APPENDIX
10.2 Project Documents

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10.2.1 Water Rights Application

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State of California
State Water Resources Control Board
DIVISION OF WATER RIGHTS
P.O. Box 2000, Sacramento, CA 95812-2000
Info: (916) 341-5300, FAX: (916) 341-5400, Web: http://www.waterrights.ca.gov

PETITION FOR CHANGE

For owners of waste water treatment plants
(WATER CODE 1211)

☐ Point of Discharge ☒ Place of Use ☒ Purpose of Use

City of San Bernardino Municipal Water Department (SBMWD)			(909) 384 - 5141
(Name of petitioner)			(Telephone - between 8 a.m. and 5 p.m.)
300 N. D. Street - 5th Floor	San Bernardino	CA	92418
(Mailing address)	(City or town)	(State)	(Zip code)

I (we)hereby petition for change(s) noted above and shown on the accompanying map and described as follows:

Point of Discharge (Give coordinate distances from section corner or other ties as allowed by Cal CR 715, and the 40-acre subdivision in which the present & proposed points lie.)
Present See Attachment A, Item No. 1
Proposed The SBMWD is not proposing to change its points of discharge.

Place of Use (If irrigation then state number of acres to be irrigated within each 40-acre tract.)
Present See Attachment A, Item No. 2
Proposed See Attachment A, Item No. 2

Purpose of Use
Present See Attachment A, Item No. 3
Proposed See Attachment A, Item No. 3

- GIVE REASON FOR PROPOSED CHANGE: See Attachment A, Item No. 4

I(we) have access to the proposed point of diversion or control the proposed place of use by virtue of ? Ownership and Written Agreement
(ownership, lease verbal or written agreement)

If by lease or agreement, state the name and address of party(s) from whom access has been obtained.

See Attachment A, Item No. 5

Give name and address of any person(s) taking water from the stream between the present point(s) of discharge and the proposed point(s) of rediversion, as well as any other person(s) known to you who may be affected by the proposed change.

Orange County Water District - See Attachment A, Item No. 6

Will this change involve water provided by a water service contract which prohibits your exclusive right to this treated water? No
(yes/no)

Will any legal user of the discharge treated waste water be affected? No - See Attachment A, Item No. 6.

I (we) declare under penalty of perjury that the above is true and correct to the best of my (our) knowledge and belief.

Dated: April 8, 2010 at San Bernardino, California

Stacey Aldstadt
Signature(s)

(909) 384 - 5141
Telephone No.

NOTE: A **$1,000 filing fee** made payable to the State Water Resources Control Board and an **$850 fee** made payable to the Department of Fish and Game must accompany this petition for change.

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demands and cut your energy costs, see our web-site at: http://waterrights.ca.gov. Additional copies of this form and water right information can be obtained at www.waterrights.ca.gov

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ENVIRONMENTAL INFORMATION FOR PETITIONS

(THIS IS NOT A CEQA DOCUMENT)

The following information will aid in the environmental review of your change petition as required by the California Environmental Quality Act (CEQA). IN ORDER FOR YOUR CHANGE PETITION TO BE ACCEPTED AS COMPLETED, ANSWERS TO THE QUESTIONS LISTED BELOW MUST BE COMPLETED TO THE BEST OF YOUR ABILITY. Failure to answer all questions may result in your change petition being returned to you, causing delays in processing. If you need more space, attach additional sheets. Additional information may be required from you to amplify further or clarify the information requested in this form.

DISCRIPTION OF CHANGES TO PROJECT

1. Provide a description of the proposed changes to your project, including but not limited to, type of construction activity, structures existing or to be built, area to be graded or excavated, changes in land use, and project operational changes, including changes in how the water will be used.

The City of San Bernardino Municipal Water Department (SBWMD) is proposing the reuse of recycled water in its service area and the marketing of surplus recycled water to water agencies outside the SBMWD service area. The SBMWD's proposed Clean Water Factory (CWF) will treat secondary effluent from the San Bernardino Water Reclamation Plant (SBWRP) to a quality approved for recharge – pursuant to the requirements of the California Department of Public Health (CDPH) and the Santa Ana Regional Water Quality Control Board (RWQCB) – and convey the recycled water to the Waterman Basins, the East Twin Creek Spreading Grounds, the Devil Canyon Basins, and the Sweetwater Basins for recharge by surface spreading. The locations of these facilities are shown in Figure 2. Recycled water spread at these facilities will recharge the Bunker Hill Groundwater Basin (Bunker Hill Basin) and, more specifically, the Bunker Hill A Management Zone, as described in the Water Quality Control Plan for the Santa Ana River Watershed (Basin Plan). The CWF will also treat a side stream of SBWRP secondary effluent to tertiary standards for unrestricted irrigation uses in the SBMWD service area. Recycled water not recharged or directly used in the SBMWD service area will be treated to tertiary standards at the existing Rapid Infiltration and Extraction (RIX) Facility with some of this recycled water discharged to the Santa Ana River and some conveyed to the Inland Empire Utility Agency (IEUA) service area. Several water agencies in the IEUA service area have expressed interest in obtaining recycled water from the SBMWD. Recycled water conveyed to the IEUA service area will be used to meet non-potable direct uses and for groundwater recharge in the Chino Basin. The reuse of the SBMWD recycled water will reduce demand for imported water in the SBMWD service area and the other areas where its recycled water will be conveyed.

"The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our Web-site at http://www.swrcb.ca.gov."
Additional copies of this form and water right information can be obtained at www.waterrights.ca.gov.

GOVERNMENTAL REQUIREMENTS

Before a final decision can be made on your change petition, we must consider the information contained in an environmental document prepared in compliance with the requirements of CEQA. If an environmental document has been prepared for your proposed changes by another agency, we must consider it. If one has not been prepared, a determination must be made as to who is responsible for the preparation of the environmental document for your change petition. The following questions are designed to aid us in that determination.

The SBMWD will be the Lead Agency for CEQA.

2. Contact your county planning or public works department for the following information:
   a. Person contacted _**N/A**_____ Date of contact _____

      Department _____ Telephone ( ) _____

   b. Assessor's Parcel No. _____

   c. County Zoning Designation _____

   d. Are any county permits required for your proposed changes? _____
      If yes, check appropriate space below:
      _____ Grading Permit, _____ Use Permit, _____Watercourse Obstruction Permit, _____ Change of Zoning, _____ General Plan Change, Other (explain):

      _____

   e. Have you obtained any of the required permits described above? _____
      If yes, provide a complete copy of each permit obtained.

3. Are any additional state or federal permits required for your proposed changes? _**Yes**_____ (i.e., from Federal Energy Regulatory Commission, U.S. Forest Service, Bureau of Land Management, Soil Conservation Service, Department of Water Resources (Division of Safety of Dams), Reclamation Board, Coastal Commission, State Lands Commission, etc.) For each agency from which a permit is required provide the following information:

   Permit type _**Water Recycling Requirments** _____

   Person (s) contacted _**N/A**_____ Agency _**Santa Ana Regional Water Quality Control Board**_

   Date of contact _**N/A**_____ Telephone (**951**) _**782 - 4130**_____

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4. Has any public agency prepared an environmental document for any aspect of your proposed changes?
_**Yes, the SBMWD.**_____

If so, please submit a copy of the latest environmental document (s) prepared, including a copy of the notice of determination adopted by the public agency. If not, explain below whether you expect that a public agency other than the State Water Resources Control Board will be preparing an environmental document for your change petition or whether the applicant, if it is a California public agency, will be preparing the environmental document for your change petition:

In 2003, the SBMWD prepared and certified a Program Environmental Impact Report titled "RIX Facility Recycled Water Sales Program" that evaluated reducing the discharge from the RIX facility to the Santa Ana River, please see Attachment B. The project described in the PEIR is similar to the project described in this Petition for Change; however, there are differences and thus a new environmental document will be prepared to evaluate the details of this specific project.

Note: When completed, please submit a copy of the final environmental document (including notice of determination) or notice of exemption to the State Water Resources Control Board. Processing of your change petition cannot proceed until such documents are submitted.

5. Will your proposed changes, during construction or operation, generate waste or wastewater containing such things as sewage, industrial chemicals, metals, or agricultural chemicals, or

Cause erosion, turbidity or sedimentation? _**No**_____ If so, explain: _____

If yes or you are unsure of your answer, contact your local Regional Water Quality Control Board for the following information (See attachment for address and telephone number):

Will a waste discharge permit be required for your petition? _**No**_____

Person contacted _____ Date of contact _____

What method of treatment and disposal will be used? _____

6. Have any archeological reports been prepared on this project, or will you be preparing an archeological report to satisfy another public agency? _**An archeological evaluation was prepared as part of the above CEQA work, please see Attachment B Section 4.14 - Cultural Resources. As part of the new environmental document for this project, an additional archeological evaluation will be prepared to cover all project locations.**_

Do you know of any archeological or historic sites located within the general project area?
___**No**_____ If so, explain: _____

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demands and cut your energy costs, see our web-site at: http://waterrights.ca.gov. Additional copies of this form and water right information can be obtained at www.waterrights.ca.gov.

ENVIRONMENTAL SETTING

7. Attach **THREE COMPLETE SETS** of color photographs, clearly dated and labeled, showing the vegetation currently existing at the following locations: **See Attachment C for the photos.**

   a. Along the stream channel immediately downstream from the proposed point(s) of diversion.
   b. Along the stream channel immediately upstream from the proposed point(s) of diversion.
   c. At the place(s) where the water is to be used.

   Note: It is very important that you submit no less than three complete sets of photographs as required above. If less than three sets are submitted, processing of your change petition will be delayed until you furnish the remaining sets!

8. From the list given below, mark or circle the general plant community types which best describe those which occur within you project area (Note: See footnote denoted by * under Question 11 below):

Tree Dominated Commuinities	Shrub Dominated Communities
Subalpine Conifer	Alpine Dwarf-Shrub
Red Fir	Low Sage
Lodgepole Pine	Bitterbrush
Mixed Conifer	Sagebrush
Sierran Mixed Conifer	Montane Chaparral
White Fir	Mixed Chaparral
Klamath Mixed Conifer	Chamise-Redshank Chaparral
Douglas-Fir	Coastal Scrub
Jeffrey Pine	Desert Succulent Shrub
Ponderosa Pine	Desert Wash
Eastside Pine	Desert Scrub
Redwood	Alkali Desert Scrub
Pinyon-Juniper	
Juniper	Herbaceous Dominated Communities
Aspen	Annual Grassland
Closed-Cone Pine-Cypress	Perennial Grassland
Montane Hardwood-Conifer	Wet Meadow
Montane Hardwood	Fresh Emergent Wetland
Valley Foothill Hardwood	Saline Emergent Wetland
Blue Oak Woodland	Pasture
Valley Oak Woodland	
Coastal Oak Woodland	Aquatic Communities
Valley Foothill Hardwood-Conifer	x Riverine
Blue Oak-Digger Pine	Lacustrine
Eucalyptus	Estuarine
Montane Riparian	Marine
Valley Foothill Riparian	
Desert Riparian	Developed Communities
Palm Oasis	Cropland
Joshua Tree	Orchard-Vineyard
	x Urban

Literature source: Mayer, K.E., and W.F. Laudenslayer, Jr., (eds). 1988. A Guide to Wildlife Habitats of California. California Department of Forestry and Fire Protection, Sacramento. 166 pp. (Note: You may view a copy of this document qt our public counter at the address given at the top of this form or you may purchase a copy by calling the California Department of Fish and Game, Wildlife Habitat Relationships (WHR) Program at (916) 653-7203).

9. Provide below an estimate of the type, number, and size (trunk/stem diameter at chest height) of trees and large shrubs that are planned to be removed or destroyed due to implementation of the proposed changes. Consider all aspects of your change petition, including changes in diversion structures, water distribution and use facilities, and changes in the place of use due to additional water development.

No trees or large shrubs will be removed or destroyed as a result of the implementation of the proposed project.

FISH AND WILDLIFE CONCERNS

10. Identify the typical species of fish which occur in the source(s) from which you propose to divert water and discuss whether or not any of these fish species or their habitat has been or would be affected by your proposed changes. (Note: See footnote denoted by * under Question 11 below):

There are no expected adverse impacts to fish, wildlife, or riparian habitat as a result of the implementation of this project. Though the City's discharge to the Santa Ana River will be decreased as a result of this project, the City will maintain some minimum discharge to the river as required by the environmental document prepared for this project.

11. Identify the typical species of riparian and terrestrial wildlife in the area and discuss whether or not any of these species and/or their habitat has been or would be affected by your proposed changes through construction of additional water diversion and distribution works and/or changes in land use in the place of water use. (Note: See footnote denoted by * below):

In the Santa Ana River System, the riparian community consists primarily of mule fat, Fremont cottonwoods, willows, salt cedars, and arundo (giant reed). Higher on the riverbanks, castor bean and Eucalyptus occur with willows, cottonwoods, and tree tobacco. Birds are the most abundant of the wildlife species within the area. These include: red-winged blackbirds, great blue herons, red-tailed hawks, great egrets, killdeers, rock doves, American crows, black phoebes, violet-green swallows, and mourning doves. Local mammals include: California ground squirrels, desert cottontails, and jackrabbits. There are no expected adverse impacts to riparian and terrestrial wildlife, and/or their habitat as a result of the implementation of this project. No water diversion structures are needed on the Santa Ana River. The conveyance facilities will be placed primarily on previously disturbed land. At the recharge facilities, fugitive grasses grow in the basins but are generally removed during yearly maintenance.

*Note: The purposes of Question 10 and 11 are to provide a preliminary assessment of the presence of typical plant and animal species in the area and whether these species might be affected by your proposed changes. Detailed site surveys to quantify populations of specific species or determine the presence of rare or endangered species may be required at a later date. It is very important that you answer these questions accurately. If you are unable to obtain appropriate answers from your local California Department of Fish and Game biologists (See attachment for address and telephone number) or you do not have adequate information or expertise to complete your answers, you should hire a fishery consultant and/or a wildlife consultant to review your project and prepare suitable answers for you. For information on available qualified fishery or wildlife consultants near you, consult your local telephone directory yellow pages under Environmental and Ecological Services, or call the California Environmental Protection Agency, Registered Environmental Assessor (REA) Program, at (916) 324-6881 or the University of California, Cooperative Extension Service (See your local telephone directory white pages).

12. Do your proposed changes involve any construction or grading-related activity which has significantly altered or would significantly alter the bed or bank of any stream or lake? **No**
If so, explain: _____

CERTIFICATION

I hereby certify that the statements I have furnished above and in the attached exhibits are complete to the best of my ability, and that the facts, statements, and information presented are true and correct to the best of my knowledge.

Date March 8, 2010 Signature Stacy Oldstadt

Attachment A

Petition for Change
City of San Bernardino Municipal Water Department (SBMWD)

Item No. 1 – Point of Discharge

Present: The SBMWD operates two wastewater treatment plants, the San Bernardino Water Reclamation Plant (SBWRP) and the Rapid Infiltration and Extraction (RIX) Facility. Both facilities are permitted by the Santa Ana Regional Water Quality Control Board (RWQCB) to discharge to the Santa Ana River per Order No. R8-2005-0074 and R8-2006-0052, respectively.

The SBWRP intermittently discharges at 2,250 ft E and 2,450 ft S of the NW 1/4 of Section 1, Township 4S, Range 22W (State Plane Coordinate is 6247482.85, 2335269.15; and the Latitude and Longitude is 34° 11' 43.4644" N and 117° 19' 57.4202" W).

The RIX discharges at 2,130 ft W and 2,560 ft N of the SE 1/4 of Section 1, Township 5S, Range 36W (State Plane Coordinate is 6226995.38, 2324350.33; and the Latitude and Longitude is 34° 2' 29.0510" N and 117° 21' 13.7167" W).

Please see Figure 1 for a map of the Santa Ana River Watershed and Figure 2 for a local map of the discharge points.

Item No. 2 – Place of Use

Present: Currently, the SBMWD discharges all of its effluent to the Santa Ana River.

Proposed: The SBMWD is proposing to use its recycled water to recharge the Bunker Hill Groundwater Basin, to meet local direct use demands, and to supply recycled water, excess to its needs, to regional partners. Recharge within the SBMWD service area will occur at the Waterman Basins, East Twin Creek Spreading Grounds, and Devil Canyon and Sweetwater Basins as shown in Figure 2. Local direct use (i.e. irrigation) will occur at sites adjacent to the SBWRP and along the Waterman Avenue corridor as shown in Figure 2. Combined, there is about 290 acres of land (i.e. parks, cemeteries, and schools) within the SBMWD service area that will be irrigated with recycled water. Recycled water in excess to SBMWD needs will be conveyed to regional partners west of the RIX facility. Figure 3 shows direct use connections and recharge sites that overlie the Chino Groundwater Basin and that currently accept recycled water from the Inland Empire Utility Agency's (IEUA) non-potable system. There are about 500 connections to IEUA's non-potable system.

Item No. 3 – Purpose of Use

Present: Currently, the SBMWD discharges all of its effluent to the Santa Ana River.

Proposed: The SBMWD is proposing to use its recycled water to recharge the Bunker Hill Groundwater Basin, to meet local direct use demands, and to supply regional partners for their direct use and recharge within the Santa Ana River Watershed.

Item No. 4 – Reason for Proposed Change

The SBMWD has begun implementing a recycled water reuse program to increase its water supply reliability and decrease its dependence on imported water, while maximizing the use of recycled water consistent with state law and policy, including but not limited to, Water Code sections 461, 13500 et seq., and 13575 et seq., Govt. Code section 65601 et seq., and the SWRCB's Recycled Water Policy.

Item No. 5 – Access to the proposed point of diversion or control of the proposed places of use.

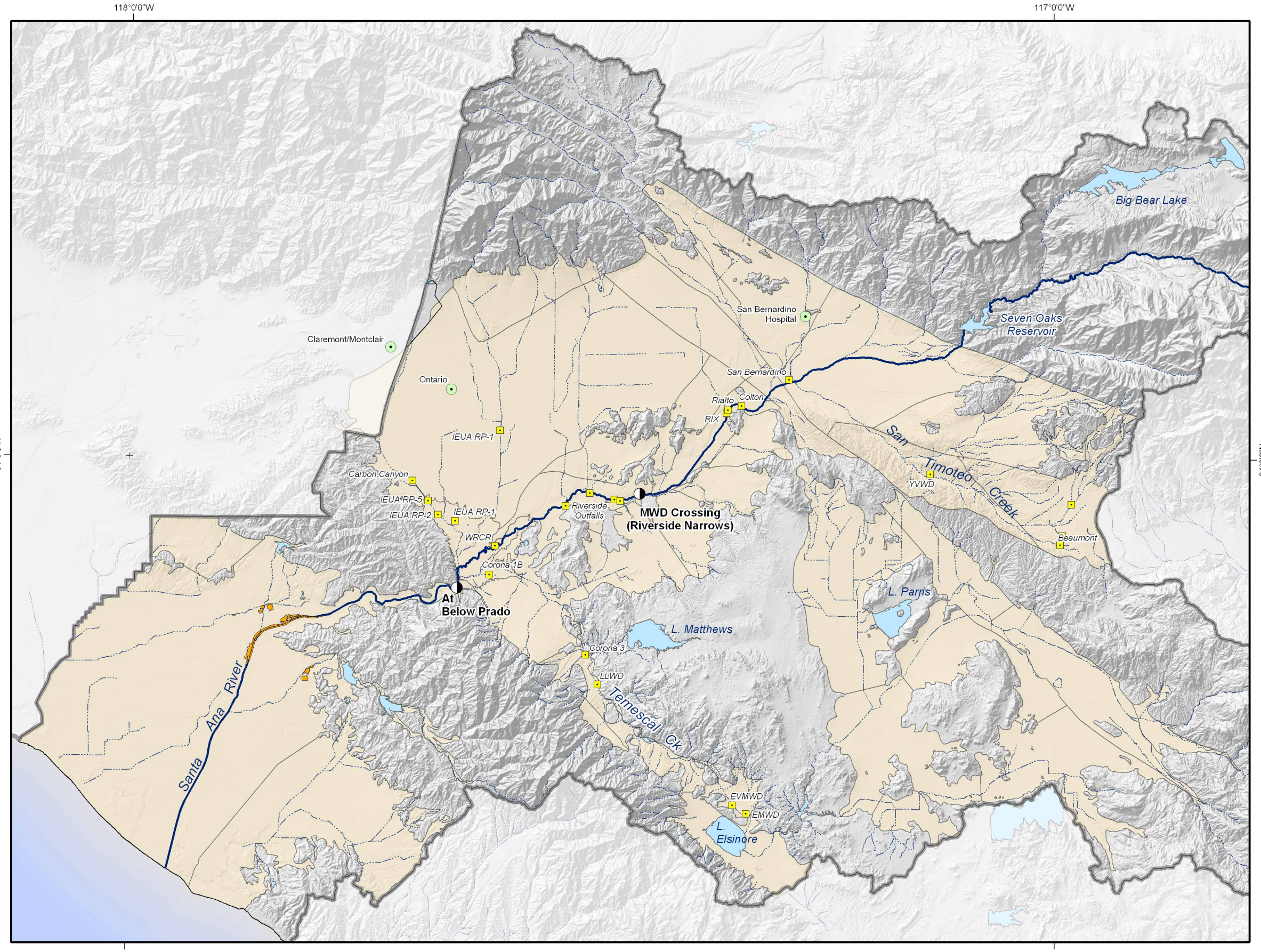
The SBMWD is proposing to divert its treated effluent (i.e. recycled water), prior to its Santa Ana River outfalls.

Recharge within the SBMWD service area will occur at the Waterman Basins, East Twin Creek Spreading Grounds, and Devil Canyon and Sweetwater Basins. These recharge facilities are owned by the San Bernardino County Flood Control District (SBCFCD). Through an agreement with SBCFCD, the SBMWD will obtain permission to use these facilities for recycled water recharge. The SBMWD will execute individual agreements with parcel owners interested in using recycled water for irrigation and with each regional partner interested in the SBMWD's recycled water.

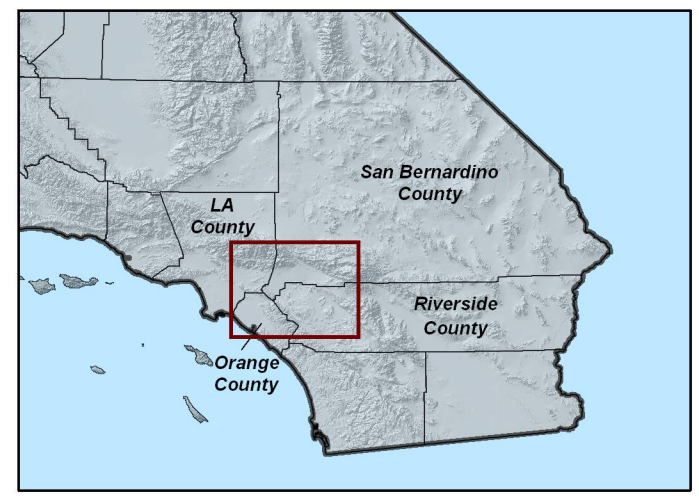
Item No. 6 – Agencies who may be affected by the proposed change.

Will any legal user of the discharge treated wastewater be affected?

The SBMWD is proposing to divert its treated effluent, prior to its Santa Ana River outfalls. There are no entities that divert water prior to SBMWD's discharge to the Santa Ana River. Orange County Water District (OCWD) may be potentially affected by the proposed change in that some of the recycled water discharged from RIX may be conveyed downstream to the OCWD service area. However, OCWD is not a legal user of the SBMWD's treated wastewater discharges



- Precipitation Station
- USGS Stream Gaging Station
- Wastewater Effluent Discharge Location
- Rivers, Creeks, and Flood Control Channels
- OCWD Forebay Recharge Facilities
- Lakes & Reservoirs
- Boundary of the Santa Ana Regional Water Quality Control Board
- Groundwater Management Zones of the Santa Ana River Watershed



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Lake Forest, CA 92630
949.420.3030
www.wildermuthenvironmental.com

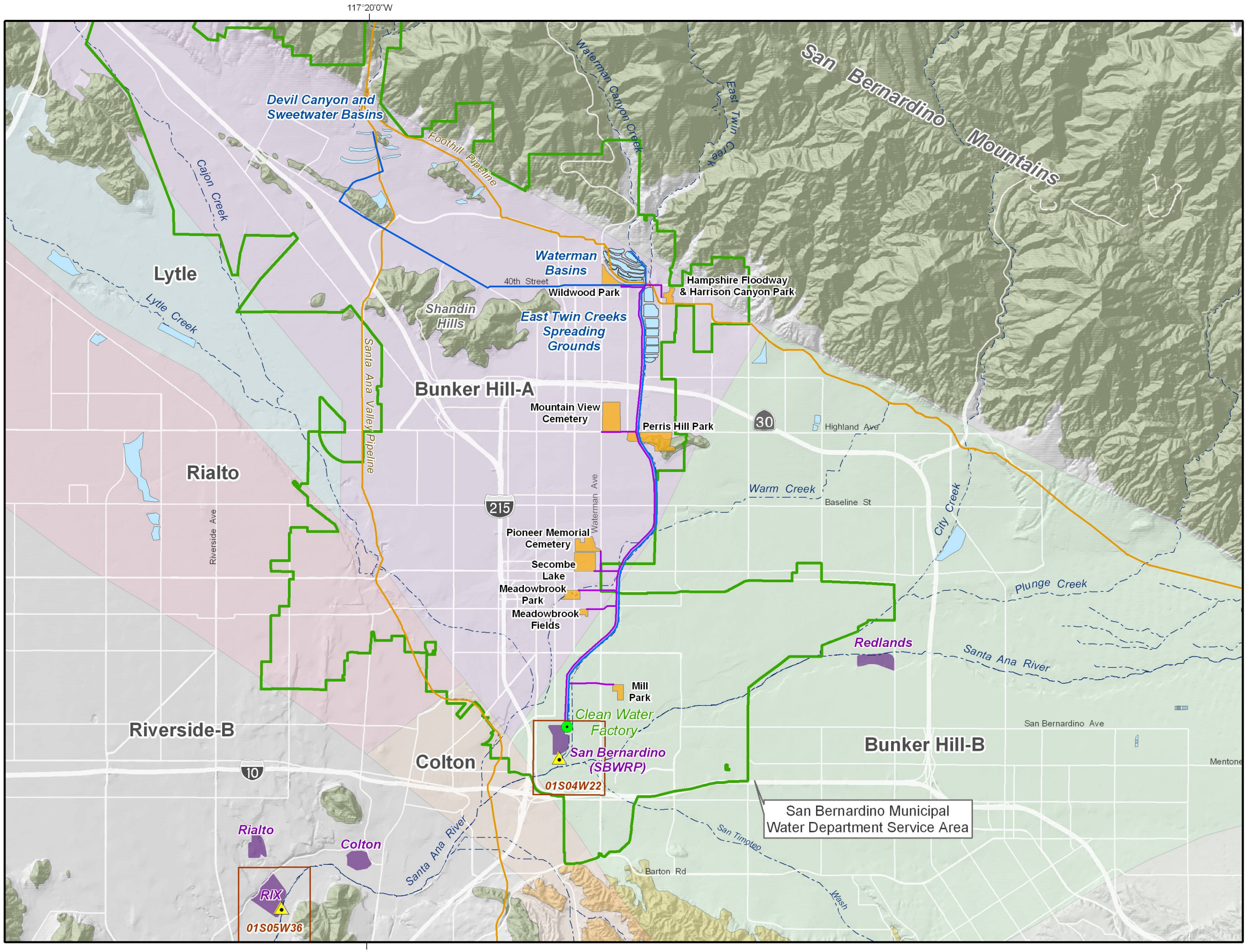
Author: AEM
Date: 20091214
File: Figure_1.mxd

0 5 10 15 Miles
0 5 10 15 20 25 KM

SBMWD's Petition for Change

Santa Ana River Watershed

Figure 1



Recharge Capacity and Local Non-Potable Demand (Acre-Ft / Year)		
Water Basins	up to	31,500
East Twin Creek Spreading Grounds	up to	41,700
Devil Canyon and Sweet Water Basins	up to	17,100
Potential Direct Users	up to	2,500
Total		**92,800**

Potential Direct Users (Acres)	
Meadowbrook Fields	6
Meadowbrook Park	18
Mill Park	15
Mountain View Cemetery	62
Perris Hill Park	70
Pioneer Memorial Cemetery	32
Secombe Lake	48
Hampshire Floodway and Harrison Canyon Park	13
Wildwood Park	24
Total	**288**

- Discharge Points
- Potential Direct Users within the SBMWD Service Area
- Water Reclamation Facility
- Proposed Recycled Water Recharge Pipelines
- Proposed Recycled Water Direct Use Pipelines
- Imported Water Pipelines
- San Bernardino County Flood Control District Recharge Facilities
- Streams, Rivers, and Flood Control Channels

Bunker Hill -A — RWQCB Management Zone



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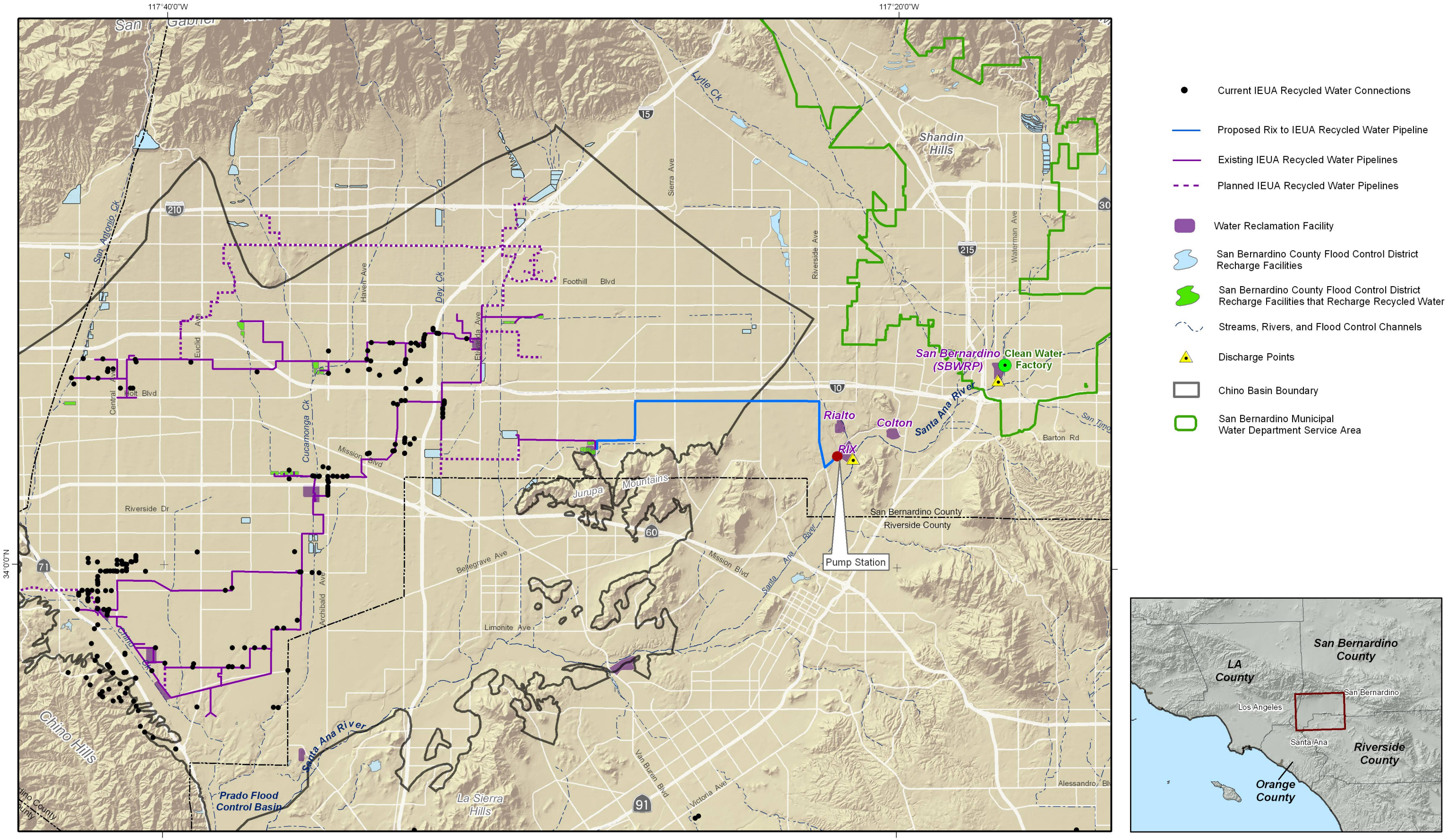
Author: MJC
Date: 201000127
File: Figure_2.mxd

0 1 2 3 4 Miles
0 2 4 6 KM

SBMWD's Petition for Change

Points of Discharge and Places of Use for the SBMWD's Recycled Water

Figure 2



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Author: MJC
Date: 201000127
File: Figure_3.mxd

SBMWD's Petition for Change

Inter-Agency Conveyance Facilities and Potential Places of Use for the SBMWD's Recycled Water

Figure 3

Attachment B

Petition for Change
City of San Bernardino Municipal Water Department (SBMWD)

Draft and Final
RIX Facility Recycled Water Sales Program
Program Environmental Impact Report
(has been included in the attached CD as a PDF)

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CITY OF SAN BERNARDINO
MUNICIPAL WATER DEPARTMENT

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DAVID S. ERICKSON
Director, Administration and Finance
JON K. TURNIPSEED
Safety Program Manager

MEMORANDUM

Date: March 10, 2003

From: City of San Bernardino Municipal Water Department

To: Distribution

Subj: Notice of Availability of a Draft Environmental Impact Report by the San Bernardino Municipal Water Department

The City of San Bernardino Municipal Water Department (Department) has prepared a Draft Environmental Impact Report (EIR) for the RIX Facility Recycled Water Use Project (SCH# 99101088) which has been prepared as the appropriate environmental determination to comply with the California Environmental Quality Act (CEQA). The Department has authorized the release of the Draft EIR document for public review and comment for this project. Because you have been identified as an interested party, a copy of the Draft EIR and related processing materials are attached for your review and comment. The period of review will be from March 12, 2003 to April 28, 2003. Written comments on the Draft EIR should be submitted to Ms. Stacey R. Aldstadt of the Department at the above address no later than April 28, 2003. Copies of the Draft EIR and referenced documents are available for review at the Department's office at 300 North "D" Street in San Bernardino, on the fifth floor.

On a date yet to be determined, the Department proposes to review and certify a Final EIR at a Department Board meeting which will discuss and possibly approve the above project.

The proposed project consists of the following: The City of San Bernardino currently discharges approximately 40 million gallons per day (mgd) from the Regional Rapid Infiltration and Extraction (RIX) Facility to the Santa Ana River. The City of San Bernardino, in conjunction with Western Water Company, intends to market the excess tertiary effluent from the RIX facility (currently estimated to be about 15 MGD, or 16,794 acre-feet per year) and sell the excess effluent for long-term beneficial uses to water users in the region. For the purpose of this environmental document, the proposed action is a Recycled Water Sale Project, of up to 18,000 acre-feet of RIX facility tertiary treated effluent, to potential water suppliers within the southern California region and support

300 North "D" Street, San Bernardino, California 92418 P.O. Box 710, 92402 Phone: (909) 384-5141
FACSIMILE NUMBERS: Administration: (909) 384-5215 Engineering: (909) 384-5532 Customer Service: (909) 384-7211
Corporate Yards: (909) 384-5260 Water Reclamation Plant: (909) 384-5258

infrastructure to delivery the water to purchasers. The RIX project site is located between La Cadena and Riverside Avenue in the City of Colton, adjacent to the Santa Ana River and project water sales may occur throughout southern California. The RIX facility exact location is in the NW 1/4 of the SE 1/4 of Section 36, T1S, R5W, SBB&M, latitude 34°02'28" and longitude 117°21'14.8" and can be found on a portion of the San Bernardino South, California 7.5' USGS Topographic Series map.

The Draft EIR concluded that implementation of the proposed RIX recycled water sales project would not cause any significant adverse impacts on the environment. Mitigation measures were identified to reduce the potential impacts for several issues, particularly water quality and biological resource issues.

You or your agency will be notified by the Department of the actual meeting date to consider the proposed project and certification of the Final EIR. The technical and environmental issues related to this project can be discussed at this meeting. Please contact Ms. Stacey R. Aldstadt if you have questions regarding the Department's review process for considering the Draft EIR.

CITY OF SAN BERNARDINO
MUNICIPAL WATER DEPARTMENT

Stacey Aldstadt

Stacey R. Aldstadt
Deputy General Manager

Notice of Completion

State of California
Office of Planning and Research
1400 Tenth Street
Sacramento, CA 95814

RIX Facility Recycled Water Use Project (SCH# 99101088)
Project Title

The RIX Facility is located between La Cadena and Riverside Avenue in the City of Colton, adjacent to the Santa Ana River
Project Location – Specific

City of Colton and other areas of southern California
Project Location – City

San Bernardino County
Project Location – County

Description of Nature, Purpose, and Beneficiaries of Project

The City of San Bernardino currently discharges approximately 40 million gallons per day (mgd) from the Regional Rapid Infiltration and Extraction (RIX) Facility to the Santa Ana River. The City of San Bernardino, in conjunction with Western Water Company, intends to market the excess tertiary effluent from the RIX facility (currently estimated to be about 15 MGD, or 16,794 acre-feet per year) and sell the excess effluent for long-term beneficial uses to water users in the region. For the purpose of this environmental document, the proposed action is a Recycled Water Sale Project, of up to 18,000 acre-feet of RIX facility tertiary treated effluent, to potential water suppliers within the southern California region and support infrastructure required to deliver the recycled water to purchasers.

City of San Bernardino Municipal Water Department
Lead Agency

N/A
Division

City of San Bernardino Municipal Water Department, 300 North "D" Street, San Bernardino, CA 92418
Address Where Copy of Initial Study is Available

March 12 , 2003 through April 28, 2003
Review Period

Ms. Stacey R. Aldstadt
Contact Person

909-384-7210
Area Code / Phone / Extension

Notice of Completion and Environmental Document Transmittal Form

Mail to: State Clearinghouse, 1400 Tenth Street, Sacramento, CA 95814 — 916/445-0613

See NOTE below

SCH # _____

1. **Project Title:** RIX Facility Recycled Water Use Project
2. Lead Agency City of San Bernardino Municipal Water Department
3. Contact Person Ms. Stacey R. Aldstadt
3a. Street Address 300 N. "D" Street, San Bernardino 92418
3b. City San Bernardino
3c. County San Bernardino County
3e. Phone 909-384-7210

Project Location The RIX project site is located between La Cadena and Riverside Avenue in the City of Colton, adjacent to the Santa Ana River and project water sales may occur throughout southern California. The RIX facility exact location is in the NW 1/4 of the SE 1/4 of Section 36, T1S, R5W, SBB&M, latitude 34°02'28" and longitude 117°21'14.8" and can be found on a portion of the San Bernardino South, California 7.5' USGS Topographic Series map.

4. County San Bernardino County
4a. City/Community Colton
4b. Assessor's Parcel No. N/A
4c. Section 36 Twp. T1S Range: R5W
5a. Cross Streets Agua Mansa Road
5b. For Rural, Nearest Community N/A
6. Within 2 miles: 6a. State Hwy Interstate 10
6b. Airports N/A
6c. Railways N/A
6d. Waterways Santa Ana River

7. Document Type

CEQA: 01. ☐ NOP; 02. ☐ Early Cons; 03. ☐ Neg Dec; 04. ☒ Draft EIR; 05. ☐ Supplement/Subsequent EIR (Prior SCH No.: _____); 06. ☐ NOE; 07. ☒ NOC; 08. ☐ NOD

NEPA: 09. ☐ NOI; 10. ☐ FONSI; 11. ☐ Draft EIS; 12. ☐ EA

OTHER: 13. ☐ Joint Document; 14. ☐ Final Document; 15. ☐ Other _____

8. Local Action Type

01. ☐ General Plan Update
02. ☐ New Element
03. ☐ General Plan Amendment
04. ☐ Master Plan
05. ☐ Annexation
06. ☐ Specific Plan
07. ☐ Community Plan
08. ☐ Redevelopment
09. ☐ Rezone
10. ☐ Land Division (Subdivision, Parcel Map, Tract Map, etc.)
11. ☐ Use Permit
12. ☐ Waste Mgmt Plan
13. ☐ Cancel Ag Preserve
14. ☒ Other: recycled water sales project

9. Development Type

01. ☐ Residential: *Units* _____ *Acres* _____
02. ☐ Office: *Sq.ft.* _____ *Acres* _____ *Employees* _____
03. ☐ Shopping/Commercial: Sq.ft. _____ Acres _____ Employees _____
04. ☐ Industrial: Sq.ft. _____ Acres _____ Employees _____
05. ☒ Water Facilities: *MGD* ~15 million gallons per day
06. ☐ Transportation: *Type* _____
07. ☐ Mining: *Mineral* _____
08. ☐ Power: *Type* _____ *Watts* _____
09. ☐ Waste Treatment: *Type* _____
10. ☐ OCS Related
11. ☐ Other: _____

10. Total Acres ~5 acres total

11. Total Jobs Created N/A

12. Project Issues Discussed in Document

01. ☒ Aesthetics/Visual
02. ☒ Agricultural Land
03. ☒ Air Quality
04. ☒ Archaeological/Historical
05. ☐ Coastal Zone
06. ☐ Economic
07. ☐ Fire Hazard
08. ☒ Flooding/Drainage
09. ☒ Geologic/Seismic
10. ☐ Jobs/Housing Balance
11. ☐ Minerals
12. ☒ Noise
13. ☒ Public Services
14. ☐ Schools
15. ☐ Septic Systems
16. ☐ Sewer Capacity
17. ☐ Social
18. ☒ Soil Erosion
19. ☒ Solid Waste
20. ☒ Toxic/Hazardous
21. ☒ Traffic/Circulation
22. ☒ Vegetation
23. ☒ Water Quality
24. ☒ Water Supply
25. ☒ Wetland/Riparian
26. ☒ Wildlife
27. ☒ Growth Inducing
28. ☐ Incompatible Land Use
29. ☐ Cumulative Effects
30. ☐ Other _____

13. Funding (approx.) Federal $ N/A **State** N/A **Total $** N/A

14. Present Land Use and Zoning: N/A

15. Project Description The City of San Bernardino currently discharges approximately 40 million gallons per day (mgd) from the Regional Rapid Infiltration and Extraction (RIX) Facility to the Santa Ana River. The City of San Bernardino, in conjunction with Western Water Company, intends to market the excess tertiary effluent from the RIX facility (currently estimated to be about 15 MGD, or 16,794 acre-feet per year) and sell the excess effluent for long-term beneficial uses to water users in the region. For the purpose of this environmental document, the proposed action is a Recycled Water Sale Project, of up to 18,000 acre-feet of RIX facility tertiary treated effluent, to potential water suppliers within the southern California region and support infrastructure required to deliver the recycled water to purchasers.

16. Signature of Lead Agency Representative Stacy Aldstadt **Date** 3-10-03

Reviewing Agencies

- [x] Resource Agency
- [ ] Boating / Waterways
- [x] Conservation
- [x] Fish and Game
- [ ] Forestry
- [ ] Colorado River Board
- [x] Dept. Water Resources
- [x] Reclamation
- [ ] Parks and Recreation
- [ ] Office of Historic Preservation
- [ ] Native American Heritage Commission
- [ ] S.F. Bay Cons. And Dev't. Commission
- [ ] Coastal Commission
- [ ] Energy Commission
- [ ] State Lands Commission
- [x] Air Resources Board
- [ ] Solid Waste Management Board
- [x] SWRCB: Sacramento
- [x] RWQCB: Region # 8
- [x] Water Rights
- [x] Water Quality
- [x] Caltrans District 8
- [ ] Dept. of Transportation Planning
- [ ] Aeronautics
- [ ] California Highway Patrol
- [ ] Housing and Community Dev't.
- [ ] Statewide Health Planning
- [x] Health
- [ ] Food and Agriculture
- [ ] Public Utilities Commission
- [ ] Public Works
- [ ] Corrections
- [ ] General Services
- [ ] OLA
- [ ] Santa Monica Mountains
- [ ] TRPA
- [ ] OPR — OLGA
- [ ] OPR — Coastal
- [ ] Bureau of Land Management
- [ ] Forest Service
- [ ] Other _____
- [ ] Other _____

For SCH Use Only:

Date Received at SCH _____ Catalog Number _____

Date Review Starts _____ Applicant _____

Date to Agencies _____ Consultant _____

Date to SCH _____ Contact _____ Phone _____

Clearance Date _____ Address _____

Notes: _____

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Volume 1

RIX FACILITY RECYCLED

WATER SALES PROGRAM

PROGRAM ENVIRONMENTAL IMPACT REPORT

Prepared for:

City of San Bernardino
Municipal Water Department
300 North "D" Street, 5th Floor
San Bernardino, California 92418

Prepared by:

Tom Dodson & Associates
2150 North Arrowhead Avenue
San Bernardino, California 92405

March 2003

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Abbreviations and Acronyms

AAM	Annual Arithmetic Meter
ADT	average daily traffic
afy	acre-feet per year
AGM	Annual Geometric Mean
APCD	Air Pollution Control Districts
APE	Area of Potential Effect
AQMD	Air Quality Management District
AQMP	Air Quality Management Plan
BACT	Best Available Control Technology
BNSF	Burlington Northern Santa Fe
BOD	biochemical oxygen demand
BP	before present
CAA	Clean Air Act
CAAQS	California ambient air quality standards
Cal/OSHA	California Occupational Safety and Health Administration
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CCAA	California Clean Air Act
CCR	California Code of Regulations
CCWD	Cucamonga County Water District
CDFG	California Department of Fish and Game
CEC	Chadwick Ecological Consultants, Inc.
CEQA	California Environmental Quality Act
cfs	cubic feet per second
CHP	California Highway Patrol
CMP	Congestion Management Plan
CNEL	Community Noise Equivalent Level
CO	carbon monoxide
COE	U.S. Army Corps of Engineers
dB	decibel
dBA	A-weighted decibel
DHS	California Department of Health Services
DOT	U.S. Department of Transportation
DTSC	Department of Toxic Substances Control

Abbreviations and Acronyms (continued)

EIR	Environmental Impact Report
EPA	U.S. Environmental Protection Agency
FAA	Federal Aviation Administration
Fed/OSHA	Federal Occupational Safety and Health Administration
FEIR	Final Environmental Impact Report
gpm/sf	gallons per minute per square foot
HAPs	hazardous air pollutants
HI	hazard index
HOV	high occupancy vehicle
HWCL	Hazardous Waste Control Law
IEUA	Inland Empire Utilities Agency
JCSD	Jurupa Community Services District
L_{dn}	Day-Night Noise Level
L_{eq}	Equivalent Noise Level
LOS	Level of Service
MBC	MBC Applied Environmental Sciences
MGD	million gallons per day
MICR	maximum individual cancer risk
mph	miles per hour
MPN	Most Probable Number
MSDSs	Material Safety Data Sheets
MWDSC	Metropolitan Water District of Southern California
NAHC	Native American Heritage Commission
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NESHAPS	National Emission Standards for Hazardous Air Pollutants
NH3	Un-ionized ammonia
NHPA	National Historic Preservation Act
NIH	National Institutes of Health
NOP	Notice of Preparation
NPDES	National Pollutant Discharge Elimination System
NRC	Nuclear Regulatory Commission
NSPS	new stationary performance sources
NTU	nephelometric turbidity unit
NWQAP	National Water Quality Assessment

Abbreviations and Acronyms (continued)

O_3	ozone
OCWD	Orange County Water District
OSHA	Occupational Safety and Health Administration
Pb	lead
PEIR	Program Environmental Impact Report
$PM_{2.5}$	particulate matter less than 2.5 microns
PM_{10}	particulate matter less than 10 microns
ppm	parts per million
RCFCD	Riverside County Flood Control District
RCRA	Resource Conservation and Recovery Act
RCPG	Regional Comprehensive Plan and Guide
RIX	Rapid Infiltration and Extraction
ROGs	reactive organic gases
RTP	Regional Transportation Plan
RMP	Regional Mobility Plan
RWQCB	Regional Water Quality Control Board, Santa Ana Region
SANBAG	San Bernardino Association of Governments
SAR	Santa Ana River
SARA	Superfund Amendments & Reauthorization Act
SARWQCB	Santa Ana Regional Water Quality Control Board
SAWPA	Santa Ana Watershed Project Authority
SBCFCD	San Bernardino County Flood Control District
SBCM	San Bernardino County Museum
SBVMWD	San Bernardino Valley Municipal Water District
SBMWD	San Bernardino Municipal Water Department
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison
SIP	State Implementation Plan
SO_2	sulfur dioxide
SoCAB	South Coast Air Basin
SR	State Route
SWPPP	Storm Water Pollution Prevention Plans

Abbreviations and Acronyms (continued)

TACs	Toxic air contaminants
TDA	Tom Dodson & Associates
TDS	Total Dissolved Solids
TIN	total inorganic nitrogen
TOC	total organic carbon
tpy	tons per year
UFC	Uniform Fire Code
$\mu g/m^3$	milligrams per cubic meter
USFWS	U.S. Fish and Wildlife Service
UV	Ultraviolet
WDR	Waste Discharge Requirements
WET	Whole Effluent Toxicity
WLAM	Wasteload Allocation Model
WRCOG	Western Riverside Council of Governments
WRR	Water Reclamation Requirements

CHAPTER 1 – EXECUTIVE SUMMARY

1.1 INTRODUCTION

The City of San Bernardino Municipal Water Department (SBMWD) is considering the sale of recycled water from its Regional Rapid Infiltration and Extraction (RIX) Facility to a private water wholesaler. The RIX Facility currently discharges approximately 40 million gallons of recycled water per day (MGD). The operator of the Water Sales Project is the City of San Bernardino Municipal Water Department. The Marketing Manager is envisioned to be Western Water Company. Under the proposed agreement, the City would deliver up to 18,000 acre-feet of recycled water per year (afy) to future customers, with a maximum delivery of 360,000 acre-feet over a 20-year period. Only the City of San Bernardino component of the RIX effluent is considered in this project.

SBMWD currently estimates that it has about 15 mgd, about 16,794 acre-feet per year, that can be considered excess tertiary effluent from the RIX facility For the purpose of this environmental document, the proposed action is a Recycled Water Sale Project, of up to 18,000 acre-feet of RIX facility tertiary treated effluent, to potential water suppliers within the southern California region. Thus, the physical change in the environment that would result from this proposed project is the diversion of up to 15 MGD initially (about 41 acre-feet per day and 16.27 MGD ultimately, about 50 acre-feet per day) from the current 40 MGD recycled water (~123 acre-feet per day, or 44,895 afy) flow discharged at the RIX facility to the Santa Ana River, leaving a continuous flow of about 25 MGD (~76.8 acre-feet per day or 28,033 afy). Facilities would be installed to divert the discharge, a flow-splitter and possible reservoir and a pump station and pipelines to transport the flows. The recycled water sold to end users could be used directly (irrigation or industrial processes) or indirectly (recharged into local aquifers for future extraction and use).

The proposed RIX Facility Recycled Water Use Project is a public works project that will be funded and implemented by the City of San Bernardino Municipal Water Department, and other local and regional agencies that may purchase the recycled water produced by the RIX Facility. No entitlements are required to implement this project, but some regulatory permits may be required. Based on the nature of the project and the issues identified in the Initial Study-Notice of Preparation process, the City of San Bernardino has determined that construction and operation of the facilities proposed could result in significant adverse environmental impacts. In order to use this baseline environmental document for future projects, a comprehensive, program environmental impact report (PEIR) has been prepared.

Thus, this PEIR has been prepared to address all of the physical changes to the environment that could result from implementing the RIX Facility Recycled Water Use Project. All comment letters and a summary of comment contents is included as Appendix 8.1. The PEIR addresses these comments as part of the evaluation for each of the issues summarized below. A copy of the Notice of Preparation for the proposed project is provided in this document as Appendix 8.1 of Chapter 8 of this PEIR.

1.2 SUMMARY OF ENVIRONMENTAL ANALYSIS

A summary of the environmental findings and mitigation measures in this Environmental Impact Report is contained in Table 1.2-1 which begins on the following page. The summary shows that the proposed project will not cause any unavoidable adverse environmental impacts if implemented as described in the this document. Some environmental impacts caused by the project are nonsignificant without any mitigation. Most of the impacts described in the following table and in the analysis in Chapter 4 are required to be mitigated to less than significant levels with implementation of recommended mitigation measures.

TABLE 1.2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Category/Issue	Impact Description	Mitigation Measures	Impact After Mitigation
Land Use	a. The project causes an unavoidable conflict with a general plan land use designation or zoning classification. b. The project conflicts with, or is inconsistent with, applicable environmental plans or policies adopted by agencies with jurisdiction over the project to the extent that the conflict is unavoidable and unresolvable	No mitigation required	Less than significant impact
	c. Cause incompatibilities with existing land use in the vicinity.	4.1-1 Following selection of alternative sites for construction of future facilities, each site shall be evaluated for potential incompatibility with adjacent existing or proposed land uses. Where pumping or other operations can create significant incompatibilities (lighting, noise, traffic, etc.) with adjacent uses, an alternative site shall be selected, or a technical report shall be prepared that identifies the specific measures that will be utilized to reduce potential incompatible activities or effects to below thresholds established in the general plan for the jurisdiction where the facility will be located.	Less than significant impact
	d. Affect agricultural resources or operations.	4.1-2 Where future facilities are proposed on locations that support agricultural operations on important farmlands, where feasible, alternative sites shall be selected that do not occupy such acreage (unless agricultural operations have already been terminated).	Less than significant impact

TABLE 1.2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Category/Issue	Impact Description	Mitigation Measures	Impact After Mitigation
Land Use (continued)	e. Implementation of the proposed project disrupt or divide the physical arrangement of an established community (including a low-income or minority community)?	No mitigation required	Less than significant impact
	f. Implementation of project cause significant displacement or loss of acreage that could be used for development?		
	g. Implementation of the proposed project cause or contribute to significant growth inducement?		
	Cumulative	No mitigation required	Less than significant impact
Population and Housing	a. Remove existing housing (including affordable housing) as verified by a site survey/evaluation.	No mitigation required	Less than significant impact
	b. Create a significant demand for additional housing based on the proposed use and evaluation of project size.		
	c. Induce substantial growth in an area either directly or indirectly (e.g. through projects in an undeveloped area or an extension of major infrastructure).		
Geology and Soils	a. Expose people or structures to potential to potential substantial adverse effects involving rupture of a known earthquake fault, or seismic-elated ground failure, or landslides?	4.3-1 A site-specific evaluation shall be conducted for all structures in conformance with the California Department of Conservation, Division of Mines and Geology Special Publication 117, Guidelines for Evaluation and Mitigating Seismic Hazards in California.	Less than significant impact

TABLE 1.2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Category/Issue	Impact Description	Mitigation Measures	Impact After Mitigation
Geology and Soils (continued)		4.3-2 If evidence of faulting is identified at any specific facility site, then a further site-specific evaluation shall be conducted in conformance with the California Department of Conservation, Division of Mines and Geology Note 49, Guidelines for Evaluating the Hazard of Surface Fault Rupture. Facility location and design will be adjusted as necessary to provide structural setbacks. Additional measures may include strengthened foundations, other engineering design, and flexible utility connections. 4.3-3 Apply appropriate design and construction criteria to all structures subject to significant seismic ground shaking. 4.3-4 If evidence of liquefaction is identified at any facility sites, particularly those in identified hazard zones near the Santa Ana River, mitigation may include: • In-situ densification of susceptible soil. • Ground improvements such as removal and replacement of susceptible soils or dewatering. • Deep foundations designed to accommodate liquefaction. • Shallow foundation design to accommodate vertical and lateral ground displacement. 4.3-5 Comprehensive geotechnical investigations shall be required prior to engineering and design development or structural and/or substantial rehabilitation of structures identified under Risk Class I & II, e.g., public facilities, as identified below:	Less than significant impact

TABLE 1.2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Category/Issue	Impact Description	Mitigation Measures	Impact After Mitigation
Geology and Soils (continued)		4.3-5 (cont.) • Risk Class I & II, Structures Critically Needed after Disaster: Structures that are critically needed after a disaster include important utility centers, fire stations, police stations, emergency communication facilities, hospitals, and critical transportation elements such as bridges and overpasses and smaller dams. Acceptable Damage: Minor non-structural; facility should remain operational and safe, or be suitable for quick restoration of service. • Risk Class III: High occupancy structures; uses are required after disasters (i.e., places of assembly such as schools and churches). Acceptable Damage: Some impairment of function acceptable; structure needs to remain operational. • Risk Class IV, Ordinary Risk Tolerance: The vast majority of structures in urban areas; most commercial and industrial buildings, small hotels and apartment buildings, and single family residences. Acceptable Damage: An "ordinary" degree of risk should be acceptable. The criteria envisioned by the Structural Engineers Association of California provide the best definition of the "ordinary" level of acceptable risk. These criteria require that buildings be able to: a. Resist minor earthquakes without damage; b. Resist moderate earthquakes without structural damage, but with some non-structural damage; or	

TABLE 1.2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Category/Issue	Impact Description	Mitigation Measures	Impact After Mitigation
Geology and Soils (continued)		4.3-5 (cont.) c. Resist major earthquakes, of the intensity or severity of the strongest experienced in California, without collapse, but with some structural, as well as non-structural damage. • Risk Class V, Moderate to High Risk Tolerance: Open space uses, such as farms, ranches and parks without high occupancy structures; warehouses with low intensity employment; and the storing of non-hazardous materials. Acceptable Damage: Not applicable. 4.3-6 All structures previously identified in categories III through V shall be designed in accordance with the applicable multiplier factor seismic design provisions of the Seismic Safety Report to promote safety in the event of an earthquake. 4.3-7 The direct impacts of faults upon proposed projects shall be considered during preliminary planning processes, and the engineering design phases. 4.3-8 All rehabilitation and new development projects implemented as a result of the proposed project shall be built in accordance with current and applicable Uniform Building Code (UBC) standards and all other applicable City, County, State and Federal laws, regulations and guidelines, which may limit construction and site preparation activities such as grading, and shall make provisions for appropriate land use restrictions, as deemed necessary, to protect residents and others from potential environmental safety hazards, either seismically induced or those resulting from other conditions such as inadequate soil conditions, which may exist in the proposed project's area of potential impact.	

TABLE 1.2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Category/Issue	Impact Description	Mitigation Measures	Impact After Mitigation
Geology and Soils (continued)		4.3-9 Local grading and building codes that reflect measures to minimize possible seismic damage shall be considered in geotechnical reports prepared for future projects. 4.3-10 If a conjunctive use program is implemented that would bring water levels up to a level that significantly increases the risk of liquefaction, a more detailed monitoring and geologic study focused on this issue will be conducted to determine whether or not liquefaction poses a hazard to surface structures and to human safety. If such a study finds the impacts to be significant, the volume of water permitted to be stored in the particular groundwater basin will be decreased sufficiently until a water level is achieved that does not pose any significant hazard to surface structures or people.	
	b. Substantial soil erosion or the loss of topsoil.	4.3-11 Add protective covering of mulch, straw or synthetic material (erosion control blankets, tacking will be required) to disturbed areas exposed to direct precipitation or concentrated surface runoff. 4.3-12 Limit the amount of area disturbed and the length of time slopes and barren ground are left exposed. For pipeline installation, soil shall be compacted to a ground surface level similar to pre-construction conditions. 4.3-13 Construct diversion dikes and interceptor ditches to divert water away from construction areas. 4.3-14 Install slope drains (conduits) and/or water-velocity-control devices to reduce concentrated high-velocity streams from developing.	Less than significant impact

TABLE 1.2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Category/Issue	Impact Description	Mitigation Measures	Impact After Mitigation
Geology and Soils (continiued)	c. Located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project	4.3-15 Any pipelines crossing the certain areas, such as the western portion of the Prado Basin, could be subject to subsidence and ground rupture associated with the subsidence. Any construction of facilities in or pipelines crossing such zones is required to have detailed geotechnical and structural engineering studies to ensure designs that can safely accommodate, per building code requirements, the described ground movement(s). 4.3-16 Continue to identify and study subsidence hazards and susceptible areas, and propose mitigation technology that is appropriate to the findings of the monitoring study. The implementation of Water Sales Program facilities shall not in any way contribute to subsidence conditions in pre-existing subsidence zones. Implementation will not cause or contribute to any new, significant subsidence impacts greater than a total of six inches in magnitude over the planning period. Impacts less than six inches in new areas are considered to be less than significant.	Less than significant impact
	d. Located on expansive soil, creating substantial risks to life or property.	4.3-17 Excavation and removal or recompaction of expansive soils shall be conducted for facilities at sites identified as having such constraints.	Less than significant impact
	Cumulative	No mitigation required	Less than significant impact

TABLE 1.2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Category/Issue	Impact Description	Mitigation Measures	Impact After Mitigation
Water Resources / Hydrology and Water Quality	a. Violate any water quality standards or waste discharge requirements.	4.4-1 SBMWD will provide adequate notice to purchaser if recycled water delivered does not meet Title 22 requirements, particularly coliform. SBMWD will provide all information available for TDS and TIN for determining groundwater recharge needs (such as long-term or corrective blending requirements) in affected groundwater basins. Prior to delivery of recycled water, the purchasing agency shall provide SBMWD with a report that verifies RIX recycled water will not cause significant water quality degradation or violation of water quality objectives for the use location. 4.4-2 SBMWD will advise other agencies as needed in the engineering studies and standards for specific facilities developed under the program. Restoration of pre-existing conditions will be the minimum goal for surface runoff control. Copies of studies demonstrating compliance with standards shall be provided to SBMWD for review and retention.	Less than significant impact
	b. Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted). c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation onsite or offsite.	No mitigation required	Less than significant impact

TABLE 1.2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Category/Issue	Impact Description	Mitigation Measures	Impact After Mitigation
Water Resources / Hydrology and Water Quality (continued)	d. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding onsite or offsite.	No mitigation required	Less than significant impact
	e. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.	4.4-3 For each project construction site, a SWPPP shall be prepared and implemented. Each plan shall identify the specific best management practices that will be used for the site to control pollutant discharges to a 60-percent or greater removal of sediment and other pollutants. In addition, the SWPPP shall identify those measures required to control accidental releases of chemicals or materials that could degrade water quality. Any accidental releases shall be cleaned up; the contaminated material properly disposed of; and the site returned to pre-discharge condition, or in full compliance with regulatory limits for the discharged material.	Less than significant impact
	f. Otherwise substantially degrade water quality.	4.4-4 Pursuant to proposed DHS regulations, an engineering report must be submitted for each planned recycled water recharge project. The engineering report will include, at a minimum, a hydrogeologic study that will evaluate and describe, in detail, the vertical and horizontal extent of the underground zone that defines six months of underground retention of the applied recycled water and the 500 foot horizontal buffer zone around the recharge facility.	Less than significant impact
	Cumulative Impact	No mitigation required	Less than significant impact

TABLE 1.2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Category/Issue	Impact Description	Mitigation Measures	Impact After Mitigation
Air Quality	a. Violate any air quality standard or contribute substantially to an existing or projected air quality violation	4.5-1 Limit construction equipment use to a mix of equipment that is substantially the same as that used for the estimation of pollutant emissions. 4.5-2 All equipment shall be properly tuned and maintained in accordance with manufacturer's specifications. 4.5-3 General contractors shall maintain and operate construction equipment so as to minimize exhaust emissions. 4.5-4 During construction, trucks and vehicles in loading and unloading queues would be kept with their engines off, when not in use, to reduce vehicle emissions. 4.5-5 Construction activities should be phased and scheduled to avoid emissions peaks and discontinued during second-stage smog alerts. 4.5-6 Water active grading sites at least twice daily and when dust is observed migrating from the site. 4.5-7 Suspend all grading and excavation operations when wind speeds exceed 25 mph. 4.5-8 Apply non-toxic chemical soil stabilizers according to manufacturers specifications to inactive construction areas (previously graded areas inactive for 10 days or more). 4.5-9 Replace ground cover or pave disturbed areas immediately after construction is completed in the affected area. 4.5-10 Sweep streets once per day and when soil material is observed on traveled roadways.	Less than significant impact

TABLE 1.2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Category/Issue	Impact Description	Mitigation Measures	Impact After Mitigation
Air Quality (continued)	b. Expose sensitive receptors to substantial pollutant concentrations.	No mitigation required	Less than significant impact
	c. Create objectionable odors affecting a substantial number of people.		
	Cumulative	No mitigation required	Less than significant impact
Transportation / Circulation	b. Exceed a level of service standard established by the County.	4.6-1 For each facilities development project that will increase trip generation by more than 50 vehicles during peak hour, the implementing agency shall prepare a traffic study that evaluates the impacts of this traffic on the local circulation system and identify project-specific or fair-share mitigation to maintain peak hour level of service at LOS "E" or better.	Less than significant impact
	a. Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system.	4.6-2 The implementing agency shall require the construction contractor to provide adequate traffic management resources during construction (signing, protective devices, flag persons, etc.) to maintain the safe flow of traffic, particularly emergency access, on local streets at all times. 4.6-3 During construction, the implementing agency shall require traffic hazards for vehicles, bicycles, and pedestrians to be adequately identified and such traffic controlled to minimize hazards. 4.6-4 The implementing agency shall require the construction contractor to ensure that no open trenches or traffic safety hazards be left in roadways during period of time when construction personnel are not present (nighttime, weekends, etc.), without appropriate signing and protection to minimize hazards.	Less than significant impact

TABLE 1.2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Category/Issue	Impact Description	Mitigation Measures	Impact After Mitigation
Transportation / Circulation (continued)		4.6-5 The implementing agency shall require all roads to be repaired adequately after construction activities to ensure that traffic can move in the same manner as before construction without damage to vehicles.	
	b. Exceed a level of service standard established by the County.	4.6-6 The implementing agency shall emphasize transportation demand management or non-motorized transportation alternatives for specific project-related employees, to reduce demand for roadway use. If projects are not already identified in the agency's transportation management plans, they shall be included.	Less than significant impact
	d. Increase hazards due to a design feature or incompatible uses.	4.6-7 Roadway improvements to eliminate or reduce any circulation system impacts or traffic hazards, as associated with access to a permanent facility, shall be mitigated in accordance with standard agency requirements or prudent circulation system planning requirements. Strategies than can be considered for application include the following: • signalization, signing and striping improvements, • additional through or turn lanes as dictated by volume, • additional storage area for vehicle queuing (i.e., right-and left-turn bays), • increasing curb radii to accommodate higher turning radius trucks, • pavement/roadbed improvements, • widening to provide sufficient land widths for trucks, and • improvements to enhance sight distances. 4.6-8 The implementing agency shall conduct a detailed operational analysis for selected final site locations and, as necessary, develop conceptual design plans to accommodate specific facility traffic. The conceptual design plans should be oriented toward facilitating the movement of large trucks at facility driveways and nearby intersections.	Less than significant impact

TABLE 1.2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Category/Issue	Impact Description	Mitigation Measures	Impact After Mitigation
Transportation / Circulation (continued)		4.6-9 The implementing agency shall conduct addition analyses for each facility on the availability of rights-of-way, adjacent land uses and locations of driveways, existing improvement plans, roadway cross-sections and unique characteristics or needs for each project.	
	c. Result in a change in rail, waterborne or air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks.	4.6-10 Any facilities developed under the program that are near airports will be evaluated for maintenance of access to airports and also reduction/elimination of any hazards to airport operations. Special mitigation to ensure access and prevent hazards will be incorporated into the project design.	Less than significant impact
	e. Result in inadequate emergency access. f. Result in inadequate parking capacity. g. Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks).	No mitigation required	Less than significant impact
	Cumulative	No mitigation required	Less than significant impact
Biological Resources	a. Substantial adverse direct or indirect affect on any species identified as a candidate, sensitive or special status species.	4.7-1 SBMWD will develop thresholds for corrective actions and management activities to minimize the take of suckers, building upon the adaptive management strategy for periodic operational shutdowns of the RIX facility. Particular attention will be paid to the spawning areas and period (March-May) of those populations downstream to MWD crossing. Flow reductions will not result in discharges less than 40 cfs or less than those produced prior to RIX operations during the spawning period. This value is considered conservative and will hold until additional data on overall stream hydrology and ecology are defined.	Less than significant impact

TABLE 1.2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Category/Issue	Impact Description	Mitigation Measures	Impact After Mitigation
Biological Resources (continued)		4.7-2 SBMWD will participate in any ongoing river studies of the arroyo chub and derive any management activities for the Santa Ana sucker in context of potential improvements for chub populations.	
	b. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service. Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption or other means. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.	No mitigation required	Less than significant impact
	c. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.	4.7-3 The Biological Resources Overlays contained in the General Plans of Riverside County or San Bernardino County will be examined for identified special habitats for each facility to be developed under the program. For projects within such habitats, a biological survey will be conducted when any resources may be impacted by a proposed project, with a subsequent report prepared by a qualified biologist. The report will include identification of site-specific resources, mitigation measures to eliminate or reduce impacts to any sensitive species or communities	Less than significant impact

TABLE 1.2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Category/Issue	Impact Description	Mitigation Measures	Impact After Mitigation
Biological Resources (continued)		4.7-3 (cont.) (Note: Riverside County prefers non-disturbance, whereas San Bernardino County will allow disturbance if enhancement of populations/habitats is also a mitigation measure), and a mitigation monitoring program.	
	d. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	No mitigation required	Less than significant impact
	e. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.		
	Cumulative	No mitigation required	Less than significant impact
Energy and Mineral Resources	a. Prevents access to mineral resources or create a demand for energy that exceeds the commercial capacity to provide energy resources.	4.8-1 All pumping of recycled water shall occur during off-peak hours, unless a project specific evaluation of electricity demand demonstrates that it will not cause or contribute to cumulative significant impacts on the electricity generation or distribution systems.	Less than significant impact
	Cumulative	No mitigation required	Less than significant impact
Hazards and Risk of Upset	a. Use, store, transport or dispose of hazardous or toxic materials (including, but not limited to, oil, pesticides, chemicals or radiation).	4.9-1 All contaminated material encountered during construction, particularly excavation, shall be delivered to a licensed treatment, disposal or recycling facility that has the appropriate systems to manage the contaminated material without significant impact on the environment.	Less than significant impact

TABLE 1.2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Category/Issue	Impact Description	Mitigation Measures	Impact After Mitigation
Hazards and Risk of Upset (continued)		4.9-2 Before determining that an area contaminated as a result of an accidental release is fully remediated, specific thresholds of acceptable clean-up shall be established and sufficient samples shall be taken within the contaminated area to verify that these clean-up thresholds have been met.	
	b. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste	No mitigation required	Less than significant impact
	c. Expose people to a potential safety hazard. d. Impair implementation or physically interfere with an adopted emergency response or evacuation plan.	4.9-3 During construction activities within existing road rights-of-way or other easements where continuous access is required, a road operation management plan shall be prepared and implemented. At a minimum this plan shall define how to minimize the amount of time spent on construction activities; how to minimize disruption of vehicle and alternative modes of traffic at all times, but particularly during periods of high traffic volumes; adequate signage and other controls, including flagpersons, to ensure that traffic can flow adequately during construction; the identification of alternative routes that can meet the traffic flow requirements of a specific area, including communication (signs, webpages, etc.) with drivers and neighborhoods where construction activities will occur; and at the end of each construction day roadways shall be prepared for continued utilization without any significant roadway hazards remaining.	Less than significant impact

TABLE 1.2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Category/Issue	Impact Description	Mitigation Measures	Impact After Mitigation
Hazards and Risk of Upset (continued)		4.9-4 To the extent feasible, installation of pipelines or other construction activities in support of the Water Sales Program shall not be located on major evacuation or emergency response routes within any affected communities. Where construction on such routes is necessary, local emergency response providers shall be contacted and emergency access and evacuation requirements shall be maintained at a level sufficient to meet their needs.	
	e. Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.	No mitigation required	Less than significant impact
	Cumulative	No mitigation required	Less than significant impact
Noise	a. Result in the development of housing, health care facilities, schools, libraries, religious facilities or other noise sensitive uses in areas where existing or future noise levels exceed an Ldn of 65 dB(A) exterior and an Ldn of 45 dB(A) interior b. result in the development of new or expansion of existing industrial, commercial or other uses which generate noise levels above an Ldn of 65 dB(A) exterior or an Ldn of 45 dB(A) interior that may affect areas containing housing, schools, health care facilities or other sensitive uses	No mitigation required	Less than significant impact

TABLE 1.2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Category/Issue	Impact Description	Mitigation Measures	Impact After Mitigation
Noise (continued)	c. Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance.	4.10-1 Construction shall be limited to the hours of 7 a.m. to 7 p.m. on Monday through Friday, and between 9 a.m. to 6 p.m. on Saturday increase with sensitive receptors, and shall be prohibited on Sundays and federal holidays except in emergencies.	Less than significant impact
	d. Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.	4.10-2 Utilize construction methods or equipment that will provide the lowest level of noise impact, i.e., use newer equipment that will generate lower noise levels.	
	f. Substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.	4.10-3 All construction vehicles and fixed or mobile equipment shall be equipped with properly operating and maintained mufflers.	
		4.10-4 Schedule the construction such that the absolute minimum number of equipment would be operating at the same time.	
		4.10-5 Maintain good relations with the school and community such as keeping people informed of the schedule, duration, and progress of the construction, to minimize the public objections of unavoidable noise. Communities should be notified in advance of the construction and the expected temporary and intermittent noise increases during the construction period.	
		4.10-6 All employees that will be exposed to noise levels greater than 75 dB over an 8-hour period shall be provided with adequate hearing protection devices to ensure no hearing damage will result from construction activities.	
	e. Substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.	4.10-7 If equipment is being used that can cause hearing damage at adjacent noise receptor locations (distance attenuation shall be taken into account), portable noise barriers or other attenuation devices shall be installed that are demonstrated to be adequate to reduce noise levels at receptor locations below hearing damage thresholds.	Less than significant impact

TABLE 1.2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Category/Issue	Impact Description	Mitigation Measures	Impact After Mitigation
Noise (continued)		4.10-8 All pump stations in areas with sensitive noise receptors shall have their noise levels attenuated to 50 dBA CNEL at 50 feet from the well head. 4.10-9 Project facilities shall be constructed and operated so that noise levels from operations do not exceed 50 dB during night hours and 65 dB averaged over the 12 hours of day time when located adjacent to existing or future sensitive land uses. This can be achieved by siting relatively noisy operations a sufficient distance from sensitive noise receptors; by incorporating attenuation features in the facility or designing attenuation features at the boundary of the property.	
	g. Located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels.	No mitigation required	Less than significant impact
	h. Within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels.		
	Cumulative	No mitigation required	Less than significant impact
Public Services	a. Have an effect upon, or result in a need for new or altered fire protection and medical aid services.	No mitigation required	Less than significant impact
	b. Have an effect on or result in a need for new or altered police protection services.	4.11-1 Water Sales Program facilities shall be fenced or otherwise have access controlled to prevent illegal trespass to attractive nuisances, such as construction sites or tank sites.	Less than significant impact

TABLE 1.2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Category/Issue	Impact Description	Mitigation Measures	Impact After Mitigation
Public Services (continued)	c. Have an effect upon, or result in a need for new or altered school room capacity.	No mitigation required	Less than significant impact
	d. Have an effect upon, or result in a need for new or altered parks or other recreational facilities.		
	e. have an effect upon, or result in a need for new or altered solid waste disposal.	4.11-2 Where feasible, vegetation removed from facility sites, including pipelines, shall be chipped and delivered to licensed composting facilities to minimize the volume of organic solid waste delivered to area landfills for disposal.	Less than significant impact
	f. Have an effect upon, or result in a need for new or altered maintenance of public facilities, including roads.	No mitigation required	Less than significant impact
	g. Have an effect upon, or result in a need for new or altered library capacity.		
	Cumulative	No mitigation required	Less than significant impact
Utilities	a. Cause a significant demand for electricity and natural gas services.	4.12-1 When electricity consuming facilities are installed in support of the project, the City shall coordinate with SCE and other power companies regarding the location and phasing of required on-site electrical facilities. 4.12-2 Proposed structure construction should comply with Title 24 of the California Administrative Code (i.e., Uniform Building Code). 4.12-3 Onsite electrical lines should be installed underground. 4.12-4 Project planners and architects should consult with SCE or other electricity providers regarding current energy conservation techniques for any above ground facilities.	Less than significant impact

TABLE 1.2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Category/Issue	Impact Description	Mitigation Measures	Impact After Mitigation
Utilities (continued)	b. Cause a significant demand for communication system services.	No mitigation required	Less than significant impact
	c. Cause a significant demand for water supply capacity.	4.12-5 All project-related development/redevelopment projects, including exterior landscape elements, shall employ xeriscape plant design and water conservation concepts. At a minimum xeriscape requirements shall include the following: a. The use of drought-tolerant species, drip irrigation systems, soil moisture sensors, and automatic irrigation systems, when appropriate. b. Extensive use of mulch in all landscaped areas. Use of mulch will improve water holding capacities of the soil by reducing evaporation and erosion. c. A minimal use of lawn, except to accommodate-lawn dependent uses such as playing fields. Warm-season grasses shall be used.	Less than significant impact
	d. Cause a significant demand for wastewater collection or treatment system capacity. e. Cause a significant demand for storm water drainage capacity. f. Result in a disjointed pattern of utility extensions.	No mitigation required	Less than significant impact
	Cumulative	No mitigation required	Less than significant impact

TABLE 1.2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Category/Issue	Impact Description	Mitigation Measures	Impact After Mitigation
Aesthetics and Visual Resources	a. Obstruct any significant or important scenic view or vista. b. Create aesthetically offensive changes in the existing visual setting or have a demonstrable negative aesthetic effect.	4.13-1 All surface areas disturbed by Water Sales Program construction activities, except those area containing structures or hardscapes, shall be revegetated, either with native vegetation in natural landscapes or in accordance with a landscape plan in man-made landscape areas (note that native vegetation is also eminently suited to man-made landscapes and requires less maintenance). Once construction is completed, revegetation shall begin immediately and, where a formal landscape plan is being implemented, it shall be coordinated with the local agency and the local design guidelines for consistency. 4.13-2 Where facilities are proposed to be located adjacent to scenic highways, corridors or other scenic features identified in local agency planning documents, Water Sales Program facility implementation will conform with design requirements established in planning documents for these designated scenic area. 4.13-3 Where facilities will disrupt views from occupied areas with significant scenic vistas, a visual simulation analysis shall be performed of the facility's impact on the important view. If the analysis identifies a significant impact on a scenic vista, the facility shall be relocated, redesigned to reduce the impact to a non-significant level, or a subsequent environmental evaluation shall be prepared. 4.13-4 When Water Sales Program above ground facilities are constructed in the future, the local agency design guidelines for the project site shall be followed to the extent that they do not conflict with the engineering and budget constraints established for the facility. 4.13-5 All utilities for Water Sales Program facilities shall be placed underground unless such undergrounding is not technically feasible.	Less than significant impact

TABLE 1.2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Category/Issue	Impact Description	Mitigation Measures	Impact After Mitigation
Aesthetic and Visual Resources (continued)	c. Create light or glare that could impact sensitive receptors.	4.13-6 Future project review and implementation shall implement the following: • Use of low pressure sodium lights where security needs require such lighting to minimize impacts of glare. • Height of lighting fixtures shall be lowered to the lowest level consistent with the purpose of the lighting to reduce unwanted illumination. • Directing light and shielding shall be used to minimize off-site illumination. • No light shall be allowed to intrude into sensitive light receptor areas.	Less than significant impact
	Cumulative	No mitigation required	Less than significant impact
Cultural Resources	a. Potentially affect significant paleontological, archaeological, and historical resources.	4.14-1 Future facility improvements will avoid damaging cultural resources where feasible. Should avoidance prove not feasible, the importance of the site shall be evaluated by a qualified archaeologist, historian or paleontologist. The first step in the process shall be the conduct of a records search for known cultural resource sites within the area of potential effect (APE). If the records search indicates a potential for cultural resources to be located within the APE, the APE shall be surveyed by a qualified cultural resources professional. If resources are found, they shall be treated in accordance with measures outlined below. If determined necessary, the construction activities shall be monitored.	Less than significant impact

TABLE 1.2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Category/Issue	Impact Description	Mitigation Measures	Impact After Mitigation
Cultural Resources (continued)		4.14-2 A monitoring plan and discovery clause/treatment plan, to be implemented during the earthmoving phase of project implementation, will be developed by the archaeologist specifying procedures to be implemented in the event archaeological remains are uncovered during earth moving activities. The plan will provide for evaluation of anticipated and unanticipated cultural resources, provide mitigation alternatives for unavoidable archaeological impacts, and include contingency procedures for times when the archaeological monitor is not present on-site. 4.14-3 The archaeological monitor will attend a pre-construction meeting to explain the mitigation program to construction contractor staff. 4.14-4 An archaeological monitor, qualified in historical archaeology, shall be present during any demolition or earthmoving operations where a potential for significant cultural resources has been identified. The archaeological monitor shall be empowered to halt work to allow evaluation and removal of buried cultural remains. The monitor will complete a form daily summarizing the location being monitored, the nature of the work being done, soil conditions and other observations, and itemizing any cultural resources observed. 4.14-5 When the monitor observes other than minor, isolated archaeological resources, the monitor will request the construction contractor to divert activities within an area deemed large enough to encompass the deposit, feature, structure or other resource observed. The monitor will report the discovery to the lead agency.	

TABLE 1.2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Category/Issue	Impact Description	Mitigation Measures	Impact After Mitigation
Cultural Resources (continued)		4.14-6 If the resources is determined to be significant, based upon integrity or scientific potential, the supervising archaeologist will prepare a research design acceptable to the City outlining measures to mitigate site impacts. 4.14-7 Should any prehistoric sites or features be encountered during excavation, a Native American monitor from the list approved by the Native American Heritage Commission (NAHC) will be added. In the event human remains are encountered, all work will be halted in the vicinity of the observation, and the County Corner and NAHC will be contacted. Treatment of remains will be determined in consultation with the Native American monitor and appropriate tribe or ban of affected Native Americans. 4.14-8 Prior to any demolition of historic structures, an advertisement shall be placed in a newspaper of regional circulation and one or more historical societies, announcing the availability of the structures for relocation. The announcement shall provide a minimum 30-day period for submittal of proposals for removal of structures. Mutually satisfactory arrangements for removal of structures shall be negotiated. If no proposals are received, or if a mutually satisfactory arrangement cannot be negotiated, the demolition will proceed. Demolition at and below present grade will be monitored. In this case, the existing site records, or the records as they may be updated, are considered to fulfill any mitigation requirement.	

TABLE 1.2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Category/Issue	Impact Description	Mitigation Measures	Impact After Mitigation
Cultural Resources (continued)		4.14-9 Prior to authorizing second-tier projects when specific locations are known, the APE shall be assessed for paleontological resources by conducting a records check, literature review or a review of the APE by a qualified professional. If resources are found, they shall be treated in accordance with measures outlined below. If determined necessary, the construction activities shall be monitored. 4.14-10 Prior to any earthmoving at proposed sites, a qualified vertebrate paleontologist will develop a storage agreement with the local museums to allow for the permanent storage and maintenance of any fossil remains recovered at construction sites and for archiving of associated specimens and corresponding geologic and geographic site data. 4.14-11 The paleontologist will develop a mitigation plan and discovery clause/treatment plan to be implemented during the earthmoving phase of project implementation. The treatment plan will allow for the recovery and subsequent treatment of any fossil remains and associated data recovered as a result of the mitigation program. This treatment plan will include approved procedures and lines of communication to be implemented if fossil remains are uncovered by earthmoving activities, including those times when the paleontological monitor is not present on the site. 4.14-12 A qualified paleontologist monitor will attend a pre-construction meeting to explain the mitigation program to the construction contractor staff.	

TABLE 1.2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Category/Issue	Impact Description	Mitigation Measures	Impact After Mitigation
Cultural Resources (continued)		4.14-13 Paleontological monitoring of earthmoving will be conducted only in areas where previously undisturbed sedimentary rock or alluvial sediments will be disturbed by earthmoving activities. Monitoring will not be required in areas underlain by younger alluvium until earthmoving has reached a depth of four feet below current grade. 4.14-14 If fossil remains are found by the monitor, earthmoving activities will be diverted around the fossil site until the remains have been removed. If not already in effect, monitoring will be increased to full time in areas underlain by the fossil-bearing rock unit, at least in the immediate vicinity of the fossil site. 4.14-15 Any recovered fossil remains will be prepared to the point of identification and identified to the lowest taxonomic level feasible by knowledgeable paleontologists. The remains then will be curated (e.g., assigned and labeled with the local museum's specimen and corresponding site numbers; mounted and placed in vials, if necessary; and placed in specimen trays with completed specimen data cards) and catalogued. The specimen and corresponding geologic and geographic site data will be archived (specimen and site numbers and corresponding data entered into appropriate museum catalogs and computer-ized data bases) by a laboratory technician. The fossil remains then will be sent to the museum, where they will be permanently stored, maintained, and made available for future study by qualified investigators. 4.14-16 A final report of findings with an inventory of recovered fossil specimens will be prepared by the paleontologist for submission to the lead agency and appropriate museum.	
	Cumulative	No mitigation required	Less than significant impact

TABLE 1.2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Category/Issue	Impact Description	Mitigation Measures	Impact After Mitigation
Recreation	a. Cause a significant demand for recreational services	No mitigation required	Less than significant impact
	b. Affect any existing recreational opportunities.	4.15-1 If future infrastructure facilities cause a significant loss of recreational capacity at any facility, the Department will offset the loss by providing comparable capacity either on or off the recreation site.	Less than significant impact
	Cumulative	No mitigation required	Less than significant impact

CHAPTER 2 – INTRODUCTION

2.1 BACKGROUND

The City of San Bernardino currently discharges approximately 40 million gallons per day (MGD) from the Regional Rapid Infiltration and Extraction (RIX) Facility to the Santa Ana River (SAR). The RIX facility is located in the City of Colton adjacent to the SAR, approximately one mile east of the intersection of Riverside Avenue and Agua Mansa Road. The City of San Bernardino, in conjunction with Western Water Company, intends to market tertiary treated effluent from the RIX facility (currently estimated to be about 15 MGD, or 16,794 acre-feet per year) and sell this amount of effluent for long-term beneficial uses to water users in the region. For the purpose of this environmental document, the proposed action is a Recycled Water Sales Program, in which up to 18,000 acre-feet per year (acre-ft/yr or AFY) of RIX facility tertiary treated effluent would be sold to potential water suppliers within the southern California region.

The City of San Bernardino Municipal Water Department is considering a proposed contractual arrangement to deliver recycled water from the RIX facility to a private water wholesaler. The operator of the Water Sales Program is the City of San Bernardino Municipal Water Department. The Marketing Manager will be Western Water Company. Alternatively, the City may move forward as a marketing agent. Under the proposed agreement, the City would deliver up to 18,000 acre-feet of recycled water per year (AFY) to future customers, with a maximum of 360,000 acre-feet over a 20-year period. The agreement would have an initial delivery term of 3 years for market development, followed by a delivery term of 20 years, renewable in 10-year increments. The private wholesaler would have right of first refusal for additional volumes of recycled water during the period of the agreement. The City would receive rights for capacity in any conveyance facilities established by the private wholesaler. Only the City of San Bernardino component of the RIX effluent is considered in this project.

2.2 PURPOSE AND USE OF AN ENVIRONMENTAL IMPACT REPORT

The California Environmental Quality Act (CEQA) was adopted to implement the goal of maintaining the quality of the environment for the people of the State. Compliance with CEQA, and its implementing guidelines, requires that an agency making a decision on a project must consider its potential environmental effects/impacts before granting an approval. Further, the state adopted a policy "that public agencies should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures available which would substantially lessen the significant environmental effects of such projects." Thus, an agency must examine feasible alternatives and identify feasible mitigation measures as part of the environmental review process when a potential for significant adverse environmental impact exists. CEQA also states "that in the event specific economic, social, or other conditions make infeasible such project alternatives or such mitigation measures, individual projects may be approved in spite of one or more significant effects thereof." (§21002, Public Resources Code)

Pursuant to State CEQA Guidelines Section 15051(b)(1), the City of San Bernardino Municipal Water Department (Department) is the agency with the greatest responsibility for approving and supervising the project as a whole and will serve as CEQA Lead Agency. CEQA requires that the Lead Agency consider the environmental information in the project record, including in this case a program environmental impact report (PEIR), prior to making a decision on the proposed project. The actions that will be considered by the Department are whether to certify this EIR and approve the sale of RIX Facility recycled water to Western Water Company for delivery to recycled water customers.

This EIR will serve as a program EIR (PEIR) for the various actions and physical environmental changes that will result from the sale of recycled water up to the 18,000 AFY limit. The project description identifies some anticipated recycled water customers and the initial construction activities associated with the installation of an infrastructure system to deliver recycled water to these customers. Additionally, the PEIR identifies follow-on activities that may occur in the future, but are not well-enough defined at this stage of review to identify specific effects from approval of the project at this stage. A PEIR has been selected as the appropriate document for compliance with the CEQA based on the definition of a program document contained in Section 15168 of the State CEQA Guidelines which states:

"A program EIR is an EIR which may be prepared on a series of actions that can be characterized as one large project and are related either: (1) Geographically, (2) As a logical part in the chain of contemplated actions, (3) In conjunction with issuance of rules, regulations, plans, or other general criteria to govern the conduct of a continuing program, or (4) As individual activities carried out under the same authorizing statutory or regulatory authority and having generally similar environmental effects which can be mitigated in similar ways."

The Department is working from a core concept, that the infrastructure installation and related facility construction activities in support of the recycled water sales program are so interrelated that they merit consideration under a PEIR. The activities are being considered within one environmental document because the Department has concluded that they are all being proposed for implementation within the same geographic area, they are interrelated as a logical part in the chain of contemplated actions by the Department and other agencies; and they are essentially part of the overall program (one large project) being implemented by Department over several years.

When applied to a program proposal, such as the proposed sale of recycled water and the associated infrastructure improvements, the reviewing agency is required to identify the potential environmental impacts of the project and determine whether there are feasible mitigation measures or alternatives that can be implemented to substantially lessen or avoid significant environmental effects of the project. The first step in this process, completion of an Initial Study to determine whether an EIR is required, has been completed by the Department for the proposed project. Based on information developed in the Initial Study, the Department determined that implementation of the proposed project has the potential to result in several significant adverse impacts to the environment for the following issues and that a PEIR should be prepared.

- Issues determined to have a potential for significant adverse impact:

  - Aesthetics
  - Air Quality
  - Biological Resources
  - Cultural Resources
  - Geology and Soils
  - Hazards and Hazardous Materials
  - Hydrology and Water Quality
  - Land Use/Planning
  - Noise

- Issues determined in the Initial Study to not have a potential for significant adverse impact:

  - Agricultural Resources
  - Mineral Resources
  - Population and Housing
  - Public Services
  - Recreation
  - Utilities/Service Systems

Of the above, the first set of issues will be examined in depth. The second set of issues will be given an appropriate level of evaluation consistent with potential for adverse impacts, in order that the PEIR will provide a complete analysis for future program actions within the scope of the project.

As noted above, this RIX Facility Recycled Water Sales Program is sponsored by the Department. This PEIR has been prepared by Tom Dodson & Associates (TDA) under contract with the Department in accordance with Section 21151 of CEQA. TDA was retained to assist the Department and responsible agencies in performing the independent review required by CEQA prior to releasing the PEIR as a draft for public review. The Department has reviewed the content of this Draft PEIR and concurs with the evaluations, conclusions, and findings contained herein. In addition to the lead agency, San Bernardino Municipal Water Department, several agencies are expected to function as responsible agencies for the project. CEQA Guidelines Section 15381 defines a "responsible agency" as a public agency other than the lead agency which has discretionary approval for the project, or components of the project.

The project may be required to obtain several permits including: a Section 404 permit from the U.S. Army Corps of Engineers (COE); a California Regional Water Quality Control Board (RWQCB) 401 Water Quality Certification; a California Department of Fish and Game (CDFG) Streambed Alteration Agreement (1601 or 1603 Agreement); a construction stormwater discharge permit, National Pollutant Discharge Elimination System (NPDES) through filing a Notice of Intent and compiling a Stormwater Pollution Prevention Plan (SWPPP); State Department of Public Health, various encroachment or construction permits from local agencies.

This document is prepared in a manner that will allow these responsible agencies to utilize this PEIR as their CEQA compliance document for the discretionary decisions required to support implementation of this project.

2.2.1 Notice of Preparation and Responses

Relying on data contained in the Initial Study, the Department prepared and distributed a Notice of Preparation (NOP) for the PEIR with the scope outlined above. The NOP was distributed to the State Clearinghouse (SCH) and interested and responsible agencies, organizations, and individuals. The NOP was circulated from October 19, 1999 through November 19, 1999. This project was assigned SCH #99101088.

The Department received 11 comment letters on the NOP, some of which were submitted after the 30-day comment period. Of these 11 comment letters, all were from agencies. A copy of the NOP (with the Initial Study) and the comment letters are provided in Chapter 8 (Appendices), Section 8.1 of this PEIR. Because the Department had already determined that a PEIR should be prepared, no new issues not already included in the scope of the PEIR were identified.

2.3 SCOPE AND CONTENT OF THIS PEIR

In accordance with Sections 15063 and 15082 of the State CEQA Guidelines, the Department authorized preparation of an Initial Study to identify the environmental resources and manmade systems that could experience significant environmental impact if the proposed project is implemented. After incorporating feasible mitigation measures, the Department's Initial Study concluded that the proposed project could result in one or more significant adverse impacts to the environment and, therefore, a PEIR should be prepared.

Comments regarding the scope of the PEIR, as received through the NOP process, are summarized in Appendix 8.1 of this PEIR (which also contains the Initial Study). In addition to evaluating the environmental issues, this PEIR contains all of the sections mandated by CEQA and State CEQA Guidelines. Table 2.3-1 provides a listing of the contents required in an EIR along with a reference to the chapter and page number where these issues can be reviewed in the document. This PEIR is contained in two volumes. Volume 1 contains the CEQA-mandated sections and appendices that support the text. Volume 2 contains the technical appendices prepared to support the evaluation in Volume 1.

Table 2.3-1
REQUIRED EIR CONTENTS

Required Section (CEQA)	Section in EIR	Page Number
Table of Contents (Section 15122)	same	ii
Summary (Section 15123)	Chapter 1	1-1
Introduction	Chapter 2	2-1
Project Description (Section 15124)	Chapter 3	3-1
Significant Environmental Effects of Proposed Project (Section 15126a); Environmental Impacts	Chapter 4	4-1
Unavoidable Significant Environmental Effects (Section 15126b)	Chapter 4	4-1
Mitigation Measures (Section 15126e)	Chapter 4	4-1
Cumulative Impacts (Section 15130)	Chapter 4	4-1
Alternatives to the Proposed Project (Section 15126f)	Chapter 5	5-1
Growth-Inducing Impacts (Section 15126d)	Chapter 6	6-1
Irreversible Environmental Changes (Section 15126c)	Chapter 6	7-1
Effects Found Not to be Significant (Section 15128)	Chapter 4	4-1
Organizations and Persons Consulted (Section 15129)	Chapter 7	7-1
Appendices, including Initial Study, Notice of Preparation, and Comment Letters	Chapter 8	8-1
Technical Appendices and Other Materials	Volume 2	--

2.4 PEIR FORMAT AND ORGANIZATION

As Table 2.3-1 illustrates, this PEIR contains eight chapters which, when considered as a whole, provide the reviewer with an evaluation of the potential significant adverse impacts from implementing the proposed project described in Chapter 3. Environmental impact reports inherently contain some repetition or redundancy because potential impacts are discussed in several sections. The following paragraphs provide a summary of the content of each chapter of this PEIR.

Chapter 1 contains the executive summary for the PEIR. This includes an overview of the proposed project and a tabular summary of the potential adverse impacts and mitigation measures.

Chapter 2 provides the reviewer with an introduction to the document. This chapter of the document describes the background of the proposed project, its purpose, and its organization. The CEQA process to date is summarized and the scope of the PEIR is identified. Technical evaluations prepared for the PEIR are identified and the format and availability of the PEIR are described.

Chapter 3 contains the project description used to forecast environmental impacts. This chapter describes the activities and facilities that determine how the existing physical environment will be altered by the proposed project. This chapter sets the stage for carrying out the environmental impact forecasts contained in the next several chapters.

Chapter 4 presents the environmental impact forecasts for the issues considered in this PEIR. For each environmental issue identified in Chapter 4, the following impact evaluation is provided for the reviewer: the project's existing environmental setting; the potential impacts forecast to occur if the project is implemented; proposed mitigation measures; cumulative impacts; and unavoidable adverse impacts.

Chapter 5 contains the evaluation of alternatives to the proposed project. Included in this chapter is an analysis of the no project alternative and other project alternatives.

Chapter 6 presents the topical issues that are required in an EIR. These include: any significant irreversible environmental changes and growth inducing effects of the project. As of January 1, 1995, the assessment of short-term benefits relative to long-term impacts is no longer required because it is considered redundant to other sections in a EIR. This change was adopted as part of SB 749 (Thompson) which became law in January 1995.

Chapter 7 describes the resources used in preparing the PEIR. This includes persons and organizations contacted; list of preparers; and bibliography.

Chapter 8 contains those materials referenced as appendices to the PEIR, such as the Notice of Preparation, comment letters, scoping meeting materials, and other materials referred to in the PEIR as being necessary for project review.

Volume 2 contains the technical appendices referenced in Volume 1 of the PEIR.

2.5 AVAILABILITY OF THE RIX FACILITY RECYCLED WATER SALES PROGRAM PEIR

A Notice of Availability for the Draft PEIR has been provided to all persons on the NOP mailing list. In addition, a copy of the Draft PEIR for this project has been distributed directly to all public agencies and other requesting agencies or individuals. All reviewers will be provided 45 days to review the Draft PEIR and submit comments to the City of San Bernardino Municipal Water Department for consideration and response. The Draft PEIR is also available for public review at the following locations during the 45-day review period:

- City of San Bernardino Municipal Water District
- Libraries in the cities of San Bernardino, Riverside, and Ontario and the counties of San Bernardino, Riverside and Orange

2.6 DEPARTMENT REVIEW PROCESS

After receiving comments on the Draft PEIR, the Department will compile a Final PEIR for certification by Department prior to making a decision on the project. The Department will review the Final PEIR for adequacy and when determined adequate, the PEIR can be used as the informational document for compliance with the CEQA for this project. Information concerning the PEIR public review schedule and meetings for this project can be obtained by contacting:

Ms. Stacey Aldstadt
City of San Bernardino Municipal Water Department
300 North "D" Street, 5th Floor
San Bernardino, CA 92418

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CHAPTER 3 – PROJECT DESCRIPTION

Note: All Chapter 3 figures are located at the end of this chapter, not immediately following their reference in the text.

This chapter contains a detailed description of the proposed project, with focus on those characteristics and activities that can cause physical changes in the environment. The description contained herein for the RIX Facility Recycled Water Sales Program provides the reviewer with a written summary of the project as it would be implemented by the City of San Bernardino Municipal Water Department (Department) following certification of this Program Environmental Impact Report (PEIR). As discussed in Chapter 2, the project description focuses on the physical facilities and associated activities that would be implemented if the proposed project is approved.

The proposed RIX Facility Recycled Water Sales Program is a public works project that will be funded and implemented by the City of San Bernardino Municipal Water Department, and other local and regional agencies that may purchase the Recycled Water produced by the RIX Facility. No entitlements are required to implement this project, but some regulatory permits may be required. Based on the nature of the project and the issues identified in the Initial Study process, the Department has determined that construction and operation of the facilities proposed could result in significant adverse environmental impacts. Based on Initial Study prepared for this project and the comments received in response to the Notice of Preparation, the issues of focus for this PEIR were determined. Thus, this PEIR has been prepared to address the physical changes to the environment that would result from implementing the RIX Facility Recycled Water Sales Program.

3.1 BACKGROUND

The cities of Colton and San Bernardino operate their own municipal wastewater treatment plants. These plants treat domestic, commercial and industrial wastewaters. Until 1996, the City of San Bernardino's facility discharged approximately 28 millions gallons per day (MGD) of secondary treated wastewater to the Santa Ana River, whereas the City of Colton discharged approximately 5.0 MGD of the effluent treated to the same general level. The Santa Ana Regional Water Quality Control Board's (Board) adopted Board Orders No. 92-22, as amended by Order No. 93-42 (City of San Bernardino) and Board Order No. 92-17, as amended by Order Nos. 92-40 and 93-42, specified that tertiary treatment be provided for treated effluent discharges going into the Santa Ana River from the two cities' plants. At the direction of the Regional Board, the cities, along with the Santa Ana Watershed Project Authority (SAWPA), designed and constructed a new treatment train to achieve treated effluent water quality equivalent to conventional tertiary treatment facilities. This new treatment facility, the Regional Rapid Infiltration and Extraction (RIX) facility, was pilot tested and determined to meet the Board's requirements for tertiary treated effluent (recycled water). In 1994, a joint powers authority was formed to operate the RIX facility, this being the Colton/San Bernardino Regional Tertiary Treatment and Water Reclamation Authority (RTTWRA).

The RIX treatment process uses in-situ native soil filtration by applying the secondary treated wastewater from each city's plant to a series of shallow earthen basins. As the secondary effluent percolates through the unsaturated soil media to the groundwater table, physical, biological and

chemical processes take place within the soil structure. As a result, dissolved organic matter and suspended solids are significantly reduced, resulting in a water quality equivalent to that produced by conventional tertiary filtration systems. Additionally, pathogens and some chemical constituents, such as nitrogen and carbon, are also reduced. Once the wastewater is filtered through the soil, it is pumped and extracted along with some native groundwater underlying the percolation basins. The extracted water is then channeled to flow-through ultraviolet (UV) disinfection banks prior to being discharged to the Santa Ana River, Reach 4.

In March of 1996, a full-scale 40 MGD capacity RIX facility started accepting and treating secondary treated wastewater from the Colton and San Bernardino plants. The RIX facility covers an approximate area of 87 acres, located at 1990 West Agua Mansa Road in the Colton area of San Bernardino County. The total basin bottom surface area is approximately 43 acres. An additional 35 acres is being considered for additional percolation ponds. Currently, there are 10 percolation ponds, 5 banks of UV disinfection units, 18 containment wells, and 13 relief wells. Onsite extraction wells are located within and downgradient of the percolation basins. Groundwater monitoring wells are installed within the same area. Approximately 25 MGD of wastewater from San Bernardino and 5 MGD from Colton are percolated daily at the site, compared to the 40 MGD permitted treatment capacity. More than 10 percent of the native groundwater is extracted together with percolated wastewater; this over-extraction is intended to assure wastewater capture and recovery. Refer to Figure 3.1-1 for the location of the RIX facility and associated discharge point to the Santa Ana River.

Due to tertiary treatment capacity restraints during wet weather, Colton/San Bernardino RTTWRA recently constructed a 7 MGD conventional tertiary sand filter (Dyna Sand) plant adjacent to the RIX ponds. This plant started operations in December of 2000.

The City of San Bernardino is cooperating with the San Bernardino Valley Municipal Water District (SBVMWD) to discharge a minimum of 16 MGD of treated effluent at the RIX facility as fulfillment of the downstream obligations created by the River adjudication. However, the City has concluded that the remaining portion of the discharge is not currently obligated to downstream uses or users. Therefore, the City of San Bernardino, in conjunction with Western Water Company, has made a decision to market this tertiary effluent from the RIX facility (currently estimated to be about 15 MGD, or 16,794 afy) and sell the effluent for long-term beneficial uses to water users in the region. For the purpose of this environmental document, the proposed action is a Recycled Water Sales Program, of up to 18,000 acre-feet of RIX facility tertiary treated effluent, to potential water suppliers within the southern California region.

The course of action determined to be most appropriate by the City for compliance with CEQA is the preparation of a Program Environmental Impact Report (PEIR). Prior to starting work on the PEIR, a Notice of Preparation (NOP) was distributed to potentially impacted parties and agencies. Comments were solicited via written responses to the NOP. All comments on the NOP have been incorporated into the scoping process for this document, and a summary of comments is provided in Appendix 8.1 of Chapter 8 to this PEIR.

A PEIR has been selected as the appropriate CEQA document for the proposed Recycled Water Sales Program based on the definition of a program document contained in Section 15168 of the State CEQA Guidelines which states:

> "A program EIR is an EIR which may be prepared on a series of actions that can be characterized as one large project and are related either: (1) Geographically, (2) As logical parts in the chain of contemplated actions, (3) In connection with issuance of rules, regulations, plans, or other general criteria to govern the conduct of a continuing program, or (4) as individual activities carried out under the same authorizing statutory or regulatory authority and having generally similar environmental effects which can be mitigated in similar ways."

If the City chooses to certify this PEIR and to approve the Recycled Water Sales Program, then each future sale of RIX Facility recycled water can be reviewed and approved under this environmental document as permitted by Section 15162 of the State CEQA Guidelines. As stated before, CEQA requires that the Lead Agency consider the environmental information in the project record, including this PEIR, prior to making a decision on the proposed project. The decision that will ultimately be considered by the governing board of the City of San Bernardino Municipal Water Department is whether or not to certify the Final PEIR as adequate to address the environmental effects of implementing the overall proposed water sales program and future individual sales of water to other entities.

This PEIR has been prepared by Tom Dodson & Associates (TDA) under contract to the City of San Bernardino Municipal Water Department (SBMWD or Department) in accordance with Section 21151 of CEQA. The Department retained TDA to assist in performing the independent review of the project required by CEQA prior to releasing the PEIR as a draft for public review. The SBMWD has reviewed the content of the Draft PEIR and concurs with the evaluations, conclusions and findings contained herein.

The following describes the facilities and operations that will produce recycled water for the RIX Facility Recycled Water Sales Program, as well as the marketing plan, which is the basis for the programmatic environmental review.

3.2 PROJECT CHARACTERISTICS

3.2.1 Project Location

The RIX Facility and discharge point is formally identified as Discharge Serial No. 001 at NW 1/4 of the SE 1/4 of Section 36, T1S, R5W, SBB&M, latitude 34°02'28" and longitude 117°21'14.8" between La Cadena and Riverside Avenue in Colton. Figure 3.1-1 shows the project location on a portion of USGS – San Bernardino South Quadrangle, California, 7.5 Minute Series topographic map.

A possible point of connection between the RIX site and potential west valley customers is the delivery of recycled water through the recycled water system being installed by the Inland Empire Utilities Agency (IEUA) is in the process of installing a recycled water system to the Regional Plant No. 3 site, located in south Fontana, at the intersection of Beech and Jurupa Avenues. This site is presently not operating, but IEUA is in the process of installing groundwater recharge basins at this location. If present plans are implemented, IEUA will connect the RP-3 recharge site to a recycled water delivery system that has a potential to deliver recycled water flows from the RIX facility throughout the Chino Basin. The location of IEUA's RP-3 facility is shown on Figure 3.2-1, which shows a portion of USGS – Fontana Quadrangle, California, 7.5 Minute Series topographic map. Note that the RIX facility is physically located about 9 miles east of the RP-3 site and these two

sites can be easily connected by a pipeline route of more than 7 miles as follows: Agua Mansa Road west to Riverside Drive, Riverside Drive north to Jurupa Avenue, and west on Jurupa Avenue to the RP-3 site. All of this route could be constructed within existing disturbed road right-of-way, with acquisition of required encroachment permits from pertinent jurisdictions. IEUA will be approached by the Department to utilize this facility as a transfer point after it is has been installed.

Otherwise, the Department will market RIX recycled water throughout the Santa Ana River Basin, and pipelines will need to be installed or capacity purchased, as in the IEUA circumstance outlined above, from other recycled water producers. Additional potential customers for RIX Facility recycled water include several Orange County locations which could be supplied through run-of-the-river deliveries or connections through regional pipelines, either direct or through the Chino Basin.

3.2.2 Project Description

3.2.2.1 Recycled Water

The recycled water "product" from the RIX facility is regulated through Article 3, Section 60305 of Title 22 Division 4, Chapter 3, "Water Recycling Criteria" of the California Code of Regulations. These regulations specify that recycled water used as a source supply for non-restricted uses be disinfected tertiary recycled water that has been subjected to conventional treatment. Although the Santa Ana River is not an impoundment, the River is designated REC-1 (a surface water with body contact beneficial use) by the Santa Ana Regional Water Quality Control Board (Board). The Board has stated that it is necessary and appropriate to require the same degree of treatment for wastewater discharges to the River as would be required for use of recycled water in a non-restricted recreational impoundment, and has specified requirements based on tertiary or equivalent treatment, as specified in Title 22, in the recently adopted Order No. 01-45 (NPDES No. CA8000304).

The Board Order includes a total coliform bacteria limit of 2.2 Most Probable Number (MPN) per 100 milliliters, a Title 22 or public health protection limit. This is more stringent than the fecal coliform objective in the Basin Plan of 200 MPN per 100 milliliters, which applies to surface waters that are or may be used for water contact recreation, in this case Reach 4 and downstream reaches of the Santa Ana River. Compliance with the 2.2 total coliform limit is seen by the Board to not only address fecal coliform bacteria, but will also assure the requisite 5-log virus reduction, i.e., that the recycled effluent be essentially pathogen free. Thus, the recycled water produced by the RIX facility meets the most stringent of water quality requirements for this parameter.

Another issue of importance to potential users of recycled water from this source is that of Total Dissolved Solids (TDS), sometimes considered by the more common term "salts." The components of TDS include such minerals as sodium, sulfate, chloride and bicarbonates. Many groundwater basins in the Santa Ana River watershed are high in TDS, which can limit the use of groundwater for irrigation or other purposes. The water from the RIX facility, as currently discharged to the River, affects the Colton Groundwater Subbasin, which lacks assimilative capacity for TDS. The Order specifies a TDS limit of 400 mg/l for the RIX discharge, unless a program to offset TDS discharges in excess of this objective is established. The Board has acknowledged this limit is difficult to achieve, due to the fact that the source water supply can be high in TDS and also that the

wastewater treatment process itself adds to TDS. The Board has included in its Order that the 12-month average TDS concentration in the effluent shall not exceed the 12-month average TDS concentration in the water supply by more than 250 mg/l, unless (a) the chemical additions in the treatment process needed to meet the waste discharge requirements are the cause of exceedances, and (b) a plan is implemented to offset TDS discharges in excess of the 250 mg/l mineral increment. The Department, as well as several other agencies, also participates in watershed-wide studies which are discussed in greater detail in Chapter 4, Section 4.9 of this PEIR.

High concentrations of nitrates in domestic water can be toxic to human life. Any sources of drinking water, ground or surface, are not to exceed 45 mg/l (as nitrate or NO_3) or 10 mg/l (as N). The Board has specified a waste load allocation for total inorganic nitrogen from publicly owned wastewater treatment plants discharging to the Santa Ana River and its tributaries, as well as to groundwater in the Upper Santa Ana River Basin, as a limit of 10 mg/l (as TIN, or Total Inorganic Nitrogen) for all flows. Nitrogen is a significant issue for those potential users of recycled water in the Santa Ana River Basin, which has been overloaded for years in nitrogen originating from the extensive dairy farm operations. The 10 mg/l TIN limit is generally used and is considered protective of surface and groundwater resources.

In terms of "priority" pollutants, the recently adopted Order for RIX discharges has eliminated water quality limits for many substances, as there has been no historic evidence that these substances were present or present in amounts to cause any exceedances of water quality standards. This makes RIX facility water desirable, as some of these particular substances are present and of great concern (for human health and aquatic life protection, as well as for taste, odor and staining problems) in some other area water sources. The previously limited constituents include: arsenic, benzene, cadmium, chromium VI, chloroform, copper, dichloromethane, halomethanes, lead, nickel, mercury, PCBs, pentachlorophenol, toluene, selenium, silver, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, boron, fluoride, iron, and manganese.

Finally, discharges of recycled water to surface waters are not to cause toxicity to aquatic organisms, as determined through Whole Effluent Toxicity (WET) testing. Since April 1996, when the RIX facility started operation, toxicity tests performed have not detected any toxicity. This indicates there is no reasonable potential for this discharge to cause or contribute to the violation of the narrative toxicity objectives identified in the Basin Plan by the Board. As a result, numeric effluent limits for toxicity were not included in the Order.

To summarize, the recycled water produced from the RIX facility can be demonstrated to be of very high quality and, thus, highly "marketable" for a variety of potential users and uses. More complete profiles of water quality are presented and discussed later on in this PEIR, in Chapter 4, Section 4.9.

3.2.2.2 Recycled Water Marketing Plan

As summarized above, the City of San Bernardino Municipal Water Department is considering a proposed contractual arrangement to deliver recycled water from the RIX facility to a private water wholesaler. The operator of the Water Sales Program is the City of San Bernardino Municipal Water Department. The Marketing Manager will be Western Water Company or the Department. Under the proposed agreement, the City would deliver up to 18,000 acre-feet of recycled water per

year to future customers, with a maximum of 360,000 acre-feet over a 20-year period. The agreement would have an initial delivery term of 3 years for market development, followed by a delivery term of 20 years, renewable in 10-year increments. The private wholesaler would have right of first refusal for additional volumes of recycled water during the period of the agreement. The City would receive rights for capacity in any conveyance facilities established by the private wholesaler. Only the City of San Bernardino component of the RIX effluent is considered in this program.

At this stage of the project, Western Water Company has identified a Water Sales Program that envisions three phases:

1. Identify prospective consumers of a portion of the high-quality water produced by the RIX facility. This phase has been completed.
2. Determine the feasibility of and needs for delivering a portion of each of the identified consumer's needs for reliable high-quality recycled water. This phase is the basis of the evaluations presented in this PEIR.
3. Develop durable arrangements for delivery of the water to one or more of the identified consumers on a commercial basis. This phase will be dependent upon the outcome of the previous phase.

The primary objectives of the Recycled Water Sales Program are:

San Bernardino Municipal Water Department

- Further California state policy objectives of using recycled water to the maximum extent possible in order to reduce the demand for scarce imported water supply and other limited local water resources. Recycled water would be substituted for appropriate uses that currently rely on imported surface water.
- Offset a portion of the costs of sophisticated tertiary treatment of recycled water by developing a commercial market for the water at a price that reflects the value of this high-quality source.
- Maintain ecological values throughout the Santa Ana River watershed.
- Avoid costly and divisive regulatory and legal processes, insofar as possible.
- Recover the costs of further treatment and delivery of recycled water to meet the needs of one or more Prospective Purchaser(s).

Western Water Company

- Use price-sensitive market mechanisms to better distribute the real cost of water to the actual beneficiaries of such water.
- Earn a reasonable profit through management of the process for achieving commercial re-use of a currently "wasted" by-product of expensive tertiary treatment.
- Establish clear rules governing dominion and control over treated wastewater.

Prospective Purchasers

- Gain long-term access to a reliable, high-quality source of water to reduce dependence on imported sources.

- Reduce long-term cost of water service to retail customers, both through lower direct resource cost and reduced operating costs.

PHASE ONE

Phase One of the Water Sales Program identified a wide range of potential consumers of recycled water in Southern California, as based on a compilation of information which was incorporated into a special study (CH2M Hill, 1998). The original extensive list was then reduced to potential customers who meet a profile in congruence with the capabilities of the RIX facility, based on the following factors:

- Increasing demand for incremental water due to growth in the service area;
- Reliance on imported surface water to meet a portion of service area demand;
- Ability to pay based on high-value beneficial end uses;
- Sophisticated governance, engineering and finance structures capable of evaluating a complex resource mix;
- Experience with, interest in and facilities for groundwater recharge;
- Institutional familiarity with the Santa Ana River watershed and its physical, legal and political characteristics; and
- Physical proximity to the RIX facility and/or existing infrastructure to minimize the requirements for substantial new capital investment to take delivery of RIX facility source recycled water.

Based on the above criteria, six Prospective Purchasers were identified. Preliminary "delivery plans" have been developed from available public information and without active assistance of any Prospective Purchaser. These Purchasers and associated delivery plans will be considered as one component of the proposed project for the purpose of this PEIR. It is the function of this PEIR to evaluate each thoroughly in light of the environmental issues and environmental impacts should further development be proposed. The major issues and impacts that have been identified up to this point are the re-direction of a portion of the outflow from the RIX facility to the Santa Ana River; the construction of delivery infrastructure to use this water source; and the utilization of the resource by the water purchaser.

PROSPECTIVE PURCHASERS CONSIDERED

Each of the following will be examined in this PEIR. Short descriptions are presented here, along with a general comparative table.

Chino Basin Watermaster

The Chino Basin Watermaster is the entity charged with administering adjudicated water rights and managing groundwater resources within the watershed and groundwater basin known as the Chino Groundwater Basin. This Basin is within the Santa Ana River watershed as shown on Figure 3.2-2. The Watermaster is responsible for managing and controlling the replenishment of water supplies in the Chino Basin, and for approving and facilitating the storage of supplemental water in the Basin. Under its Rules and Regulations, water producers in the Basin must obtain approval from

or notify the Watermaster for certain activities, such as constructing a well, spreading water in the Basin, spreading or storing supplemental water, and producing water from the Basin.

Currently, within the Chino Basin, there are 32 flood control and spreading basins already in existence, and several new ones planned. The Watermaster has recently released a request for proposals for the use of unused storage capacity within the Basin. The safe yield in the Chino Basin is estimated to be 140,000 afy. Preliminary analysis suggests that Management Zone 3, the area of the Chino Basin physically closest to the RIX facility, is out of balance with a deficit of inflow and also having poorer water quality than other zones. Thus, recharge with high-quality water from the RIX facility could be useful, in conjunction with appropriate mitigation or at the appropriate location where the Basin Plan water quality objective is higher than RIX dissolved solids concentrations.

In order to develop this alternative, water originating at the RIX facility would have to be conveyed by a pipeline for a distance of approximately seven to nine miles, to a prospective area of infiltration above the Jurupa Hills within Management Zone 3. A specific path for the pipeline has not been determined, nor has an evaluation of the availability of existing infrastructure been conducted. However, a reasonable route to the Chino Basin would be a pipeline installed within existing road rights-of-way (Agua Mansa Road to Riverside Drive to either Slover or Jurupa Avenue) and acquisition of rights within this right-of-way is not considered to be difficult because these are public rights-of-way. The local geological characteristics and experience with other spreading operations in the vicinity of IEUA's RP-3 site would support infiltration of water, including recycled water. There is a modest elevation difference (about 880 feet MSL at RIX and 960 feet MSL for RP-3) such that pumping would be necessary, but nominal. If IEUA's RP-3 facilities are not available, the Department would have to construct additional pipelines to deliver water to potential users in the west valley.

The requirements for this alternative would include: (1) booster pumps to pressurize delivery of RIX recycled water to the prospective spreading basins; (2) a pipeline sufficient to convey up to 20 MGD of water; and (3) infiltration galleries of sufficient size to settle the water in the Chino Basin over a foreseeable range of weather conditions. Additionally, further treatment of the water might be desirable to improve quality. This treatment might be in the form of a reverse osmosis facility to remove nitrate and TDS, similar to what is being done at the existing Chino I Desalter and proposed at the Chino II Desalter.

Inland Empire Utilities Agency

This agency, originally named the Chino Basin Municipal Water District, was formed in 1950 to supply supplemental water to the region. The agency name was changed to the Inland Empire Utilities Agency (IEUA) in 1998 and it provides supplemental water, as well as regional wastewater and recycled water services, to seven contracting agencies. These are: City of Chino, City of Chino Hills, Cucamonga County Water District, City of Fontana, City of Montclair, City of Ontario, and the City of Upland. The agency participates in the implementation of the Optimum Basin Management Plan (OBMP) for the Chino Basin, particularly in managing salt loads and protecting groundwater.

The population served within the IEUA's jurisdiction is 661,000, projected to grow to 1,200,000 by the year 2025. The member agencies of the IEUA produce water in excess of the safe yield of the

Chino Basin, such that the IEUA, in cooperation with the Chino Basin Watermaster, has an extensive replenishment plan. This includes the capability to use its own recycled water from its four wastewater treatment facilities, which total a potential of 70,000 acre-feet of recycled water. This water is currently distributed to 37 clients through a backbone pipeline system, mostly for landscape irrigation in Chino and Chino Hills. For the year 2020, the plan is to use recycled water for groundwater recharge (28,000 acre-feet), landscaping (29,400 acre-feet), and industrial use (12,500 acre-feet).

In terms of adding RIX recycled water to the above program, the delivery path would be similar to that of the Watermaster, i.e., a seven to nine mile long pipeline extending from the RIX facility to the RP-3 site, north of and adjacent to Jurupa Hills. There are additional infrastructure possibilities for connection to the IEUA's backbone system in the future. This assumption is based on a backbone recycled water distribution system that is proposed to be installed by IEUA in the Chino Basin over the next 3 to 5 years. As noted above, if IEUA facilities are not available to help move RIX recycled water throughout the west valley, then separate pipelines would have to be installed to deliver the recycled water.

One of IEUA's member agencies, Cucamonga County Water District has expressed an interest in acquiring several thousand acre-feet of RIX recycled water and it would receive this water in a manner outlined under the So Cal agency, as described below.

So Cal

So Cal is the principal operating subsidiary of the American States Water Company, a publicly-traded (NYSE) water utility company. It provides municipal and industrial water service to communities throughout southern California, including areas located in both the Chino Basin and the Orange County Basin. So Cal's Claremont service has 11,280 customers, which uses 27 wells producing water from two different groundwater basins, Six Valleys and Chino Basin. However, the total adjudicated production rights in these basins is only about one-third of the service's annual demand of 12,000 acre-feet of water and only 10 percent of the total groundwater is produced in the Chino Basin. To provide the required supplemental water, So Cal has four connections to Metropolitan Water District (imported) water supply.

So Cal also operates water distribution systems in Placentia and Los Alamitos. These systems are adjacent to the Yorba Linda Water District system and the City of Anaheim system, both of which are riparian to the Santa Ana River. Placentia and Los Alamitos produce a combined total of roughly 75 percent of their water needs from 21 wells completed in the Orange County Basin and provide the remainder through purchase from Metropolitan Water District. Generally, So Cal serves areas with increasing populations and associated increasing demands for water resources.

Although So Cal's water production facilities are in Management Zone 1 of the Chino Basin, too far from the RIX facility for practical direct delivery of recycled water, the company has storage, production and export rights in the Chino Basin through the Chino Basin Watermaster. Using the same path as for deliveries to the Watermaster, So Cal could take water by exchange. Because Management Zone 1 has a better balance between groundwater recharge and discharge than Management Zone 3, an "over-exchange" could be arranged to recognize the value of sub-area water balance provided by the RIX facility output. Alternatively, once connected to the proposed

IEUA recycled water distribution system or a system installed by the Department, recycled water could possibly be delivered to Management Zone 1, with adequate pumping infrastructure. So Cal's extensive network of both physical facilities and service areas in the region could make further exchanges possible on an intra-company basis.

Another option could be the establishment of an agreement with Orange County Water District to store water in the Basin. This water could be delivered by discharge from the RIX facility to the Santa Ana River, as is currently occurring. The groundwater storage agreement might include provisions for the waiver of the replenishment assessment. Water from the RIX facility could also be delivered via exchange or by delivery through the existing facilities of the Orange County Water District.

The infrastructure requirements would be similar to those required for deliveries to the Watermaster within Chino Basin. Additionally, So Cal would have to either develop additional production capacity within the Chino Basin, or arrange exchanges with other producers who already have excess production capacity.

Jurupa Community Services District

The Jurupa Community Services District serves 2,163 acres with an additional 715 acres by annexation. The District serves the unincorporated communities in the Jurupa Valley of Riverside County, including Agua Mansa, Belltown, Rubidoux, Sunnyslope, Glenn Avon, Country Village, Pedley, Indian Hills, Jurupa Hills, Mira Loma, and Country Village. The District is composed almost entirely of parcels used or planned to be used for residential, commercial and industrial purposes. The District is located approximately 7 miles west of the City of Riverside, generally south of State Highway, and both east and west of Interstate 15. The District manages facilities for water, sewer and flood control.

The District could function as a central buyer for recycled water from the RIX facility. There are other small services that could be potential buyers in this area, such as Glen Avon Heights Mutual Water Company, Rubidoux Water Department, Santa Ana River Water Company, and Fort Fremont Mutual Water Company. Water would be delivered in a manner similar to that proposed for the Watermaster, i.e., pipeline to Jurupa Hills area, then infiltration in the RP-3 or Declez Basins which are situated in Management Zone 3 of the Chino Basin.

Orange County Water District

This District was formed in 1933 to protect the overdrafted Orange County Basin from agricultural overproduction. The District safeguards and supplements the groundwater supplies for more than 20 cities and water districts, which serve approximately two million people in northern Orange County. The district owns 1,600 acres of land along the Santa Ana River in Anaheim and has constructed and converted facilities to capture essentially all of the flows to recharge the Basin. Most of the water in the groundwater basin is directly recharged by the Santa Ana River bed. The Prado Dam, built primarily as a flood control structure after a devastating 1938 flood, regulates the SAR flow. The Basin produced 356,000 acre-feet of groundwater in 1999. The District also maintains facilities and purchases supplemental imported water from Metropolitan Water District

of Southern California (MWDSC). The District desires to reduce reliance on imported water by increasing groundwater production from the Basin to 500,000 acre-feet by 2020 through MWDSC.

San Bernardino could continue to discharge RIX water into the Santa Ana River at its current flows or select a more direct delivery system through a pipeline that could follow existing rights-of-way along the Santa Ana River corridor or through the RP-3 site. This option would benefit Orange County Water District and its producers in providing water downstream for recharge to the Basin. However, it is a significant amount of recycled water for which no compensation is received. There would be no infrastructure requirements for the run-of-river delivery option, as Orange County Water District has existing and planned infiltration facilities, several for percolation directly into the Santa Ana River bed and nine percolation basins within the cities of Anaheim and Orange.

Santa Margarita Water District

All of the drinking water for Santa Margarita Water District is imported water, purchased from Metropolitan Water District through the Municipal Water District of Orange County. It comes from one of two sources: the Colorado River Project and the State Water Project. Water from both systems is treated to drinking water standards at the Diemer Filtration Plant in Yorba Linda, then piped to the district through two main lines. However, the District produces much recycled water, 1.5 MGD at its Oso Creek Water Reclamation Plant. This water is used for irrigation throughout the City of Mission Viejo and partially offsets the need for imported water. The District plans to expand the use of groundwater for irrigation with additional water reclamation facilities, desalination facilities, stream flow capture, water conservation and water transfers from outside of the area.

Water produced by the RIX facility could meet a portion of the incremental demand of the District. The District has a stated priority of gaining practical access to the Orange County Basin (Santa Ana River flow), which has not been available up to this point due to historic political agreements. In order to develop this alternative, then, a new diversion from the Santa Ana River near Yorba Linda would have to be approved. The water could then be introduced into the intake of the Diemer Filtration Plant for delivery to the District through existing facilities. Use of Metropolitan Water District facilities could be expensive, especially if there are needs for changing treatment. Additional filtration could be necessary to upgrade the Santa Ana River water diverted for introduction into the pipelines serving this district. An option would be to negotiate a pumping agreement between Orange County Water District and this District for water infiltrated in the ponding areas of the Orange County Water District system along the Yorba Linda and Anaheim reaches of the Santa Ana River, or to negotiate delivery by exchange with an existing member agency of the Orange County Water District or MWDSC.

Regarding infrastructure requirements, a treatment change could be necessary. Alternatives that involve a new diversion from the Santa Ana River could require development of a well field to recapture subsurface flows from the alluvium or of additional infrastructure to treat water in the River for delivery in existing or new pipelines.

3.2.2.3 Features of Alternatives

Each of the alternatives needs to be developed further, especially in terms of jurisdictional and financial arrangements, and physical features for which environmental issues and impacts can be

assessed. However, at this point, for the purposes of the programmatic EIR, the general features of the proposed program are presented in the following table, Table 3.2-1.

3.2.2.4 Regional Recycled Water Sales

In addition to the specific alternative potential water customers outlined above, Western Water Company's marketing could result in delivery of RIX recycled water to any customers within the Santa Ana River Basin, or adjacent basins which are connected by water infrastructure or agreements that would permit such purchases and transfers. Such sales are undefined at this time, but an environmental evaluation for such generic water sales, water supply infrastructure, and water utilization is provided in the context of this PEIR. This analysis will be presented based on assumptions regarding potential impacts for sale of RIX recycled water up to 18,000 afy; for certain assumed infrastructure components (pipelines, pump stations, recharge basins, etc.); and for assumed water uses and the context in which the use will occur. In the future when individual sales projects are evaluated, the potential impacts of such a sale, distribution and use will be reconsidered in light of this PEIR, and, when potential impacts from such second-tier projects are considered in the future, additional environmental documentation can be prepared in accordance with State CEQA Guidelines Section 15162.

Table 3.2-1
SUMMARY OF THE MARKET ALTERNATIVES FOR RIX FACILITY RECYCLED WATER

Prospective Purchaser	Chino Basin Watermaster	Inland Empire Utilities Agency	Southern California Water Company	Jurupa Community Services District	Orange County Water District	Santa Margarita Water District
Primary Feature	Delivery from RIX facility	Delivery from RIX facility	Delivery from RIX facility	Delivery from RIX facility	Continued discharge to SAR	Continued discharge to SAR
Secondary Features	Nine-mile pipeline to Chino GW Basin MZ 3	Nine-mile pipeline to Chino GW Basin MZ 3	Nine-mile pipeline to Chino GW Basin MZ3; Water by exchange	Nine-mile pipeline to Chino GW Basin MZ3	Continued use of existing and planned infiltration facilities	New diversion from lower SAR required
Infra-structure Needs	Booster pumps; Pipeline; Infiltration galleries; Treatment with RO possible	Booster pumps; Pipeline; Infiltration galleries; Additional pipelines	Booster pumps; Pipeline; Infiltration galleries; Additional production facilities	Booster pumps; Pipeline; Infiltration galleries	None above those already planned	New pipelines; Pumping facilities; Additional filtration process possible
Environmental Issues and Impacts	Diversion of flows from SAR; Pipeline construction; Water quality	Diversion of flows from SAR; Pipeline construction; Water quality	Diversion of flows from SAR; Pipeline construction; Water quality	Diversion of flows from SAR; Pipeline construction; Water quality	Pipeline and percolation facilities construction as planned; Water quality	Pipeline, pumping and treatment facilities construction
Costs and Benefits	Income for producer; Costs for infrastructure to both user and producer	Income for producer; Costs for infrastructure to both user and producer	Income for producer; Costs for infrastructure to both user and producer	Income for producer; Costs for infrastructure to user (funds available)	No income for producer; Continued benefits to user	Income for producer; Facility costs to user; Impacts on other users of lower SAR

3.3 USES OF THIS ENVIRONMENTAL IMPACT REPORT

As previously stated, the City of San Bernardino Municipal Water Department Board of Directors must approve and certify the PEIR before any of the proposed actions identified above will be allowed to proceed and cause the corresponding changes to the physical environment. This PEIR will be used as the information source and CEQA compliance document for the following discretionary action or approval by the Department: authorization for Western Water Company or the Department to market, sell and deliver up to 18,000 afy of RIX facility recycled water.

Other public agencies not listed here may also choose to utilize this PEIR to evaluate discretionary actions for compliance with CEQA guidelines and regulations. For example, any agency purchasing water from the RIX facility could rely upon this PEIR as a Responsible Agency to comply with CEQA. Other agencies that could utilize this PEIR as a Responsible Agency include:

- Department of Health Services
- State Water Resources Control Board, National Pollutant Discharge Elimination System (NPDES) (construction permit), and Storm Water Pollution Prevention Plan.
- Corps of Engineers, California Department of Fish and Game, and Regional Water Quality Control Boards, permits or waivers for crossing of existing stream channels, even if crossings are borings beneath the channel.
- Counties and local cities, acquisition of encroachment permits where required.

No other permits are known that may or will be required as part of the implementation of the proposed project.

3.4 ALTERNATIVES

3.4.1 No Project Alternative

The No Project Alternative would result in all proposed RIX recycled water sales, facilities and water use not being developed. This alternative would eliminate proposed sale up to 18,000 afy to other agencies and the effect of maintaining discharges into the Santa Ana River will be examined under this alternative.

3.4.2 Implement a Reduced Volume of Water Sales

Western Water Company has indicated that the minimum volume of RIX recycled water it must market to make the proposed project feasible is 5,000 afy. This volume of RIX recycled water sales will be examined as an alternative to the proposed project.

3.4.3 Alternative Facility Locations

The proposed project could theoretically be located at another site within the Santa Ana River Basin. However, the RIX facility is fixed in place at its existing location and the California Supreme Court determined the following in previous case law, *Citizens of Gillette Valley* v. *Board of Supervisors*, 1988:

> "[A] project alternative which cannot be feasibly accomplished need not be exhaustively considered. A feasible alternative is one which can be accomplished in a successful manner within a reasonable period of time, taking into account economic, legal, social and technological factors." [Citations.] Surely whether a property is owned or can reasonably be acquired by the project proponent has a strong bearing on the likelihood of a project's ultimate costs and the changes for an expeditions and successful accomplishment."

The RIX Facility Recycled Water Sales Program is a proposal for sale of recycled water from a specific facility, and only that water being contributed by the City of San Bernardino (the rest of the water comes from Colton). There is no other location or facility under the City's control which could provide this volume of water to meet the project objectives. It is not possible to transfer this recycled water resource and its potential sale to another facility or location and reasonably meet

the project objectives defined above. The Supreme Court ruled that it is not necessary to consider alternative locations when such an alternative is not reasonable or feasible. Therefore, the alternative of implementing the proposed project at another location is not considered a reasonable or feasible alternative to the proposed project and will not be given further consideration.

3.5 RELATED PROJECTS

The Orange County Water District has submitted applications to the State Water Resources Control Board to obtain water rights to the flows of all water reaching Prado Dam. The Inland Empire Utilities Agency and Chino Basin Watermaster are in the process of installing the infrastructure systems to utilize approximately 70,000 acre-feet of recycled water in the future for groundwater recharge, irrigation and industrial uses. No other projects related to recycled water use are known to occur within the Santa Ana River Basin at this time.

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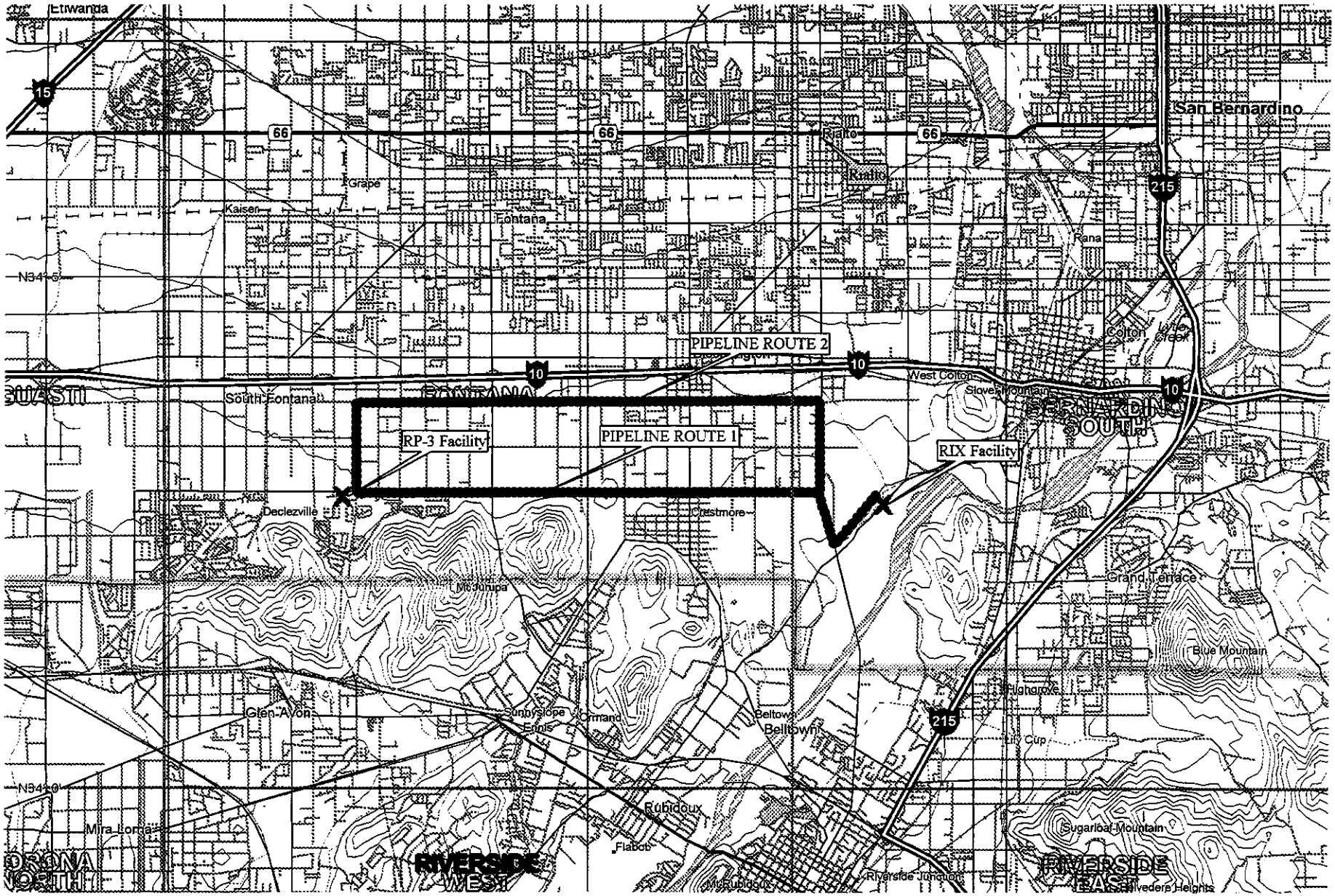
FIGURE 3.1-1
RIX Facility Location



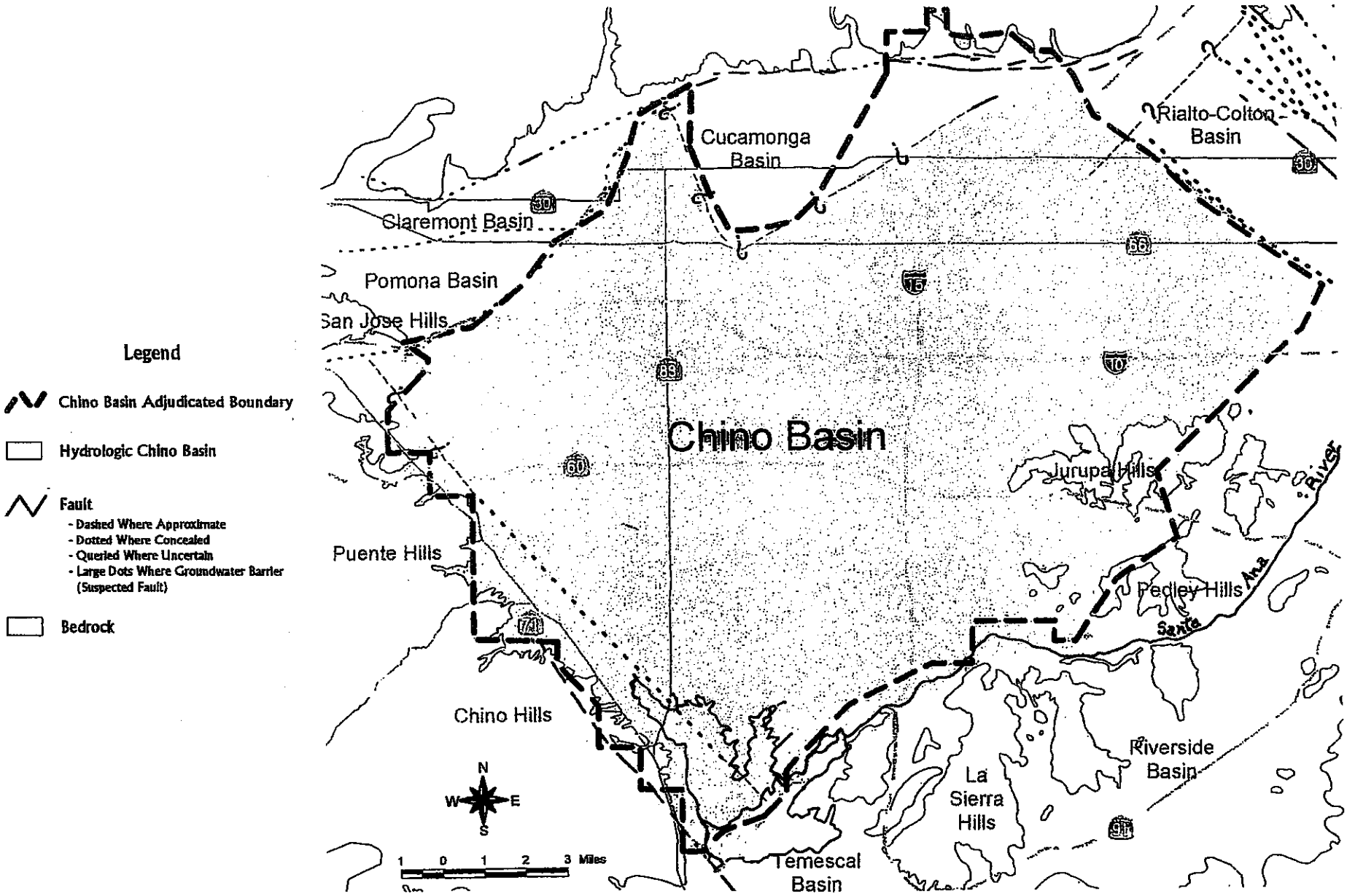
Source: Albert A. Webb Associates (derived from USGS San Bernardino South Quadrangle)

FIGURE 3.2-1
IEUA RP-3 Facility in Relation to RIX Facility



Source: 3-D TopoQuads DeLorme

FIGURE 3.2-2
Santa Ana Watershed Showing Chino Groundwater Subbasin



Source: OBMP Phase I Report, Figure 1-1

CHAPTER 4 – ENVIRONMENTAL IMPACT EVALUATION

Note: All Chapter 4 figures are located at the end of this chapter, not immediately following their reference in the text.

This chapter of the Program Environmental Impact Report (PEIR) provides the detailed information used to forecast the type and significance of potential adverse environmental impacts that implementation of the proposed program can cause if the program is implemented as described in Chapter 3 of this document. In the following subchapters each of the environmental topics identified in the Notice of Preparation (NOP) and Initial Study and as having a potential to cause significant impact is evaluated. The environmental impact analysis section for each environmental topic is arranged in the following manner:

a. An introduction that summarizes the specific issues identified in the NOP and the Initial Study process as specific environmental topics that will be discussed;

b. A summary of the current or existing environmental setting for each physical resource or human infrastructure system is presented as the physical baseline for the environment from which impacts will be forecast;

c. Based on stated assumptions, the potential impacts without applying any mitigation are forecast and the significance of impacts is assessed using identified criteria or thresholds of significance;

d. Recommended measures that can be implemented to substantially lessen potential adverse environmental impacts are identified, and their effectiveness in reducing impacts to non-significant levels is evaluated;

e. Potential cumulative adverse environmental impacts are assessed under each environmental topic, where applicable; and

f. Unavoidable adverse environmental impacts, including significant unavoidable impacts, are identified, and any adverse impacts that may be caused by implementing mitigation measures are addressed.

In order to provide the reviewer with a criterion or set of criteria with which to evaluate the significance of potential adverse impact, this document provides issue-specific criteria, i.e., thresholds of significance, for each topic considered in this PEIR. These criteria are either standard thresholds established by law or policy (such as ambient air quality standards) or project-specific evaluation thresholds that are developed and used specifically for this program. After comparing the forecasted physical changes in the environment that may be caused by the proposed program with the significance threshold criterion or criteria, a conclusion is reached on whether the proposed program has the potential to cause a significant adverse environmental impact for the issue being evaluated.

Measures to reduce adverse environmental impacts are identified and described in this chapter of the PEIR. Over the past several years, mitigation has evolved in scope and complexity. As society responds to environmental issues that affect whole communities, last year's mitigation measures are integrated into rules and regulations, such as the Uniform Building Code or Water Quality Control Plans. Measures incorporated into rules and regulations become mandatory requirements (not discretionary) and they no longer need to be identified as project specific mitigation measures. Land use jurisdictions, such as the cities or county within the project area, similarly incorporate former mitigation measures into the agency's "standard conditions of approval" for projects under their purview.

Finally, as developers and planners become more sophisticated, they integrate sound environmental mitigation into their project design. As a result, the boundary between regulatory requirements, standard conditions, proponent design guidelines and mitigation measures identified in environmental documents, all designed to reduce significant environmental impacts, gets blurred. The discussion of mitigation measures under each environmental topic summarizes all of the various measures to reduce potential significant adverse environmental effects, either to the extent feasible or to a level of nonsignificance. After determining the degree of mitigation that can be achieved by the proposed measures and after identifying any adverse impacts that the mitigation measures can cause, a conclusion is provided regarding the significant and/or unavoidable adverse impact for each environmental topic.

This document utilizes conservative (worst case) assumptions in making impact forecasts based on the assumption that the impact forecasts should over predict (if they cannot be absolutely quantified) consequences, rather than under predict them. The information used and analyses performed to make impact forecasts are provided in depth in this document to allow reviewers to follow a chain of logic for each impact conclusion and to allow the reader to reach independent conclusions regarding the significance of the potential impacts described in the following subchapters. Reviewers are encouraged to comment on the analyses, conclusions and the thresholds of significance used to make the forecasts of adverse environmental impacts in this PEIR.

4.1 LAND USE

4.1.1 Introduction

Land use issues were included as a topic for evaluation in this PEIR to determine if any potential land use or growth inducement impacts are associated with the installation of facilities and with the operation of the proposed RIX Recycled Water Sales Program. Any facilities that are constructed as a part of this program need to be consistent with the General Plans of the agencies with land use jurisdiction over the sites. Additionally, these facilities must be constructed to minimize incompatibilities with existing and prospective future uses on adjacent and downgradient land. The NOP and initial study processes identified several land use issues that are evaluated in this subchapter of the PEIR. The following land use issues have been identified as topics for discussion to determine the significance of environmental impacts associated with program implementation:

- Land use conflicts (construction and operation impacts),
- Physical division of an established community,
- Growth inducement,
- Inconsistencies between proposed project and applicable general plans and regional plans, and
- Inconsistencies with any applicable habitat conservation plan or natural community conservation plan.

This subchapter of the PEIR addresses the above issues and has been compiled by relying primarily upon data contained in a previous planning document prepared in support of the Chino Basin Optimum Basis Management Program, the Inland Empire Utilities Agency's (IEUA) Final Environmental Impact Report (FEIR) for Water Facilities Master Plans, the Santa Ana Watershed Project Authority's (SAWPA) Integrated Water Resources Plan (1998 and 2002 Update), and the General Plans and other pertinent planning documents for the program area, and data from the National Water Quality Assessment Program for the Santa Ana Watershed and Basin. These planning documents include the general plans for the following agencies: cities of Colton, San Bernardino, Riverside, Norco, Corona, the counties of Riverside and San Bernardino; and the Southern California Association of Government (SCAG) publications: Regional Comprehensive Plan and Guide (RCPG) and Regional Mobility Plan (RMP). One issue examined in this subchapter is growth inducement. It is a key issue of concern related to implementation of the program and by examining it in this first chapter of the PEIR, the stage is set to include the implications for growth in all subsequent sections of this document.

4.1.2 Environmental Setting

4.1.2.1 Existing Land Use Designations

For most of the alternatives presented in Chapter 3 (Project Description) of this document, the only facilities that are proposed in conjunction with this program are subsurface pipelines that would be constructed within existing road rights-of-way. Within both San Bernardino and Riverside counties and the other incorporated cities that the proposed program area encompasses, water-related facilities constructed within such rights-of-way are generally considered fully consistent with each jurisdiction's planning documents. The construction of a diversion outlet for the Santa Margarita

Water Company purchase alternative would similarly be considered consistent with a local agency's general plan since the diversion is a water-related facility designed to help deliver and transport water.

The National Water Quality Assessment Program (NWQAP) – Santa Ana Basin Study Unit covers an area of about 2,700 square miles encompassing parts of Orange, San Bernardino, Riverside and Los Angeles counties. The entire Santa Ana River Basin is substantially urbanized: about 32 percent of the land use is residential, commercial, or industrial, and the area is home to more than 4 million people. Agricultural land use accounts for about 10 percent of the watershed, according to this study.

The Santa Ana River is the largest stream system in southern California, beginning in the San Bernardino Mountains and flowing more than 100 miles to the Pacific Ocean. Groundwater is the main source of water supply in the watershed, providing about 66 percent of the consumptive water demand. Inland aquifers upstream from Prado Dam underlie about 1,200 square miles of the NWQAP study unit. Thickness of these aquifers ranges from several hundred to more than 1,000 feet. Depth to groundwater ranges from several hundred feet near the base of the mountains to near land surface along rivers and wetlands, such as immediately upstream of Prado Dam. Imported water from northern California and the Colorado River is also an important source of water supply, accounting for about 27 percent of the region's water supply to meet consumptive demand. Other sources of supply include surface water derived from precipitation within the basin (4 percent) and recycled water (3 percent). (http://ca.water.usgs.gov/sana_nawqa/env_set.html)

The RIX Recycled Water Sales Program could ultimately involve the entire Santa Ana River watershed. At this time, however, the market alternatives likely to be developed first appear to only affect two key areas, the Santa Ana River corridor upstream of Prado Dam, and the Chino Groundwater Subbasin. The other market alternatives could affect the River downstream of Prado Dam and into Orange County. Thus, the land use issues will be addressed by this PEIR as: (1) the upper Santa Ana River watershed generally, (2) a study area addressing pipelines and related facilities involving the Chino Basin, and (3) the lower watershed.

Upper Santa Ana River Watershed

A document recently completed, *Final Technical Memorandum for the TIN/TDS Study-Phase 2B of the Santa Ana Watershed Wasteload Allocation Investigation* (Wildermuth Environmental, Inc., October 2002), contains a characterization of existing and future and uses within the entire Santa Ana River watershed upstream of Prado Dam, but excluding the drainage area tributary to Lake Elsinore. The area addressed in the Investigation encompasses an estimated 668,346 acres. Land uses were presented in two ways, those based on the Anderson land use code system, which numerically distinguishes various land use types (SCAG and SAWPA databases), and those converted to the WLAM (Wasteload Allocation Model) system in order to develop the hydrological model that was used in the TIN/TDS Study. The data used for the study were from 1993 surveys, which are the most recent and comprehensive surveys available.

A summary table of the major land use categories/descriptions under the Anderson land use code system are shown as follows in Table 4.1-1. It can be seen that over 42 percent of the identified land uses are urban, with residential comprising the biggest percentage. Also, "vacant" land is over

42 percent. The types represented under this category are: vacant undifferentiated, abandoned orchards and vineyards, and vacant with limited improvements. Agriculture comprises 11.7 percent of the identified land uses, with orchards and vineyards and cropland and improved pasture land as the greatest uses. The percentages of the entire watershed are somewhat lower, in that the entire watershed has not been surveyed according to these categories, probably accounted for in national forest and other resources land.

Table 4.1-1
LAND USE DATA FOR THE UPPER SANTA ANA RIVER WATERSHED

Land Use Category	Total Area (acres)	Percentage of Identified Land Use Area	Percentage of Watershed
URBAN OR BUILT-UP	287,638	42.6	29.0
Residential	160,028	23.9	16.3
Commercial and Services	33,380	5.0	3.2
Industrial	24,728	3.6	2.3
Transportation, Communications and Utilities	26,810	3.8	2.8
Mixed Commercial and Industrial	631	0.1	0.1
Mixed Urban	62	0.0	0.1
Under Construction	8,569	1.3	0.0
Open Space and Recreation	9,959	1.4	1.0
Urban Vacant	23,471	3.5	2.4
AGRICULTURE	77,985	11.7	8.0
Cropland and Improved Pasture Land	29,833	4.5	3.0
Orchards and Vineyards	31,316	4.7	3.2
Nurseries	1,751	0.3	0.2
Dairy and Intensive Livestock	8,912	1.3	0.9
Poultry Operations	728	0.1	0.1
Other Agriculture	3,458	0.5	0.4
Horse Ranches	1,987	0.3	0.2
VACANT	286,366	42.9	29.2
WATER	10,761	1.6	1.1
OTHER	3,597	0.5	0.4
TOTALS	**668,346**	**100**	**68.2**

Source: Wildermuth Environmental, Inc., 2002

Chino Basin

The "Final Task I Memorandum" (Memorandum) was prepared in 1993 by a team led by James M. Montgomery, Consulting Engineers (now Montgomery Watson). This document was developed to assist the Chino Basin Watermaster to develop management programs for the Chino Groundwater Basin and establishes a baseline for land uses within a "Study Area" that will be used in this PEIR. Table 4.1-2 lists the planning areas and agencies included within the Study Area that are relevant to the current program under discussion. The Study Area defined in the Memorandum was much

more extensive than the program area adjacent to the Santa Ana River, as it encompassed an estimated 225,937 acres extending from Pomona on the west to Rialto and Jurupa Community Services District (JCSD) on the east and Rancho Cucamonga on the north and Corona on the south. This Study Area includes the entire Chino Groundwater Basin administered by the Chino Basin Watermaster and the service area administered by IEUA. The JCSD is located within the boundaries of this Study Area and is a member of the Chino Basin Watermaster.

This Study Area occupies a land area that extends from the western boundary of the Santa Ana River. For most of the water sales alternatives, the prospective purchasers would be transporting water within this Study Area. The identified study area's existing land uses are dominated by residential development (~29%) and vacant areas and agricultural land (~43%). The vacant land within the study area occurs primarily in the southern, northern and central portions of the study area. Open space areas in the southern portion of the study area are dominated by Chino Hills State Park (recreational open space), Prado Flood Control Basin (Santa Ana River flood control and riparian woodland/wildlife habitat subject to innundation) and agricultural lands. The Jurupa Hills form and open space island in the central eastern portion of the study area.

Table 4.1-2
JURISDICTIONS AND PLANNING AGENCIES BORDERING
THE SANTA ANA RIVER AND EXTENDING TO OR WITHIN THE CHINO BASIN

Planning Area	Planning Agency
Corona	City of Corona
Colton	City of Colton
Fontana	City of Fontana
Rialto	City of Rialto
El Prado Park and Golf Course	San Bernardino County
Jurupa	Riverside County
Mira Loma	Riverside County
Pedley Hills	Riverside County
Rubidoux	Riverside County
Norco	City of Norco
Riverside Agricultural Preserve[1]	Riverside County
San Bernardino Agricultural Preserve	San Bernardino County

Note: 1 Included in Jurupa Community Services District Plan.

The program area that is located east of this Study Area includes the cities of Colton, Redlands, Grand Terrace, San Bernardino and Riverside and portions of unincorporated San Bernardino and Riverside counties. Because portions of Corona and Norco fall within the Study Area, these entire jurisdictions were included in the analysis portion of the Task I Memorandum. and these cities are listed along with their corresponding Planning Agency that administers their General Plan in Table 4.1-2. For program approval and implementation of the proposed subsequent individual projects to occur, the program must be found to be consistent with all area planning documents.

Lower Santa Ana River Watershed

Generally, the alternative market areas not located within the previously described upper watershed or Chino Basin do not appear to pose substantial alterations in any existing land uses or conflict with any general plan. The Santa Margarita Water District alternative would require the construction of a new diversion from the Santa Ana River (SAR) near Yorba Linda. The diversion is considered to be water-service related infrastructure, and thus does not conflict with existing land use designations within the Santa Ana River channel. The Orange County Water District (OCWD) alternative would capture the water through recharge within the SAR and existing off-channel facilities and with extraction facilities along the Santa Ana River within the cities of Anaheim and Orange. This alternative would not necessarily require the construction of any new water-related facilities. The So-Cal alternative could operate through a storage agreement with OCWD or the Chino Basin Watermaster. This alternative would require only the new pipeline facilities proposed under the Watermaster or OWCD alternatives, which can be implemented in a manner fully consistent with the area's governing general plans.

If future circumstances dictate delivery of RIX recycled water to these other land use jurisdictions (such as the Santa Margarita Water District, So-Cal and the OCWD), additional review of potential land use issues will be conducted for the proposed facilities and the delivery program to these organizations.

4.1.2.2 Discussion of Regulations Controlling Water Facility Infrastructure Development

California Government Code Section 53091 specifies that water supply facilities, such as those associated with the proposed program, are exempt from zoning restrictions. Specifically, the text of the Section 53091 states: *Zoning ordinances of a county or city shall not apply to the location or construction of facilities for the production, generation, storage or transmission of water....* The purpose of this section is to ensure that water system infrastructure can be installed to meet the demand by all water consuming land uses and it recognizes the universal role that water supply plays within our society.

Based on the above referenced California Government Code section and the general support for water system infrastructure contained in all area general plans, there are very few land use regulation constraints that will limit the future development of adequate water system infrastructure to support the proposed program. It should be noted that most agencies carefully coordinate the implementation of water system infrastructure to ensure that individual facilities will meet overall goals and objectives of the general plans (such as the build-out land uses within a jurisdiction), not just the water supply and management goals and objectives of such plans.

4.1.2.3 Discussion of California State Water Code Relating to Recycled Water

On October 7, 2001, the Governor approved California State Assembly Bill Number 33 1. Under this bill, the Department of Water Resources (the principal state agency with control over water) is required to convene a 2002 Water Task Force. As Identified in Section 13578 the purpose of the task force is *to identify and report to the Legislature on opportunities for increasing the use of recycled water ... and identify constraints and impediments, including the level of state financial assistance available for project construction, to increase the use of recycled water.*

The purpose of the proposed recycled water sales program is in direct support of Sections 13578 and 13577 of the California State Water Code, and this project directly attempts to increase the use of recycled water so that it benefits the population which generates and funds treatment of this resource.

4.1.3 Project Impacts

Implementation of the RIX Facility Recycled Water Sales Program will result in limited direct physical change to existing land uses within the study area. Indirectly, the proposed program will support changes in land use by contributing to an adequate water supply to meet long-term, ultimate growth and development projections within the study area as envisioned in each jurisdictions land use plans. Table 4.1-3 contains a list of potential project alternatives and the estimated acreage that will be necessary in order to support program development and implementation in the future.

4.1.3.1 Threshold of Significance

There are no formal standards or thresholds for evaluating the significance of land use impacts. Even when evaluating a potential for land use conflicts, a number of factors must be considered (such as noise, different activity patterns of land uses, odors, etc.) in determining the significance of potential conflicts. Since there are no formal thresholds that define significant land use impacts, the following thresholds will be utilized in evaluating the significance of potential land use impacts from implementing any of the alternatives outlined in the project description (Chapter 3 of this document):

- The project causes an unavoidable conflict with a general plan land use designation or zoning classification;
- The project conflicts with, or is inconsistent with, applicable environmental plans or policies adopted by agencies with jurisdiction over the project to the extent that the conflict is unavoidable and unresolvable;
- The project is incompatible with existing land use in the vicinity;
- The project results in an unavoidable disruption or division in the physical arrangement of an established community (including a low-income or minority community; and

Table 4.1-3
PROSPECTIVE PURCHASER ALTERNATIVES AND AREAS OF IMPACT

Prospective Purchaser Alternatives	Estimated Total Area for New Facilities (in acres)	Assumptions and/or Comments
Cucamonga County Water District (CCWD) Alignment used in this estimate: Agua Mansa Road to Riverside Avenue to Slover Avenue to RP-3 site at Beech and Jurupa Avenues	61.1	• 1,000 square feet for appurtenances • 1 acre for a new pump station • 46,800 feet of pipeline with a 20-30 foot easement
Chino Basin Watermaster Utilizes the same alignment as the CCWD alternative	61.1	• 1,000 square feet for appurtenances • 1 acre for a new pump station • 46,800 feet of pipeline with a 20-30 foot easement
So-Cal Utilizing storage, production and export rights within the Chino Basin, So-Cal can utilize the same delivery pathway as Watermaster and/or CCWD	61.1	• 1,000 square feet for appurtenances • 1 acre for a new pump station • 46,800 feet of pipeline with a 20-30 foot easement
Orange County Water District Delivery would be through the Santa Ana River to OCWD facilities down-stream	~1	• Up to 1 acre for a new pump station or diversion outlet • Pipelines (area of impact unknown at this time for this project)
Santa Margarita Water District	2.5	• Up to 2.5 acres adjacent to the Santa Ana River for a diversion outlet and associated structures • Pipelines (area of impact unknown at this time for this project)
Jurupa Community Services District As with the CCWD and Watermaster alternatives, delivery would first be to RP-3 to access IEUA's water transport network for ultimate infiltration in the local recharge basins	61.1	• 1,000 square feet for appurtenances • 1 acre for a new pump station • 46,800 feet of pipeline with a 20-30 foot easement

- The project induces significant growth within the project area or in the region.

Each of these significance thresholds will be applied to the potential land use impacts forecast to occur from implementing the proposed program, and a conclusion regarding the significance of potential land use impacts will be clearly presented in the following analysis.

a. Can implementation of the project cause significant conflict with the General Plan or zone designations?

The main type of infrastructure that will be constructed in support of the proposed program are pipelines and related facilities such as appurtenances and blow-offs. Specific locations for these facilities have not been selected at this point in time. Therefore, the location of these facilities will be determined on a case-by-case basis in the future, however, pipeline construction is currently proposed within existing road rights-of-way, which are already highly disturbed. Thus pipelines are not forecast to cause any significant conflicts with local general plans. Further, as stated in California Government Code Section 53091, these facilities are not subject to zoning ordinances. Each of these facilities is also consistent with the general goals, objectives and policies of general plans within the Study area that an "adequate supply of safe water" be provided for residents and that use and consumption of water is properly managed.

With the possible exception of direct conflicts with adjacent land uses, discussed below, implementation of the program is not forecast to cause any significant conflicts with general plans or zoning designations for those jurisdictions within the study area or overall area of impact. This conclusion is based on the findings outlined above and the recognition in the general plans that communities in the Study area must allow for adequate water system infrastructure, as such infrastructure is an essential component of future growth, just as are adequate roads, utilities, wastewater and other infrastructure systems.

With regard to potential conflicts with regional plans, the regional population forecasts contained in the SCAG publications, particularly the RCPG, are all based on the adopted general plans of the jurisdictions located within the Study area. The program does not contain any policies or propose any activities that would modify or affect any general plan; it simply provides a program to better manage the use of recycled water within southern California and to enhance the overall future water supply of this region, as it will provide another source of water to meet certain future water demands envisioned in these general plans. The activities that will be supported by the proposed program are one level removed from the actual design, construction and operation of the water systems required to meet the demand from potential water purchasers in the southern California area. As such, the implementation of the program is consistent with the RCPG population forecast and has no potential to modify this forecast in any manner:

b. Will the project create a significant conflict with applicable environmental plans or policies adopted by agencies with jurisdiction over the project?

The agency with jurisdiction over adoption and implementation of the project is the City of San Bernardino. The applicable environmental policies that affect the program area are contained in the local jurisdiction general plans and the agencies with oversight regarding the proposed activities contained in the project description. These agencies include the California Department of Health

Services (DHS) that regulates the reuse of recycled water and the Santa Ana Regional Water Quality Control Board (RWQCB) and the Water Quality Control Plan Santa Ana River Basin (1995 Basin Plan), which establish beneficial uses and water quality objectives for water resources in the Chino Basin and for most of the area being considered for delivery of RIX recycled water.

Regarding the environmental plans and policies contained in general plans of local land use agencies within the project area, implementation of the program has a potential for significant conflicts with certain policies or general plan elements. However, each of these environmental plan/policy issues is discussed separately in this PEIR and the following summarizes the conclusions reached in these evaluations regarding potential for significant conflicts with such plans:

1. Geology/Seismic Hazards: Because the proposed program has little potential to substantially raise or lower the water table in certain locations, potential geologic or seismic constraints will not be increased within the program area. Thus, the program would not conflict with goals, objectives and policies in the Geology Section of the general plans. The evaluation of these issues in the PEIR indicates that no potential exists for adverse geologic impacts to result from implementing the program.

2. Flood Hazards: The proposed sale of recycled water from the RIX facility prior to its delivery to the Santa Ana River would actually decrease potential flood hazards rather than increase them by reducing overall discharges to the River. Since there would not be any significant increase in impervious or paved surfaces from the proposed program, there should be no measurable change in run-off into the region's flood control systems. Thus, there is no net increase in risk for flooding that would result from this program.

3. Fugitive Dust Hazards: Some of the general plans and the South Coast Air Quality Management District (SCAQMD) Air Quality Management Plan (AQMP) address high wind conditions and fugitive dust control policies. Some program alternatives will result in disturbing areas with exposure to high wind conditions (Santa Ana winds) or that will generate fugitive dust. Specific fugitive dust/wind erosion control measures are outlined in the AQMP and identified in this document. These measures will be implemented to ensure that fugitive dust generating activities do not conflict with local or regional particulate control plans.

4. Environmental Risks: Many of the general plans identify policies for addressing the potential risks associated with utilizing hazardous materials or transporting fluids by pipeline that could degrade the environment through accidental releases. The proposed program does not propose to transport any materials that are considered to be hazardous materials. No impact relating to environmental risks is forecast to occur as a result of program implementation.

5. Noise: Construction of specific program facilities will result in creating short-term noise effects on the environment. Pumping stations have a potential to cause noise during operation (long-term). Noise thresholds are established in local general plans. Implementation of the program will be carried out in conformance with these noise thresholds or standards and as a result, the program's implementation is not forecasted to have significant conflicts with the goals and policies of the local jurisdiction general plans with regards to noise.

6. Mineral Resources: Because no facilities or actions are proposed which would alter access to any mineral resources, no significant impact was identified that would be associated with program implementation.

7. Cultural Resources: Cultural resources (Native American, prehistoric and historic) occur throughout most of the Study area and a potential exists for facilities to impact such resources in conflict with plans and policies contained in Study area general plans. Specific mitigation measures have been identified to ensure that cultural resources are given adequate protection as individual facilities are developed in the future. With implementation of such mitigation measures, no significant conflicts with cultural resource goals and policies in the area general plans are forecast to occur.

8. Aesthetic Resources and Values: Each general plan for Study area jurisdictions defines significant views, aesthetic resources and design guidelines within a community. Goals and policies are established in these general plans to minimize conflicts with views, to protect scenic vistas and to meet aesthetic or design guidelines for new facilities. A potential exists for RIX recycled water facilities to conflict with plans and policies contained in the general plans of the affected land use jurisdictions. Specific mitigation measures have been identified to ensure that aesthetic resources are given adequate consideration and protection as individual facilities are developed in the future. With implementation of such mitigation measures, no significant conflicts with aesthetic or visual goals and policies is forecast to occur within the program's area of potential impact.

9. Recreational and Open Space Resources: Each general plan for the area of potential impact also identifies the type and extent of recreational facilities and open space resources that will be protected or established within a community. Goals and policies are established in these general plans to protect and minimize conflicts with recreational and open space resources. As the program does not propose any change to open space resources, no significant conflicts with recreational and open space goals and policies in Study area general plans are forecast to occur.

With regard to DHS regulations related to use of recycled water and the Basin Plan beneficial use designations, a detailed analysis of water quality issues is provided in this document in the Water Resources/Water Quality subchapter of Chapter 4. Fundamentally, the project is designed to increase reuse of recycled water within southern California. Water quality of the recycled water and its use are tightly controlled by the DHS regulations and use of recycled water must be shown to be feasible without significant conflicts with the Basin Plan beneficial objectives for existing water resources in the area of use. Potential conflicts with the DHS regulations and the water quality objectives defined in the Basin Plan must be resolved before a commitment can be made to the final use for the recycled water. Note that a project must obtain DHS approval for the intended use of the water at the specific delivery site prior to delivery of the recycled water to the prospective purchaser, unless it is considered incidental or unplanned groundwater recharge. Through a conscientious evaluation of the final market and use of the recycled water, the proposed program standards and requirements of both DHS and Regional Board goals can be fulfilled without causing a significant conflict.

As with any project being implemented as part of a program extending over many years, a potential exists for plans and policies to change or for a specific project to pose a potentially significant conflict with existing plans and policies. Based on the type of projects envisioned for implementation under this program, and the measures available to control or avoid such conflicts, the analyses in this PEIR indicate that such potential conflicts, as outlined above, can be managed, or reduced, to below a significant level of conflict.

However, the California Environmental Quality Act (CEQA) process does provide a fail-safe mechanism for future projects by ensuring that each proposed specific project will be reviewed in the context of the findings and mitigation measures outlined in this document. Under the programmatic concept, program implementation will be carried out by ensuring that all future specific facility projects, or future modifications, are evaluated under Sections 15162 and 15168 of the State CEQA Guidelines. Under this tiered review process, if a specific project is identified as causing a significant impact in one of the issue categories addressed in this document or as causing a significant conflict with the plans and policies discussed above that define significance thresholds, then a subsequent environmental document will be prepared and processed, including public review. Thus, the combination of the measures identified in this document and the mandatory CEQA procedures discussed above will ensure that no future project or program modification will result in significant conflicts with plans or policies, without this information be made available to the decision-makers prior to a decision being made on such specific projects or amendments. Mitigation measures for specific issues outlined above are identified in the subchapter of Chapter 4 where the issue is evaluated in this PEIR.

c. Will implementation of the proposed project cause incompatibilities with existing land use in the vicinity?

In the context of the two-tiered evaluation being conducted in this PEIR (general plan and specific project levels), the implementation of the proposed program does not include nor will it cause any changes in existing land uses or existing land use designations as defined in the general plans of the local jurisdictions in the area of potential impact. Fundamentally, each general plan assigns each parcel of land a specific land use and, in those limited instances where potentially incompatible land uses are located adjacent to one another, the general plans define those measures that must be implemented to ensure compatibility between such uses. Thus, where commercial uses and residential uses abut one another, specific lighting and noise incompatibilities posed by such juxtaposition are controlled by implementing controls on the intensity and direction of lighting and by implementing noise buffers that attenuate noise from commercial activities. Since the program will not alter any existing general plans or land use designations, its implementation has no identified potential to cause any incompatibilities at the general plan level.

At the project specific level, future projects do have some limited potential to cause significant incompatibilities. However, specific incompatibilities cannot be defined until specific project locations are identified for individual alternatives implemented under this program. As was outlined above in the discussion of potential conflicts with environmental plans and policies, mitigation measures have been identified for specific land use conflicts that may potentially cause incompatibilities. These measures are discussed at a general level for the type of projects and activities that will be implemented under this program.

Thus, where an project component will be located adjacent to a potentially conflicting use (such as a pump station located adjacent to residential uses), the location of the facility may be moved, thus totally avoiding the incompatibility, or specific measures may be implemented to attenuate the noise impact by attenuating pump noise below the local noise standard. For the example given, the pump could cause an incompatibility between water transport and residential uses due to noise impacts. Instead of relocating the pump, the pump motor could be placed in a structure that would provide sufficient noise attenuation to ensure that the pump noise would not conflict with the adjacent residential use. As discussed in the previous section of this subchapter, for each of the major environmental issues specific measures have been identified that can reduce the impacts from implementing future projects to a non-significant level of impact, using the thresholds of significance identified for that issue (i.e,. noise attenuation for residential uses to below 50 decibel (dB) Community Noise Equivalent Level (CNEL) during evening hours).

Potential pump station incompatibilities have already been discussed for residential uses. But the same incompatibility may occur if a facility, such as a diversion structure is to be constructed near biologically sensitive site. Where significant biological resources occur, avoidance of siting a facility may be the best way to avoid creating an incompatibility between land uses, but again, mitigation is available to ensure that the potential incompatibilities are either avoided, prevented or controlled to less than significant levels of impact. Ultimately, agencies from which the project may need to mitigate for construction of diversion outlets or infiltration galleries include the Flood Control Department (of Orange, San Bernardino or Riverside counties), the U.S. Army Corps of Engineers (COE), California Department of Fish and Game (CDFG), and the Regional Water Quality Control Board.

The construction of facilities will generate noise and fugitive dust during the construction period. Specific measures to control fugitive dust and noise have been identified in these respective issue subchapters so that a nuisance (incompatibility) will not be caused while construction is in progress. During operation, the activity of delivering and utilizing recycled water does not pose any known potential for direct conflicts.

Pipelines are generally placed underground and do not pose any potential incompatibility with surface uses overlying their location or with adjacent uses. Installing pipelines can create the same potential incompatibilities with adjacent uses as identified above for pumping stations and other water-transport related facilities. An additional incompatibility from constructing pipelines, which are commonly placed in road or other utility rights-of-way, is the short-term disruption of traffic flow and creation of traffic hazards. Again, mitigation measures are identified to ensure that pipeline construction activities do not create significant adverse impacts related to these conflicts in activities.

The water treatment facilities that may be utilized to treat recycled water once delivered to an existing treatment facility may generate a modest amount of noise, but these facilities area already largely in place and would not generate a measurably greater amount of noise than that which is already being created at the treatment location. Thus, no significant long-term incompatibilities will be caused by program implementation.

Mitigation is identified below for implementation with the program when placing incompatible land uses adjacent to one another is considered. The implementation of a formal siting process for future

project designs will either result in avoiding juxtaposition of incompatible land uses, or in the identification and implementation of sufficient mitigation to ensure that even when such uses are adjacent, no significant incompatibility will remain.

d. Will implementation of the proposed project affect agricultural resources or operations (e.g. impacts to soils or farmlands, or impacts from incompatible land uses)?

The program area contains significant agricultural resources, primarily dairy ranches that are located west of the Santa Ana River (for projects to be located in the Chino Basin). Additionally, the mainstem Santa Ana River Corridor is lined with various agricultural/farming uses. These uses are forecast to gradually shift to urban uses over the next several decades, but there is no specific schedule for this transition to urban uses. The time period required for transition will depend upon future demand for urban development in the area, and the overall costs of operating, maintaining and closing the dairy ranches.

Of this agricultural land, little to none of it will be impacted by any of the proposed program alternatives. Although the specific project designs and locations are not available at the current time, the proposed program does not propose to construct any facilities on existing agricultural operations, and should specific project design require the construction of a facility on valuable farmland that is not already developed for another purpose, the acreage of prime soils to be impacted will be negligible, and can thus be considered less than significant (<1 acre total area).

At the general plan level, the program will not cause or contribute to the transition of agricultural land to urban uses. It may even be possible that some recycled water can be used in support of agricultural operations. Thus, implementation is not forecast to have any adverse effect on the agricultural to urban land use transition.

Since most pipelines will be placed within existing rights-of-way (implying that these alignments are already disturbed) and if placed under agricultural land would allow most agricultural operations to continue, the installation and operation of pipelines is not forecast to cause any measurable loss of agricultural land.

e. Will implementation of the proposed project disrupt or divide the physical arrangement of an established community (including a low-income or minority community)?

At the general plan level the program will not affect any existing land use designations and, therefore, its implementation has no potential to contribute to area divisions of the physical arrangements of existing communities in the area of potential impact.

At the project specific level, the only proposed facilities large enough to create any physical divisions in the physical arrangement of communities would be pipelines. Pipelines will be placed underground and therefore have no potential to cause any long-term physical divisions in communities beyond construction operations. Short-term traffic impacts will be mitigated to a less than significant level and are discussed in the Transportation/Circulation subchapter of Chapter 4.

f. Will implementation of project cause significant displacement or loss of acreage that could be used for development?

The estimate for total acreage that could be utilized for project facilities (see Table 4.1-3) is between 60 to 70 acres. This can be compared to the 668,347 acres in the upper Santa Ana watershed, of which 286,366 acres were vacant in 1993 (see Table 4.1-1). Also, the Chino Basin totaled 225,937 acres that were included in the Task I Memorandum Study area, of which more than 75,000 acres were vacant in 1990. Of the facilities proposed, the pipelines and associated facilities such as pumping stations or diversions are unlikely to permanently remove developable land from uses designated on the general plans within the area of potential impact. This is because pipelines will be placed underground and should not conflict with surface uses leaving most of the potentially disturbed area available to be developed for direct urban purposes. No mitigation is required other than the siting procedure already described below.

g. Will implementation of the proposed project cause or contribute to significant growth inducement?

The proposed program is not intended to be directly involved in the provision of municipal water supplies to customers. Thus, the recycled water sales program is in essence one-step removed from actual development and provisions of adequate water supplies in support of building-out each jurisdictions' general plan. The proposed program is supportive of the individual water master plans of each prospective water service agency. As most of the water service agencies have already planned to serve the identified build-out populations within their service areas, this particular program simply provides a possible methodology for the implementation of the service agencies' existing master plans. As a program, the proposed program may help to reduce costs and achieve a reasonable mixture of water supplies for prospective purchasers, but the program does not supplant the already existing requirement and planning efforts of the interested water service agencies to provide the water supplies for their service areas' ultimate build-out population.

In this analysis of future growth and potential growth inducement, it is this document's contention that growth decisions have already been made by local agencies governing land use decisions, and further, that the program does not remove any existing constraint on future development because existing water service agencies have alternative means (perhaps not as cost or environmentally effective as using the recycled water available for purchase under the proposed program) to meet future water demands. This concept is embodied in policy principles adopted by the Metropolitan Water District of Southern California's (MWDSC) Board of Directors and restated as part of the Regional Comprehensive Plan and Guide's (RCPG) Water Resources evaluation for southern California. These policy principles state:

1. *Water supply is not a reason in and of itself to limit or control growth in California. There are sufficient water resources to accommodate continued population and economic growth through better management, including conservation, voluntary transfers and additional storage and conveyance facilities. Water supply for urban, agricultural and environmental uses will be adequate and reliable.*

2. *Growth management and the allocation and direction of development should be the responsibility of general purpose government. Utilities, including water purveyors, should provide adequate facilities to serve the project growth at the state, regional and local levels.*

3. *For planning and infrastructure purposes, water supply should be treated as a utility not required to be a general purpose government plan element. However, water purveyors at the state, regional and local levels should be members of any proposed infrastructure planning structure to ensure optimum coordination and infrastructure resources investment.*

The net effect of these principles is to define water infrastructure as following, not leading or causing, development. The question still remains as to whether the implementation of the program causes or accommodates growth and the related environmental impacts caused by the increased population that can occupy the service areas of prospective recycled water purchasers in the future. The answer to this question can be found in the land use planning process which now determines the future vision of the region at build-out as defined by general plans for the program area and the regional planning documentation which already indicates that adequate water supplies are available to meet this future demand.

The ultimate vision of future growth and development within the program area was established in the governing project and service area general and master plans, respectively, and it is assumed in these general plans that the water service areas have identified the infrastructure required to support the population which will be in place as growth occurs in the future. The net effect of these general plans is to create a set of expectations regarding future land use and growth that may or may not occur depending upon the actual carrying capacity of the various utility and service resources required to meet future growth. It also seems clear that the established planning process and the overall growth pressures in southern California are the primary causes of future growth, i.e. they induce the actual growth that occurs, and the various utilities, such as the water service agencies, are effectively forced to create urban water management plans that can accommodate such growth, at least within the limits of current or future resources that may be available. As the RCPG analysis of water resources indicates, there are sufficient water resources to meet future demand for the foreseeable future and the availability of an additional amount of recycled water for purchase on the market will not induce growth, rather it will simply accommodate growth within the limits of existing land use and general plan limits.

As noted above, the position taken in this document is that the utility planning process is more appropriately playing a passive (accommodating) role, not an active (inducing) role, in future growth that is dictated by local land use plans and the continuing growth of population throughout southern California. If communities within the program area choose to restrict growth and maintain a certain vision of the future as a static or slowly growing entity, the land use planning agencies (cities and counties) had the opportunity during the general planning process to establish such plans. Under such circumstances, the utility providers, including the water supply agencies would have designed their future service plans to accommodate a level of future growth consistent with available resources.

In addition to the limitations placed on development within each communities' general plan, additional development constraints have been imposed on large-scale future development by requiring specific studies to address water consumption and water availability. Where insufficient water is available to meet demand from a project, the following enacted legislation can prevent or limit future development. Senate Bill 221 requirements apply to a proposed residential development of 500 or more units, or a project that will increase the number of water service connections by 10 percent or more in a district with fewer than 5,000 service connections. Similarly, Senate Bill 610

affects proposals for large-scale development. A detailed evaluation of water resources available to the local water purveyor must be provided to the local decision-making agency. Where insufficient water supply is available, limits can be placed on future developments. These requirements will further ensure that future development does not induce growth that will exceed local water supply capacity and induce unsustainable growth.

4.1.4 Mitigation Measures

The analysis above indicates that implementing the RIX Facility Recycled Water Sales Program has only limited potential to cause significant adverse land use impacts. The following mitigation measures are recommended as actions that need to be implemented for individual projects proposed as part of the water sales program:

4.1-1 Following selection of alternative sites for construction of future facilities, each site shall be evaluated for potential incompatibility with adjacent existing or proposed land uses. Where pumping or other operations can create significant incompatibilities (lighting, noise, traffic, etc.) with adjacent uses, an alternative site shall be selected, or a technical report shall be prepared that identifies the specific measures that will be utilized to reduce potential incompatible activities or effects to below thresholds established in the general plan for the jurisdiction where the facility will be located.

4.1-2 Where future facilities are proposed on locations that support agricultural operations on important farmlands, where feasible, alternative sites shall be selected that do not occupy such acreage (unless agricultural operations have already been terminated).

With implementation of these two measures, the only potentially significant land use issues related to program implementation (incompatibility between a proposed specific facility or activity and sensitive land uses and cumulative contributions to removal of important farmlands) will be reduced below the significance thresholds outlined at the beginning of section 4.1.3.1.

4.1.5 Cumulative Impact

The proposed program activities are specifically designed to provide for an efficient and effective usage of recycled water resources within the southern California region. The proposed program has been evaluated as being fully consistent with the program areas' general plans and the activities are not forecast to contribute to any land use incompatibilities with existing or future uses within the project area based on implementing identified mitigation measures. The program could contribute to a loss of agricultural activity in a small, and cumulatively insignificant manner by converting up to one acre of agricultural land or valuable farmland to water -service related uses. The program's potential contribution to this cumulative impact is not considered to be significant; however, to even further minimize impacts to agriculture or farmlands, the mitigation measures outlined above shall be implemented to avoid agricultural and valuable farmlands where feasible.

Finally, the program has been determined not to contribute to future growth as envisioned in the program area general plans. This conclusion is based on two lines of reasoning: first, the program does not remove any constraint on growth; and second, the provision of water to meet future demand is determined to be growth accommodating, not growth inducing. The program can be implemented without causing or contributing to future significant cumulative growth or development within southern California.

4.1.6 Unavoidable Adverse Impact

The land use impact evaluation presented above indicates that implementation of the proposed program will be consistent with the project and water service area general plan land use designations and environmental policies. Implementing the proposed program is not forecast to cause any direct or indirect significant adverse land use impacts after implementation of the two mitigation measures outlined above. Therefore, no significant unavoidable adverse land use impacts are forecast to occur if the program is approved and implemented as proposed and mitigated.

4.2 POPULATION AND HOUSING

4.2.1 Introduction

The program area that is located north of the RIX facility site includes unincorporated San Bernardino County and the cities of Colton and San Bernardino. On the eastern boundary of the Santa Ana River are the cities of Riverside and Grand Terrace. West of the Santa Ana River are the cities of Colton, Rialto, Corona, and Norco. The City of Fontana is not located directly adjacent to the River, but the RP-3 site, where many of the proposed alternatives would pump water for distribution and for tie-ins to other systems, is located within the City's boundaries. Other communities in the program area include Bloomington, in San Bernardino County, and Rubidoux, Pedley Hills, Norco, and Mira Loma in Riverside County. All of the aforementioned cities and communities are located within either San Bernardino County or Riverside County.

4.2.2 Environmental Setting

Current demographic data have been obtained from the local jurisdictions and the 2000 U.S. Census of Population and Housing (2000 Census). Future population and housing projections have been provided using the Southern California Association of Governments (SCAG) 2001 Regional Transportation Plan (RTP) projections and Western Riverside Council of Governments (WRCOG) data.

4.2.2.1 Population

According to the U.S. Census, the population of Riverside County was 1,545,387 in 2000. Of the total, 51 percent of the people were White, and people of Hispanic/Latino origin were the second largest group at 36.2 percent. The percentage of persons under 18 years of age in Riverside County was 30.3 percent and 12.7 percent of persons are 65 and over.

The population in San Bernardino County in 2000 was 1,709,434. The largest population group, at 44 percent, was White persons, while the next largest group, at 39.2 percent, was persons of Hispanic/Latino origin. The percentage of persons in San Bernardino County under 18 years of age was 32.3 percent, and the percentage of persons aged 65 and over was 8.6 percent.

Table 4.2-1 summarizes the characteristics of the existing regional population and housing for the County of Riverside, County of San Bernardino, cities/communities adjacent to the Santa Ana River between the RIX discharge and Prado Dam, and other communities from the RIX facility westward to RP-3 and the Chino Basin. The City of San Bernardino is included since it is located immediately to the north and it is the lead agency for the proposed project and joint operator of the RIX facility. The 2000 Census data for the cities and communities were utilized for the following analysis.

Table 4.2-1
POPULATION AND HOUSING DATA FOR THE PROGRAM AREA

Area	Population (2000)	Housing Units (2000)
County of Riverside	1,545,387	584,574
County of San Bernardino	1,709,434	601,369
City of Corona	124,966	39,271
City of Colton	47,662	15,680
City of Fontana	128,929	35,908
City of Grand Terrace	11,626	4,458
City of Norco	24,157	6,277
City of Riverside	255,166	85,974
City of San Bernardino	185,401	63,535
Community of Jurupa and Surrounding Areas (unincorporated Riverside County)	85,106	24,778
TOTALS Both Counties	3,254,821	1,186,043

Source: SCAG Census Data, 2000 Place Profiles

In accordance with Policy 3.01 of the Regional Comprehensive Plan and Guide (RCPG) (SCAG 1996), SCAG has projected future population for the counties of Riverside and San Bernardino. SCAG population projections indicate a 39.4 percent population increase in Riverside County and 36.8 percent in San Bernardino County between 2010 and 2025.

4.2.2.2 Housing

The U.S. Census calculated that in 2000 there were 601,369 housing units in San Bernardino County, of which 87.9 percent were occupied. Of the 528,594 occupied housing units, 64.5 percent (340,933) were owner occupied. The average household size was 3.15 persons.

In Riverside County there were 584,674 housing units in 2000. Of the total housing units, 86.6 percent were occupied. Owner occupied units were 348,532 and constituted 68.9 percent of all occupied units. The average household size was 2.98 persons.

4.2.3 Project Impacts

The sale of RIX facility recycled water proposes a variety of new facilities under the various proposed alternatives. The main facilities proposed under the program are pipeline(s) with associated supportive structures (such as blow-offs), appurtenances, pump stations, and possibly a single diversion outlet from the Santa Ana River. The population and housing issues in this evaluation are examined as they relate to constraints imposed upon the RIX recycled water sales

project in this PEIR. The specific project alternatives and associated facilities are summarized in Table 4.1-3 of the Land Use analysis section.

4.2.3.1 Threshold of Significance

A project would be considered to have a significant adverse impact to population and housing if it would:

- Remove existing housing (including affordable housing) as verified by a site survey/evaluation;
- Create a significant demand for additional housing based on the proposed use and evaluation of project size; and/or
- Induce substantial growth in an area either directly or indirectly (e.g. through projects in an undeveloped area or an extension of major infrastructure).

Each of these significance thresholds will be applied to the potential population and housing impacts forecast to occur from implementing the proposed program, and a conclusion regarding the significance of potential land use impacts will be clearly presented in the following analysis.

4.2.3.2 Impact Evaluation

a. Would implementation of the project removal existing housing (including affordable housing) as verified by a site survey/evaluation?

The main type of infrastructure facilities that will be constructed in support of the proposed program are pipelines and related facilities, such as appurtenances and blow-offs. Specific locations for these facilities have not been selected at this point of time. Therefore, the location of these facilities will be determined on a case-by-case basis in the future; however, pipeline construction is currently proposed only within existing roadways, which are already highly disturbed, thus pipelines do not pose any significant conflict with the General Plan Housing Elements.

The RIX Recycled Water Sales Program is not forecast to result in the displacement of existing housing since the project would consist of constructing pipelines and pump stations, mainly within public (road) rights-of-way that have no potential to adversely affect either population or housing. Finally, any facility sites that would be utilized in the future will intentionally avoid existing housing resources. Should unoccupied residentially zoned property be utilized for the limited facilities, assumed to be about one acre, the loss of potential units would only be four units based on a facility site of potentially one acre, multiplied by a ratio of four units per acre. The potential effect on future housing would only be four units and is, thus, considered a *de minimis* amount of potential units given a housing stock in the region of 1,210,521 units. Impacts are forecast to be less than significant. Thus, no mitigation is necessary.

b. Will the project create a significant demand for additional housing based on the proposed use and evaluation of project size?

The proposed RIX Recycled Water Sales Program will not create a significant demand for any additional housing due to the fact that the project serves only to help enable water districts and agencies within the southern California area to meet existing and future service area demands for recycled water. The service agencies are mandated by the jurisdictional authority overseeing their respective services areas to provide levels of service consistent with population forecasts and area general plans. This program will help enable the service agencies to meet its existing and future obligations in compliance with the jurisdictional authority's general plan. This program is not growth inducing as discussed in the Land Use analysis (Section 4.1) of this PEIR. The program, like most water infrastructure facilities, functions in a growth accommodating, not a growth inducing manner. Impacts are forecast to be less than significant, thus no mitigation is necessary. With no potential to increase population relative to adopted plans for the proposed service area, no potential exists to significantly increase demand for housing.

c. Will implementation of the proposed project induce substantial growth in an area either directly or indirectly (e.g. through project in an undeveloped area or an extension of major infrastructure)?

This program is not growth inducing as discussed in the Land Use Analysis (Section 4.1) of this PEIR (please refer to Section 4.1.3.1 (g) for additional discussion regarding this topic). The program, like most water infrastructure facilities, functions in a growth accommodating, not a growth inducing manner. Impacts are forecast to be less than significant, thus, no mitigation is necessary.

4.2.4 Mitigation Measures

Since no potential has been identified for significant population or housing impacts, no mitigation is required.

4.2.5 Cumulative Impact

The proposed program activities are specifically designed to provide for an efficient and effective usage of recycled water resources within the southern California region. The proposed program has been evaluated as being fully consistent with the project areas' general plans and the activities are not forecast to contribute to any population or housing incompatibilities with existing or future housing resources within the program area. The program could contribute to a cumulatively insignificant loss of residential-zoned land by converting up to one acre of land zoned for residential uses to water-service related uses. The program's potential contribution to this cumulative impact is not considered to be significant.

Finally, the program has been determined not to contribute to future growth as envisioned in the program area general plans. This conclusion is based on two lines of reasoning: first, the program does not remove any constraint on growth; and second, the provision of water to meet future demand is determined to be growth accommodating, not growth inducing. The program can be implemented without causing or contributing to future significant cumulative growth or development within southern California.

4.2.6 Unavoidable Adverse Impact

The population and housing impact evaluation presented above indicates that implementation of the proposed program will be consistent with the policies and guidelines set forth in the various program area General Plan Housing Element sections administered by the jurisdictional planning agency. Implementing the proposed program is not forecast to cause any direct or indirect significant adverse population or housing impacts. Therefore, no significant unavoidable adverse population or housing impacts are forecast to occur if the program is approved and implemented, and no mitigation is necessary.

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4.3 GEOLOGY AND SOILS

4.3.1 Introduction

In the comment letters on the Notice of Preparation for the program, no specific comments were made regarding geology and soils. The San Bernardino County Transportation/Flood Control Department did have concerns about flooding, including the creation of any conditions that might cause erosion or sedimentation. The Initial Study for the project identified seismic-related impacts of new facilities as potentially significant without mitigation, due to the general project area being in southern California. Therefore, this section discusses geology and soils, with emphasis on sensitive locations for new facilities and mitigation measures for reducing geological hazards due to the development of facilities under the program.

4.3.2 Environmental Setting

Geological aspects of the upper Santa Ana River watershed have been thoroughly described by Mark J. Wildermuth in the context of hydrology in several recent reports, including: *Describe Watershed Hydrology and Identify Current TDS and TIN Inflows in the Watershed* (for SAWPA, TIN/TDS Study of the Santa Ana Watershed, Phase 1A Report, Sept. 1997); *Technical Memorandum* (for SAWPA, TIN/TDS Study of the Santa Ana Watershed, Phase 2A, Tasks 1-5, July, 2000) and *The Optimum Basin Management Plan Phase I Report* (for IEUA, July, 2000). These reports were to be used as a basis for defining not only the underlying geology and hydrology, but in identifying TDS (total dissolved solids) and TIN (total inorganic nitrogen) inflows into the watershed and related issues. Information is summarized as follows, for those areas relevant to the program in the upper watershed: the San Bernardino-San Timoteo and Chino-Riverside. Other county reports are referenced, in addition.

The San Bernardino County General Plan Final EIR describes the regional geologic setting as follows:

> *San Bernardino County is located in a tectonically active region near the boundary of two major crustal plates. This boundary (between the Pacific and American Plates) is generally marked by the San Andreas Fault Zone, which extends through the southwestern portion of the County. The San Andreas system exhibits predominantly right strike-slip movement (i.e., horizontal displacement to the right when viewed across the fault), whereby the Pacific Plate moves relatively northwest with respect to the continent. This active tectonic environment has strongly influenced the geologic and physiographic history of the County...The southwestern portion is within the Peninsular Ranges Physiographic Province. This area is characterized by northwest-southeast trending longitudinal mountain ranges and valleys with intervening faults. The San Andreas, San Jacinto, and Elsinore Fault zones constitute the primary structural features of the Peninsular Ranges Province, and extend through southwestern San Bernardino County in a generally northwest-southeast direction. These (and related) structures delineate a series of crustal blocks aligned in a stepped topography across the province. Elevations become progressively higher in these blocks away from the coast, culminating in the San Jacinto Peninsular Ranges Province in the Valley region includes the Chino and Puente Hills (the northernmost extensions of the Santa Ana Mountains) and adjacent valleys. These areas incorporate rugged low lying highlands and*

alluviated basins at elevations of approximately 500 to 1,500 feet m.s.l. (Sections VIII-3 to VIII-4).

The program area can generally be divided into two zones, relative to the upper Santa Ana River system, the San Bernardino-San Timoteo and the Chino-Riverside.

4.3.2.1 San Bernardino-San Timoteo

The San Bernardino and San Gabriel Mountains form the northern boundary of the program area. They are separated by the Cajon Pass, which is a structural trough down-faulted between two major faults, the San Andreas and the San Jacinto. To the east, there is a structural depression between the San Jacinto Fault and the San Bernardino Mountains, which forms an alluvium-filled, groundwater bearing portion of the Bunker Hill-San Timoteo area. The southern boundary is along a drainage divide in what is known as the "Badlands" south of San Timoteo Canyon.

There are several hill areas in the program area, with the northern part containing the Shandin Hills, Wiggens Hill, Perris Hill, and others. They are composed of igneous and metamorphic rocks at 50 to 550 feet above the valley floor. Crafton Hills and Reservoir Canyon Hill are located to the east and southeast of the City of Redlands, with a maximum elevation of 3,500 feet above sea level. They consist of crystalline rock surrounded by faults, suggesting an uplifted block. The Yucaipa Hills are east of the City of Yucaipa, extending from the Oak Glen Fault southward to the Banning Fault. They are 5,400 feet in elevation above sea level and 2,000 feet above the valley floor. The Badlands are hills along the southern and southwestern portion. These hills are composed of sedimentary San Timoteo Beds, containing numerous ephemeral streams.

There are numerous alluvial plains and benches in this area, including the Beaumont Plain and the Yucaipa Plain. There is another older alluvial plain extending from the south bank of Mill Creek at Crafton Hills, which passes through the City of Redlands and extends to the Colton Narrows. This plain is overlain by a younger alluvial fan extending to the south bank of the Santa Ana River. There are also outcrops of older alluvium occurring north and west of the Santa Ana River to Devore Heights. It is these unconsolidated alluvial deposits between the crystalline highlands that are the principal water-bearing deposits.

Refer to Figure 4.3-1 for a generalized view of the Bunker Hill-San Timoteo area.

4.3.2.2 Chino-Riverside

This area is characterized by large-scale crustal disturbances at intersecting Transverse and Peninsular Ranges. Major active faults form boundaries for four distinct blocks: the San Gabriel, Chino, Santa Ana, and Perris. The San Gabriel Mountains are to the north, bounded on the south by the Cucamonga fault system. The Chino-Puente-San Jose Hills are bounded on the east by the Chino fault system. The Santa Ana Mountains are located to the southwest and are bounded on the east, also being separated from the Chino block, by the Elsinore-Whittier fault system. Alluvium from these blocks washed into the low-lying areas of the margins of the down-warped Perris block. This forms the main groundwater reservoir of the Chino-Riverside area.

Alluvium in the area is either Younger or Older. Younger alluvium is comprised of unweathered and unconsolidated sand, gravel and silt in deposits up to 150 feet thick. Older alluvium underlies the Younger alluvium at thicknesses of 500 to more than 1,000 feet. It consists of boulders, gravel, sand, silt and clay derived mostly from the basement rocks in the San Gabriel Mountains. There are also terrace deposits, consisting of older alluvial material testing on planed-off bedrock surfaces above stream level.

Refer to Figure 4.3-2 for a generalized view of the Chino-Riverside area.

Specific geologic and hydrologic characteristics of the Chino Groundwater Basin, which is the major underlying aquifer in this zone, are described in the OBMP Phase I Report (Wildermuth Environmental, Inc. July, 2000) as follows:

> *Chino Basin was formed when eroded sediments from the San Gabriel Mountains, the Chino Hills, Puente Hills, and the San Bernardino Mountains filled a structural depression...The bottom of the Basin - the effective base of the freshwater aquifer - consists of impermeable sedimentary and igneous rocks, the base of the aquifer is overlain by older alluvium of the Pleistocene period followed by younger alluvium of the Holocene period.*
>
> *The younger alluvium varies in thickness from over 100 feet near the mountains to just a few feet, south of Interstate 10 and generally covers most of the northern half of the Basin in undisturbed areas. The younger alluvium is not saturated and thus does not yield water directly to wells. Water percolates readily in the younger alluvium and most of the large spreading basins are located in the younger alluvium.*
>
> *The older alluvium varies in thickness from about 200 feet thick near the southwestern end of the Basin to over 1,100 feet thick southwest of Fontana, and averages about 500 feet thick throughout the Basin. Well capacities range between 500 and 1,500 gallons per minute (gpm). Well capacities exceeding 1,000 gpm are common, with some modern production wells test-pumped at over 4,000 gpm. In the southern part of the Basin where sediments tend to be more clayey, wells generally yield 100 to 1,000 gpm. Three main water-bearing (hydrostratigraphic) units were identified by Montgomery Watson (1993) during the development of a three-dimensional groundwater model of the Basin.*
>
> *Faults are one of the principal agents in the development of the landscape and restriction of groundwater flow in the Chino Basin. The Basin is bounded by major fault systems along which the mountains and hills have been uplifted. The faults and groundwater barriers are significant in that they define the external boundaries of the Basin and influence the magnitude and direction of groundwater flow near the boundaries (OBMP Phase I Report, pp. 2-2 to 2-3).*

4.3.2.3 Soils

Quaternary alluvial deposits and recent soils comprise the majority of the near-surface and surficial sediment covering the project's area of potential. Older subsurface strata may include Tertiary marine and non-marine sedimentary and volcanic units; Mesozoic marine sedimentary, metasedimentary, metavolcanic, and plutonic units; Paleozoic sedimentary and metasedimentary

units; and Precambrian igneous and metamorphic units (San Bernardino County General Plan FEIR, VIII-5).

In general, the soils within program area are deep well-drained sands, sandy loams, and silty loams on relatively flat valley floors, and shallow to deep, well to excessively drained sandy loams on foothills and upland areas (San Bernardino County General Plan FEIR, VIII-5). These types of soils are suitable for agricultural use. Drainage in the basin is comprised of the Santa Ana River and associated intermittent tributary streams (San Bernardino County General Plan FEIR, VIII-5). The general topography consists of slopes less than 10 percent for all areas except small area of hills spread throughout such as the Jurupa and Pedley Hills.

The following discussion was taken from the San Bernardino and Riverside County soil surveys. The study area is overlain by more than 78 alluvial soil types described for their top 60 inches of thickness. The soils tend to be sand, silt and clay loams with occasionally gravelly or cobbly sandy loams. Fifteen of these soil types are prime agricultural soils and 20 are rated "suitable" for cultivation. The thirteen general soil association within the program area have been grouped into three major soil groups. These soil groups are described as follows:

Group 1 soils *are on recent (younger) alluvial fans and plains, and consist of deep, permeable soils with no development in the profile. The soils of Group 1 were formed by the transport of unconsolidated materials. These soils represent about 75 percent of the study area. Generally, the soils in Group 1 are found on slopes that range from zero to nine percent and consist of coarse textured soils developed in granitic alluvium, gravelly or cobbly alluvium, or weakly consolidated sandstone and shale. Runoff from these soils is usually low and infiltration is moderate to high (greater than 1 inch per hour). Soil depths are greater than 60 inches.*

Group 2 soils *occur on older alluvial fans and terraces and have a more developed profile than the soils of Group 1. Group 2 represents about 5 to 10 percent of the study area. These soils are developed on granitic or sedimentary alluvium and are moderately fine textured soils of silty loam or sandy loam in the surface layer with clay loam in the subsoils and substratum. These soils have a moderate to low infiltration rate (less than 1 to 2 inches per hour). The subsoils are more finely textured than the surface soils. A portion of these soils are found on zero to 2 percent slopes; these soils are moderately developed with clays in the subsoils and claypan in the lower horizon. Group 2 soils located on slopes ranging from 2 to 5 percent contain some hardpan 48 to 72 inches below the surface. Group 2 soils found on 5 to 9 percent slopes include the steep side slopes of alluvial fans and terraces.*

Group 3 soils *overlie crystalline, sedimentary, or granitic bedrock. These soils are found in the Chino Hills, Puente Hills, the base of the San Gabriel and Jurupa Hills and in small areas near the San Bernardino-Riverside county line. Group 3 represents about 15 to 20 percent of the study area. These soils are found on steep slopes ranging from 15 to 20 percent. The soils are predominantly pale brown loams, fine sandy loams, or clays. The substrate of parent materials of these soil associations are shale, schist, gneiss, coarse-grained sandstone, granodiorite and moderately high infiltration rates (1 to 2 inches per hour). The depth of these soils ranges from 20 to 40 inches.*

The soils that comprise the program area have accumulated from the alluvium washed down from the San Gabriel and Santa Ana blocks during the latter part of the Quaternary epoch. The alluvium can be classified based on apparent age. The alluvial formations are described in the following:

Younger alluvium *consists of relatively unweathered sand, gravel, and silt deposits up to 150 feet thick, and occupies streambeds, washes, and other areas of younger or recent sedimentation. Oxidized particles tend to be flushed out of the sediments during transport. Recent alluvium is commonly light yellow, brown, or gray...The primary source for the origin and generation of younger alluvium is the San Gabriel Mountains.*

During transport, the largest of the fragments travel the least distance. The northern part of the program area, closer to the base of the San Gabriel Mountains, therefore, exhibits younger alluvium composed primarily of coarser material mixed with some clay and sand. Farther from the mountain front the slope of the land is gentler and the particles are of smaller size. The alluvium here is in layers of gravel, sand and silt. The finest particles are able to travel the greatest distances and settle out farthest from the mountains, near Prado Dam.

In most places, the highly permeable younger alluvium is above the water table. Water percolates readily through the younger alluvium.

Sand dunes in the east-central part of the valley floor were formed as a result of the "Santa Ana" wind storms, carrying sand winnowed from alluvial deposits lying to the northeast of the dune area. The spread of irrigated agriculture and the planting of windbreaks in the valley, however, have probably acted to stabilize the dunes. The dune sand has been grouped with the younger alluvium because of its similar water- bearing characteristics...

A thick section of stabilized, moderately to deeply weathered alluvium of Pleistocene Age unconformably underlies the younger alluvium. Older alluvium is typically distinguishable by its red-brown or brick-red color. Beneath the older alluvium are formations that range in age from Pleistocene to Precambrian, in an unconformable sequence. Around the edge of the Chino study area, the base of the alluvial layers can be readily distinguished, but in many places in the central part of the valley, the base of the older alluvium cannot be defined...the average thickness is estimated to be not more than 500 feet.

Older alluvium *is made up of boulders, gravel, sand, silt, and clay derived largely from basement rocks in the San Gabriel Mountains. The accumulation of the older alluvium began, probably in middle Pleistocene time, when the present valley first began to form south of the rising San Gabriel block.*

The combined effects of sorting and weathering give the older alluvium in the central part of the area the lowest clay content and the highest well yields and transmissivity of the alluvium of this area.

Terrace deposits *consist of dark red and red-brown alluvial material resting on planed-off bedrock surfaces above stream level. Because terrace deposits consist of alluvium resting on bedrock above stream level, they are mainly above the water table and do not store significant amounts of water.*

Residuum *is found in areas of low relief where there is little erosion. In-place, deep weathering of basement and consolidated sediments has resulted in extensive residual formations that locally store and yield water. Structures of the disintegrated and decomposed parent rock are preserved in the residuum and grade into those of the underlying bedrock. The residual materials are marked by oxidation colors of red and brown. Because of their relatively high clay content and generally thin and disconnected occurrence, they are inferior to transported and reworked alluvium as a source of water to wells. These soils are generally found in the Norco area and adjacent to the Santa Ana River near Pedley Hills.*

The nonwater-bearing formations include continental deposits of late Pliocene to middle Pleistocene age, marine sedimentary and volcanic strata of late Cretaceous to later Tertiary age, and crystalline igneous and metamorphic rocks of the basement complex...San Timoteo beds in the easternmost part of the study area belong to the lower levels of a thick sequence of deposits in which fossils of middle to late Pliocene age have been found. These beds resemble the older alluvium of the Chino area, but are cut by numerous faults and are sharply folded as a result of mid-Pleistocene mountain building.

In the western part of the program area, consolidated sedimentary and volcanic rocks, ranging in age from late Cretaceous to Pliocene consist of well stratified marine sandstone, shale, and conglomerate and interlayered lava flows...

Basement complex *consists of deformed and re-crystallized metamorphic rocks that have been invaded and displaced in places by granitic and related igneous rocks. The intrusive granitic rocks, which make up most of the basement complex, were emplaced about 110 million years ago in the late Middle Cetaceous (Larsen, 1958). These were subsequently uncovered by erosion, especially in the San Gabriel Mountains and in the uplands of the Perris block. They have been the major source of detritus to the younger sedimentary formations, in particular, to the water bearing deposits of the program area.*

4.3.2.4 Regional Earthquake Faults

There are several faults in these program zones, two of which are considered to be the most active in Southern California (San Andreas and San Jacinto). Refer to Figures 4.3-3 and 4.3-4 for regional fault maps. Those in the San Bernardino-San Timoteo zone are summarized as follows:

- San Andreas Fault – A northwest trending fault along the south side of the San Bernardino Mountains. This fault is the boundary between two huge crustal plates (Pacific and North American) that are moving relative to each other at the rate of a few inches per year. This fault is widely recognized as the longest and most active fault in the state. It has been mapped from Cape Mendocino in northern California to an area near the Mexican border. The fault is known to be active from historic earthquakes, some of which have caused surface rupture, and from abundant evidence of displacement of recent sediments. A maximum credible earthquake for the San Andreas Fault is Magnitude 8.25.

- San Jacinto Fault – A northwest trending fault along the Badlands and through the San Bernardino Valley to Cajon and Lytle Creeks. Like the San Andreas fault, the San Jacinto fault has been active for millions of years. Several historic earthquakes in Southern California

have been associated with this fault. A maximum credible earthquake for the San Jacinto Fault is Magnitude 7.5.

- Banning Fault – Starts approximately 3 miles north of Beaumont, where there are south-facing scarps in older alluvium. It is exposed again where it crosses the front of the Yucaipa Hills. It is marked discontinuously to the Loma Linda Fault by vertical, lime-cemented fracture zones and by discordant dips and troughs along uplifted areas. The magnitude of displacement across the fault is about 250 feet at the intersection with the projected Cherry Valley fault.

- Cherry Valley Fault – The fault appears as discontinuous troughs and benches from south of Calimesa to an area between Beaumont and Yucaipa. The Older Alluvium and San Timoteo Beds have been displaced upward on the north side of the fault relative to the south side. The average displacement across the fault is inferred from projected data and may be as great at 150 feet.

- Loma Linda Fault – This fault is parallel to and approximately a mile east of the San Jacinto Fault. Although there is no topographic evidence of the fault in the alluviated portion of the area, it can be traced into the Badlands for about half a mile on aerial photographs.

- Oak Glen Fault – This fault is located along the north side of several small basement complex outcrops north of Mentone. It extends across the northernmost edge of the Crafton Hills and joins the Chicken Hill Fault. Displacement along this section is down on the north as much as 300 feet. Maximum vertical displacement across another reach of the fault is just east of the intersection with the Hill Ranch Fault and is approximately 250 feet. To the west, near the junction with the Greenspot Fault, the displacement is as much as 500 feet.

- Greenspot Fault – This fault has a low, southwest-facing scarp in older alluvium in the Mill Creek bed in Mentone. This fault is a barrier to groundwater movement. Before the ground-water levels upgradient of the fault were drawn down, overflow at the fault supported lush phreatophyte growth, from which the fault got its name.

- Redlands Fault – A northeast trending fault extending from San Timoteo Canyon, where it is well exposed in the bluff on the northern side. Subsurface features eventually join the Crafton Fault and the Mentone Fault.

- Chicken Hill Fault – This fault lies along the eastern side of Crafton Hills and trends northeast across the alluvium between Crafton Hills and Reservoir Canyon Hill. It is also exposed locally beyond Oak Glen Creek on the west side of the Yucaipa Plain. Surface expression is marked by intense shearing of basement complex rock, truncated spurs and lush phreatophyte growth in canyons crossed by the fault.

A major earthquake on one of these regional faults could cause significant ground shaking. Ground acceleration from a maximum credible earthquake of magnitude 8.2 on the San Andreas Fault could range as high as 1.0 g (Rancho Cucamonga General Plan, Section 3-8) in the northern program area and 0.55 g in the southern program area.

The fault zones predominant in the Chino-Riverside zone are summarized as follows:

- Rialto-Colton Fault – This fault trends approximately parallel to the San Jacinto fault zone and is of similar age and origin. Its subsurface effect is seen in the low rounded hill in the upper middle four sections of T1S, R5W. The east side of the hill appears to have been moved toward the northwest. Southeast of the low hill, as much as 450 feet of down throw on the east side is shown on the base of the groundwater reservoir. Subsurface data suggest that what seems to be a southern segment of the fault is a parallel branch and that a gap exists between the branches north of Slover Mountain.

- Red Hill Fault – This fault is east of Upland, evidenced by a rounded knoll of reddish older alluvium projecting above the valley floor. This fault is well known as the geologic divider between the Cucamonga and Chino groundwater basins. The northeast trend of this barrier corresponds closely with a prominent scarp in the alluvial fan south of Day Canyon and with the southern edge of Red Hill. Micro-seismic monitoring has shown that a large number of small earthquakes (Magnitude 1-3) occur beneath the [City of Rancho Cucamonga] and that a few epicenters were located on or near the trace of the Red Hill Fault. A maximum credible earthquake for the Red Hill fault is Magnitude 6.5. The northeastern end of the Red Hill fault has apparently displaced recent alluvial deposits and has also been included in an Alquist-Priolo Special Studies Zone. The remainder of its trace, however, did not meet state criteria, despite substantial evidence for its continuation to the southwest.

- Red Hill Trace – The geological study for a recent development (Rancho Cucamonga Tract 10035) discovered a possible "finger" of the Red Hill Fault to the west of the main trace near Red Hill. Additional study indicated that although it was likely not a branch, it is possible that additional extensions of the fault may exist in this area.

- Indian Hill Fault – On the north side of Claremont a low rounded knoll composed of Older Alluvium marks the up-thown side of the Indian Hill Fault. This fault can be followed in the subsurface due west from its intersection with the San Jose Fault to the boundary of this zone. Water level disparities and displacements in the effective base of the aquifer indicate that the fault extends more than six miles into the San Gabriel Mountains. It is likely a simple gravity fault that was caused by the recent upward movement of the basement on the North.

- Cucamonga Fault – This fault is considered potentially active, primarily because of scarps that indicate offset in recent alluvial deposits along the northern edge of the City. Although the length of the fault is not known for certain, it has been mapped from near Lytle Creek to the north of San Antonio Canyon. Mapped traces of the fault vary from a single line near Cucamonga Creek to a zone a half mile wide south of East Etiwanda Canyon. A significant offset in the mapped traces occurs across the alluvial deposits of Deer Creek. A maximum credible earthquake for the Cucamonga Fault is Magnitude 7.0.

- Chino Fault – The Chino Fault is an extension of the Elsinore-Whittier fault zone. It passes through bedrock exposures along the flanks of the Chino and Puente Hills (Troxel, 1954).

- Central Avenue Fault – This fault is a potentially active fault that trends in a northwest-southeast alignment along the west side of El Prado Road. Because the projected surface

location of the fault is not well known, a 1,000-foot-wide study zone has been designated for planning purposes. Because the Central Avenue Fault has not been studied in detail, little data is available regarding the maximum credible earthquake and maximum ground accelerations from an earthquake along this fault. The Central Avenue fault is a potentially active fault within the Elsinore-Whittier fault zone. There is evidence, however, suggesting possible offset of Holocene near-surface deposits (Chino Subarea 2 Preserve Master Plan) and the City of Chino has designated the projected fault trace as a fault study zone.

- San Jose Fault – This fault trends southwest from a point near the San Antonio Canyon. The fault has displaced soil in the San Jose Hills. A maximum credible earthquake for the San Jose fault is Magnitude 6.5.

- San Antonio Canyon Faults – Potentially active and identified from several mapped traces in the canyon, the San Antonio Canyon fault is about 15 miles long. A maximum credible earthquake for the San Antonio fault is Magnitude 6.5.

- Whittier-Elsinore Fault – The Whittier-Elsinore fault is a potentially active fault with vertical movement, unlike the horizontal movements associated with the San Andreas and the San Jacinto. The Whittier-Elsinore fault branches into the Whittier fault and the Chino fault. The latter is buried along most of its length and is the closest part of the Whittier-Elsinore system to the City of Rancho Cucamonga. A maximum credible earthquake for the Whittier-Elsinore Fault is Magnitude 7.5.

Table 4.3-1 summarizes the maximum credible earthquakes associated with the major faults described above. There is little doubt that project's area of potential impact and the Chino Groundwater Basin will experience strong seismic shaking at some time in the future. Several of the nearby faults have the potential to generate large earthquakes that would be felt throughout the Basin. The Rancho Cucamonga General Plan describes the potential ground shaking, which would apply generally to the whole Chino Basin in the following manner:

Table 4.3-1
MAXIMUM GROUND ACCELERATIONS ESTIMATED FOR SEISMIC EVENTS NEAR OR WITHIN THE PROGRAM AREA

Fault	Estimated Maximum Credible Earthquake[1]	Estimated Maximum Accelerations[2]
Cucamonga	7.0	0.60 - 0.95
Red Hill	6.5	0.70 - 0.80
San Jose	6.5	0.50 - 0.75
San Antonio	6.5	0.50 - 0.75
San Jacinto	7.5	0.40 - 0.85
San Andreas	8.25	0.35 - 0.70
Elsinore-Chino	7.5	0.30 - 0.55

Notes: 1 Richter Magnitude: Estimated based on Slemmons (1977) and Greenfelder (1974)
2 Accelerations are for bedrock as calculated by Idriss and Pong (1987)

Source: Summarized from Rancho Cucamonga General Plan EIR (1981)

The level of shaking that might occur can be estimated by first assuming that the maximum credible earthquake for a fault could occur at its nearest approach to the City. The ground response, developed from measurements of past earthquakes, can then be used to estimate expected bedrock accelerations. Fife and others (1976) mapped isoacceleration lines for southwest San Bernardino County, which might be expected from earthquakes on the San Andreas, San Jacinto, Cucamonga, and Whittier-Elsinore faults, based on attenuation relationships derived by Schnabel and Seed (1972). The ranges of these accelerations shown for the City are listed in Table 4.3-1. Also included are the Red Hill, San Jose, and San Antonio faults and calculated maximum expected acceleration for all seven faults, based on near-field attenuation relationships developed by Idriss and Power (1978).

The highest accelerations expected beneath the Project Area according to Fife and others (1976) would be about 75 percent of gravity (0.75 g) adjacent to Cucamonga fault as a result of a maximum credible M 6.5 earthquake. Based on more recent rupture length-magnitude and attenuation relationships (Slemmons, 1977; Idriss and Power, 1978), bedrock acceleration may be as high as 0.95 g. This assumes that a Magnitude 7.0 event could occur on a plane dipping 45 degrees to the north and the center of energy release would be 5 km deep. Accelerations north of the surface trace, which would be the upthrown block, might be even higher.

The Red Hill fault, if the maximum credible earthquake occurs, could generate bedrock accelerations as high as 0.8 g. Bedrock beneath the eastern edge of the City of Rancho Cucamonga might be expected to experience up to 0.85 g from a large earthquake on the San Jacinto fault.

Values shown in Table 4.3-1 are for accelerations in bedrock. Seismologists consider bedrock to be material with a shear wave velocity faster than 2,000 feet per second. Seismic

velocities beneath the City are not specifically known, but in general, these velocities are typically attained at a depth of about 500 feet in the valley alluvium (Fife and others, 1976). Areas with deep cohesionless soils, such as those underlain by recent fan deposits, might be expected to experience accelerations at the ground surface that are as low as 60 percent of those calculated for bedrock (after Seed and others, 1975). Areas with stiffer soils, such as older, clayey alluvium, would be expected to experience higher percentages of the calculated values. Predominant periods of shaking are expected to be shorter in bedrock than in areas covered by thick alluvial deposits.

Other faults near the Chino Basin include the Rialto-Colton Fault, the Indian Hill Fault, and the Lytle Creek Fault. According to the Geologic Map, these faults are not known to be active in the last 700,000 years. Additionally, the Chino Avenue Fault is located westerly of the City of Chino, however none of these faults are predicted to generate maximum accelerations greater than those contained in Table 4.3-1.

According to the Riverside County General Plan, the portion of the Chino Basin that is located in Riverside County does not overlie any Alquist-Priolo Special Studies Zones. A small portion of the special study zone for the Cucamonga fault appears to be within the boundaries of the Chino Basin. The State of California requires additional geologic investigations prior to construction of certain structures and facilities within this study area. This special studies zone occupies part of the area marked as high-priority for construction of new groundwater recharge facilities, and more geologic investigations are necessary for facilities sited near this area.

4.3.2.5 Other Geologic Hazards

Ground Rupture

Fracturing and displacement of the ground surface can occur as a direct result of movement along an active fault (primary ground rupture), or as a result of sympathetic movement from intense ground shaking on weakened, older fault traces (secondary ground rupture). Primary ground rupture commonly results in greater surface displacement; whereas secondary ground rupture is commonly more widespread. Both types of ground rupture are potentially destructive to surface improvements, and in 1972 the State of California legislated the Alquist-Priolo Special Studies Zone Act (now known as Alquist-Priolo Earthquake Fault Zones Act) to define and restrict development areas of potential fault-related ground rupture. As of 1972, the faults listed for special study zones included the San Andreas, San Jacinto and part of the Cucamonga fault zones. In 1974, however, a preliminary draft of the Proposed Seismic and Public Safety Element of the Environmental Improvement Agency (San Bernardino Planning Department) recommended that the County consider additional faults for special studies, including (in order of priority as listed):

- The branch of the eastern portion of the Cucamonga fault,
- The Red Hill fault (a branch of the Cucamonga fault), and
- The Chino-Elsinore fault (northwesterly extension of the Elsinore fault).

The fundamental purpose of requiring further study in Alquist-Priolo zones is to prevent high-occupancy structures and important or potentially hazardous facilities from being constructed on an active earthquake fault, if avoidable.

The San Bernardino County General Plan EIR states that, "Known historic ground rupture in the Valley region is limited to minor fault creep along the San Jacinto Fault Zone near the city of Colton. Regionally, the potential hazards associated with ground rupture in the Valley are considered relatively low, due to the local nature of rupture related damage (i.e., along the fault traces themselves) and the provisions of the Alquist-Priolo Act" (San Bernardino County General Plan EIR, VIII-16). Portions of the City of Norco and unincorporated Riverside County lie within specially designated County Hazard areas; however, these are not part of the Alquist-Priolo Special Study Zones established by the State of California.

Liquefaction Hazards

Liquefaction is a process that occurs during the shaking action of an earthquake seismic event with accelerations of about 0.5 g or greater. When saturated, cohesionless, fine granular sediment (usually silty sand or fine sand) are subjected to intense seismic shaking they transform from a solid and act as a fluid. During seismic shaking, they loose bearing capacity and extreme damage to structures that are sited on these soils can occur due to settling, tilting, or floating of the foundation. The stability of silty clay and clay, and coarse sediment (such as gravel) is generally not as affected. Liquefaction is generally restricted to saturated or near-saturated sediments at depths of less than 50 feet (San Bernardino County General Plan EIR, VIII-18).

One area of relatively high liquefaction potential occurs in an approximately 20 square-mile area located in the southwestern portion of the City of Chino and adjacent areas, such as the Prado Basin area. This area has a relatively shallow groundwater table (groundwater depths have varied from 100 feet to less than 30 feet) and consists of sandy alluvial soils. The areas that are most susceptible to liquefaction correspond to former artesian areas of the Basin, and other areas with high groundwater levels, which existed before extensive groundwater pumping lowered the groundwater levels.

Settlement/Subsidence

Settlement is the localized lowering of the ground surface due to a decrease in the volume of the underlying soil or sediment. Various phenomena can cause this phenomena, including consolidation, hydro-consolidation, and seismically induced settlement. A common cause of ground fissuring within alluvial basins is the removal of subsurface fluids resulting in compaction of poorly consolidated aquifer materials and land subsidence (Fife et al., 1976; Galloway et al., 1998). In other words, groundwater extractions may have caused regional settlement/subsidence within the southeastern-most portion of San Bernardino County..

The most obvious evidence of land subsidence can be seen in the appearance and propagation of land surface fissures in the area of California Institution for Men (CIM) and the City of Chino. .A general north-south trend of fissuring located directly east of the main trough of subsidence that has been mapped by ground level surveying. Ground fissuring was first observed east of Central Avenue and crossing Edison Avenue in 1973 by a United States Geological Survey geologist (Fife

and others, 1976). Beginning in 1991, a number of additional fissures appeared within the northwestern portion of CIM property. During following years, fissuring occurred to the north of and parallel to the CIM fissuring in the City of Chino and southward into the CIM Minimum compound where several structures have been damaged.

Seiche

Seiche is the oscillation of the surface of a landlocked water body that varies from a few minutes to several hours. Seiche can be seismically induced or be the result of material (rocks, landslide, etc.) falling into the water body. No major surface water bodies are present in the program area. However, seiching can also occur in man-made structures, such as water tanks, usually resulting in collapse of the structure and inundation of an immediate area. There are several such structures in the program area, which must be noted prior to placement of other facilities.

Tsunami

This is a tidal wave caused by seismic events in or near the ocean. This would only apply to areas along the Pacific coast. Generally, the program area could not be affected by this hazard.

4.3.3 Environmental Impacts

Impacts to geology and soils are deemed to be significant according to CEQA Guidelines (§15064 and Appendix G) if the direct, indirect or cumulative effects of the proposed project:

- Expose people or structures to potential substantial adverse effects, including the risk of loss injury, or death involving: (1) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a know fault? (2) Strong seismic-elated ground failure, including liquefaction? (3) landslides?

- Result in substantial soil erosion or the loss of topsoil?

- Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?

- Be located on expansive soil, as defined in table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?

- Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?

The Notice of Preparation for the program indicated that all of the above, except the last, might be potentially significant unless mitigation is incorporated. It was stated that the southern California region is generally known to be susceptible to various hazards related to seismic and geological conditions, such that these factors must be major issues for any project implemented under the

program. The last item was dismissed as an issue in that the project does not involve development of septic systems or other new wastewater disposal systems.

a. Will the program expose people or structures to potential substantial adverse effects, including the risk of loss injury, or death involving: (1) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a know fault? (2) Strong seismic-related ground failure, including liquefaction? (3) landslides?

The entire program is located within a seismically active area and, therefore, subject to several hazards. Besides general facility construction standards, each local agency has additional requirements for construction of facilities that would address these issues. Facilities to be developed under the RIX Recycled Water Sales Program for which seismic criteria apply particularly are: any chemical storage, any water tanks, pipelines, and structures associated with pump stations. Mitigation measures will need to be implemented for any facilities that are required to remain in operation following a major seismic event. It should also be noted that none of the structures associated with the proposed project are anticipated to be occupied in any manner by humans.

b. Will the program result in substantial soil erosion or the loss of topsoil?

Construction activities for specific facilities installed in support of the proposed program have a potential to cause soil erosion and loss of topsoil. Operation activities are not forecast to cause any erosion or loss of topsoil based on the type of long-term activities associated with the proposed project. Mitigation measures will need to be implemented for construction of proposed facilities to ensure that erosion and soil loss do not occur as a result in installing the proposed facilities.

c. Will the program be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?

It is possible that pipelines may extend through certain areas of unstable geologic units and soils. Although most water reservoirs (water tanks) are developed for potable water supply, water tanks for recycled water could be developed and it is likely they would be sited on hillsides in order to provide for gravity flow. Stability for such facilities will have to be considered on a case-by-case basis. Mitigation measures will need to be implemented for facilities located in areas of potential instability, such as in the southern Chino area.

d. Will the program be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?

Expansive soils are limited in the region to clay soils in the vicinity of Prado. Facilities located in these area could be affected by expansive soils as referenced above. Site-specific geotechnical studies will be required to identify any potential expansive soil hazards and site specific mitigation measures. A general mitigation measure is outlined below to address this potential impact.

4.3.4 Mitigation Measures

4.3.4.1 To Reduce Seismic Hazards

The following general mitigation measures would be implemented for all subsequent projects under the RIX Recycled Water Sales Program. These measures can reduce all potential geotechnical impacts, due to seismic hazards, to a level that is considered to be less than significant with respect to the proposed thresholds.

Risks from geological hazards shall be mitigated through a combination of engineering construction, land use, and development standards. All projects shall include a detailed geological, geotechnical, and soils engineering study that will address potential hazards associated with the geological processes discussed in the following sections. All construction shall conform to appropriate city and county building codes, standards, and requirements.

4.3-1 A site-specific evaluation shall be conducted for all structures in conformance with the California Department of Conservation, Division of Mines and Geology Special Publication 117, Guidelines for Evaluation and Mitigating Seismic Hazards in California.

4.3-2 If evidence of faulting is identified at any specific facility site, then a further site-specific evaluation shall be conducted in conformance with the California Department of Conservation, Division of Mines and Geology Note 49, Guidelines for Evaluating the Hazard of Surface Fault Rupture. Facility location and design will be adjusted as necessary to provide structural setbacks. Additional measures may include strengthened foundations, other engineering design, and flexible utility connections.

4.3-3 Apply appropriate design and construction criteria to all structures subject to significant seismic ground shaking.

4.3-4 If evidence of liquefaction is identified at any facility sites, particularly those in identified hazard zones near the Santa Ana River, mitigation may include:

- ***In-situ densification of susceptible soil.***
- ***Ground improvements such as removal and replacement of susceptible soils or dewatering.***
- ***Deep foundations designed to accommodate liquefaction.***
- ***Shallow foundation design to accommodate vertical and lateral ground displacement.***

4.3-5 Comprehensive geotechnical investigations shall be required prior to engineering and design development or structural and/or substantial rehabilitation of structures identified under Risk Class I & II, e.g., public facilities, as identified below:

- ***Risk Class I & II, Structures Critically Needed after Disaster: Structures that are critically needed after a disaster include important utility centers, fire stations, police stations, emergency communication facilities, hospitals, and critical transportation elements such as bridges and overpasses and smaller dams.***
  Acceptable Damage: Minor non-structural; facility should remain operational and safe, or be suitable for quick restoration of service.
- ***Risk Class III: High occupancy structures; uses are required after disasters (i.e., places of assembly such as schools and churches).***
  Acceptable Damage: Some impairment of function acceptable; structure needs to remain operational.

- ***Risk Class IV, Ordinary Risk Tolerance: The vast majority of structures in urban areas; most commercial and industrial buildings, small hotels and apartment buildings, and single family residences.***
  <u>Acceptable Damage</u>: An "ordinary" degree of risk should be acceptable. The criteria envisioned by the Structural Engineers Association of California provide the best definition of the "ordinary" level of acceptable risk. These criteria require that buildings be able to:
  - ***a. Resist minor earthquakes without damage;***
  - ***b. Resist moderate earthquakes without structural damage, but with some non-structural damage; or***
  - ***c. Resist major earthquakes, of the intensity or severity of the strongest experienced in California, without collapse, but with some structural, as well as non-structural damage.***
- ***Risk Class V, Moderate to High Risk Tolerance: Open space uses, such as farms, ranches and parks without high occupancy structures; warehouses with low intensity employment; and the storing of non-hazardous materials.***
  <u>Acceptable Damage</u>: Not applicable.

4.3-6 All structures previously identified in categories III through V shall be designed in accordance with the applicable multiplier factor seismic design provisions of the Seismic Safety Report to promote safety in the event of an earthquake.

4.3-7 The direct impacts of faults upon proposed projects shall be considered during preliminary planning processes, and the engineering design phases.

4.3-8 All rehabilitation and new development projects implemented as a result of the proposed project shall be built in accordance with current and applicable Uniform Building Code (UBC) standards and all other applicable City, County, State and Federal laws, regulations and guidelines, which may limit construction and site preparation activities such as grading, and shall make provisions for appropriate land use restrictions, as deemed necessary, to protect residents and others from potential environmental safety hazards, either seismically induced or those resulting from other conditions such as inadequate soil conditions, which may exist in the proposed project's area of potential impact.

4.3-9 Local grading and building codes that reflect measures to minimize possible seismic damage shall be considered in geotechnical reports prepared for future projects.

4.3-10 If a conjunctive use program is implemented that would bring water levels up to a level that significantly increases the risk of liquefaction, a more detailed monitoring and geologic study focused on this issue will be conducted to determine whether or not liquefaction poses a hazard to surface structures and to human safety. If such a study finds the impacts to be significant, the volume of water permitted to be stored in the particular groundwater basin will be decreased sufficiently until a water level is achieved that does not pose any significant hazard to surface structures or people.

4.3.4.2 <u>To Minimize Erosion</u>

Mitigation measures are available to minimize erosion problems associated with wind and water, especially during the construction phase when the ground surface is exposed. During construction activities related to specific projects, the following measures may be used individually or in conjunction to control potential erosion at locations where construction activities expose the ground surface to wind and water erosive forces:

4.3-11 Add protective covering of mulch, straw or synthetic material (erosion control blankets, tacking will be required) to disturbed areas exposed to direct precipitation or concentrated surface runoff.

4.3-12 Limit the amount of area disturbed and the length of time slopes and barren ground are left exposed. For pipeline installation, soil shall be compacted to a ground surface level similar to pre-construction conditions.

4.3-13 Construct diversion dikes and interceptor ditches to divert water away from construction areas.

4.3-14 Install slope drains (conduits) and/or water-velocity-control devices to reduce concentrated high-velocity streams from developing.

4.3.4.3 To Reduce Hazards of Unstable Geologic Conditions

4.3-15 Any pipelines crossing the certain areas, such as the western portion of the Prado Basin, could be subject to subsidence and ground rupture associated with the subsidence. Any construction of facilities in or pipelines crossing such zones is required to have detailed geotechnical and structural engineering studies to ensure designs that can safely accommodate, per building code requirements, the described ground movement(s).

4.3-16 Continue to identify and study subsidence hazards and susceptible areas, and propose mitigation technology that is appropriate to the findings of the monitoring study. The implementation of Water Sales Program facilities shall not in any way contribute to subsidence conditions in pre-existing subsidence zones. Implementation will not cause or contribute to any new, significant subsidence impacts greater than a total of six inches in magnitude over the planning period. Impacts less than six inches in new areas are considered to be less than significant.

4.3.4.4 To Reduce Hazards of Expansive Soils

4.3-17 Excavation and removal or recompaction of expansive soils shall be conducted for facilities at sites identified as having such constraints.

Implementation of the above mitigation measures will lower the impact of seismic safety to that of less than significant. After the construction phase, long-term erosion control can be accomplished by keeping soils under vegetative cover, hardscape (pavement, gravel, or other hard cover) and planting windbreaks. The type of vegetation used as windbreaks must comply with SCAQMD's standards. After construction, soils underlying facilities and pavements will not be subject to erosion. Unstable geologic hazard conditions, including expansive soils, will be fully mitigated by implementing the measures outlined above.

4.3.5 Cumulative Impact

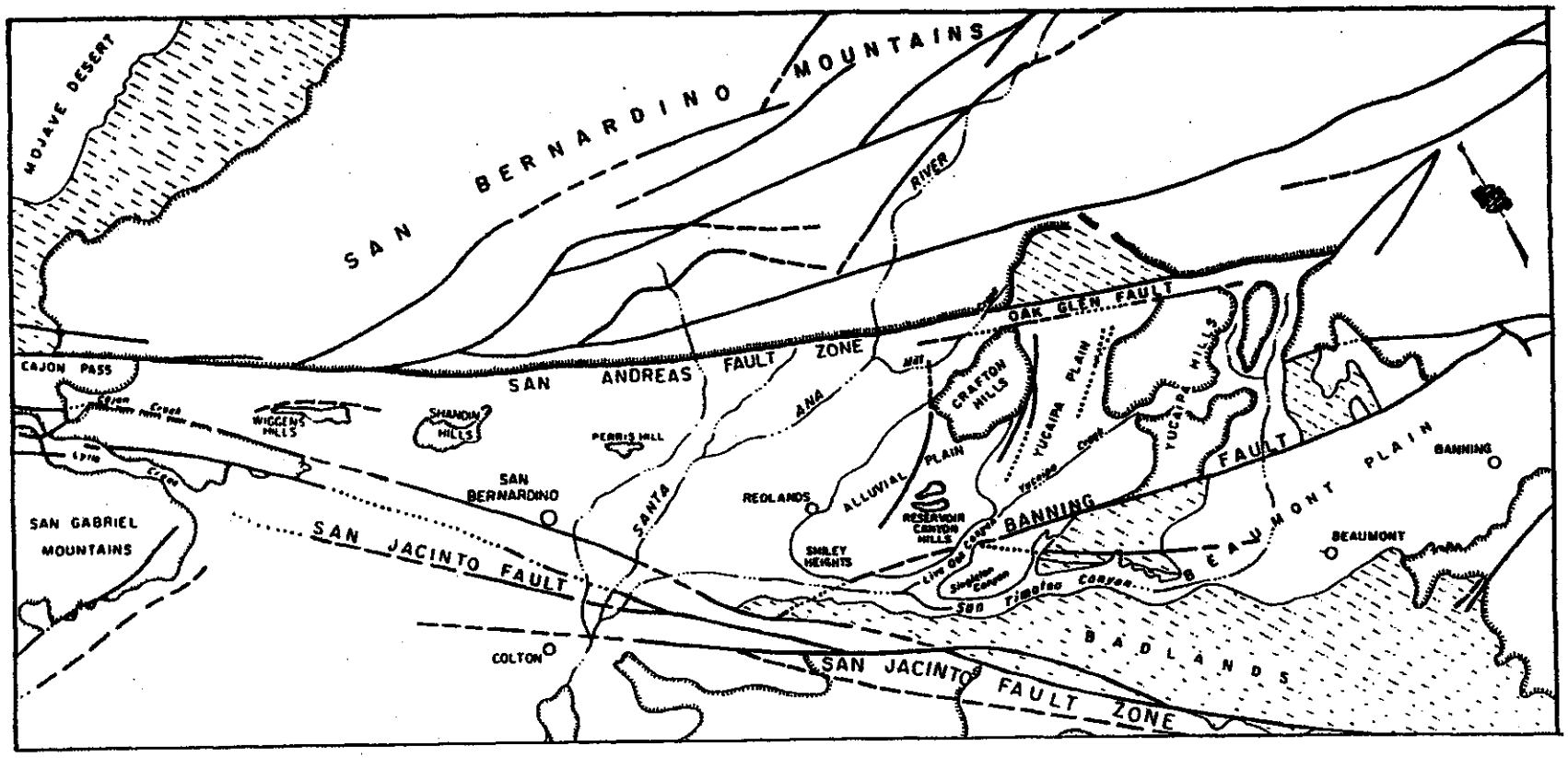
Future development in accordance with RIX Recycled Water Sales Program is not forecast to cause any significant adverse cumulative geologic or soil impacts. Geology impacts are seldom cumulative in nature, and this project does not include occupiable structures or essential facilities which could add to cumulative damage during a major seismic event. With implementation of the mitigation measures outlined above, projects implemented under the program would not contribute to cumulative exposure of humans in occupied structures to seismic, liquefaction, or subsidence

hazards. Therefore, no additional mitigation measures are required to ensure that cumulative geologic and soil impacts remain below a significant impact threshold.

4.3.6 Unavoidable Adverse Impact

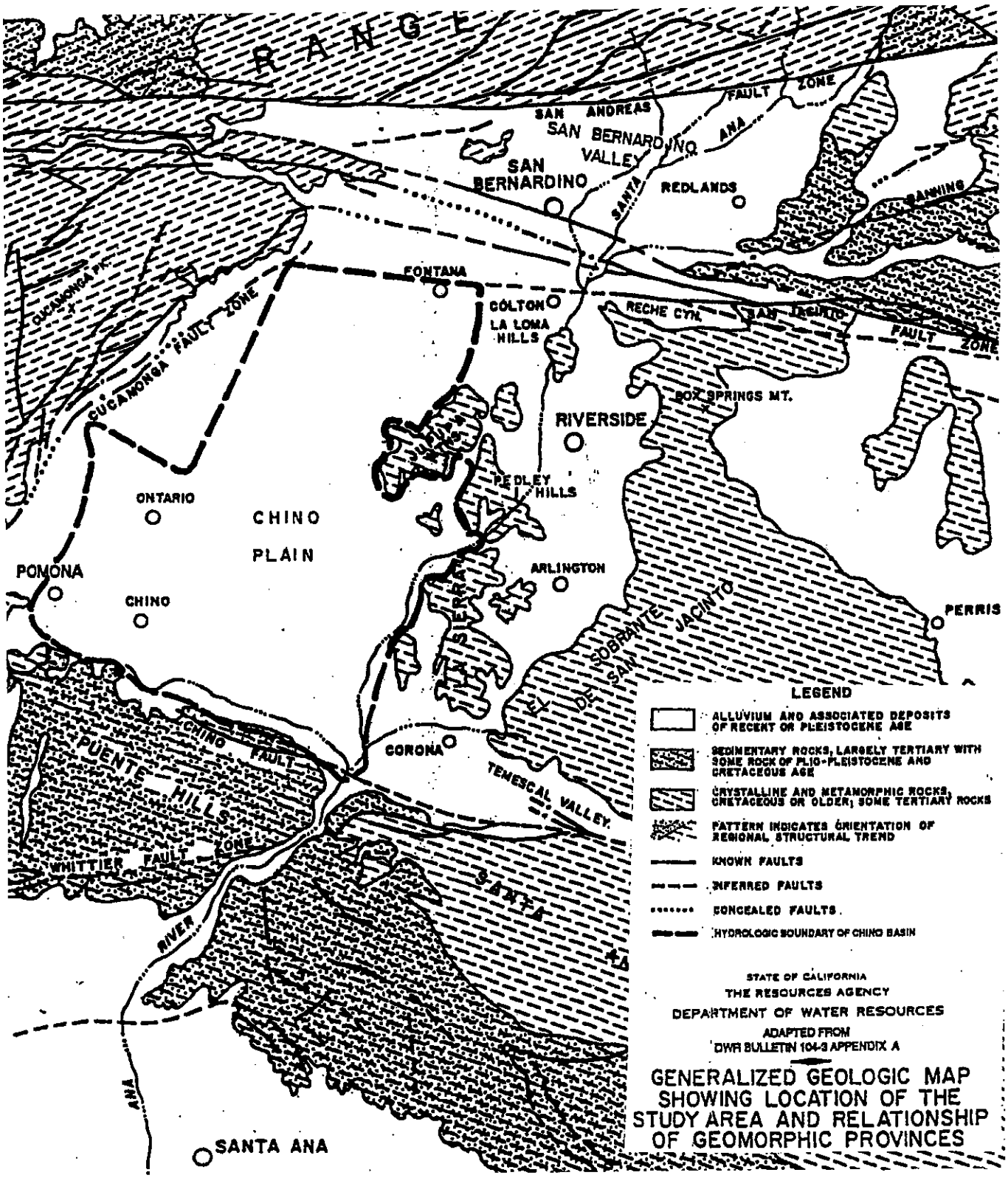
This geologic and soil resource impact evaluation indicates that the proposed implementation of the RIX Recycled Water Sales Program will involve construction projects that have a potential to be exposed to significant geotechnical constraints or cause geologic/soil impacts. However, with proposed mitigation, implementing specific future projects will not cause any significant unavoidable adverse geologic and soil resource impacts or cause future projects to be exposed to significant unavoidable geotechnical constraints. Therefore, no significant unavoidable adverse geologic or soil impacts are forecast to occur if the proposed program is implemented.

FIGURE 4.3-1
Bunker Hill-San Timoteo Geology



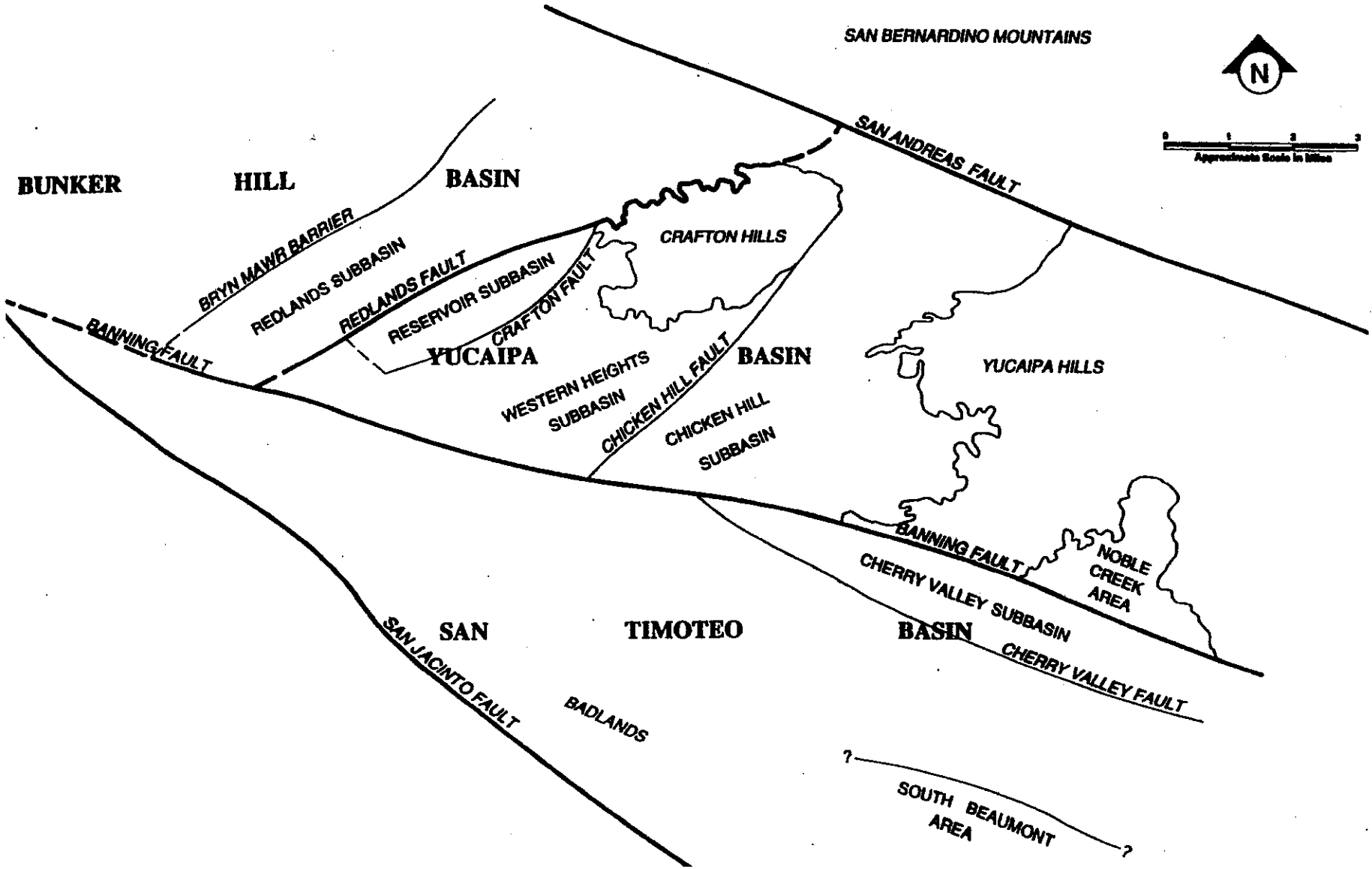
Source: Wildermuth Environmental, Inc., 1997

FIGURE 4.3-2
Chino-Riverside Area Geology



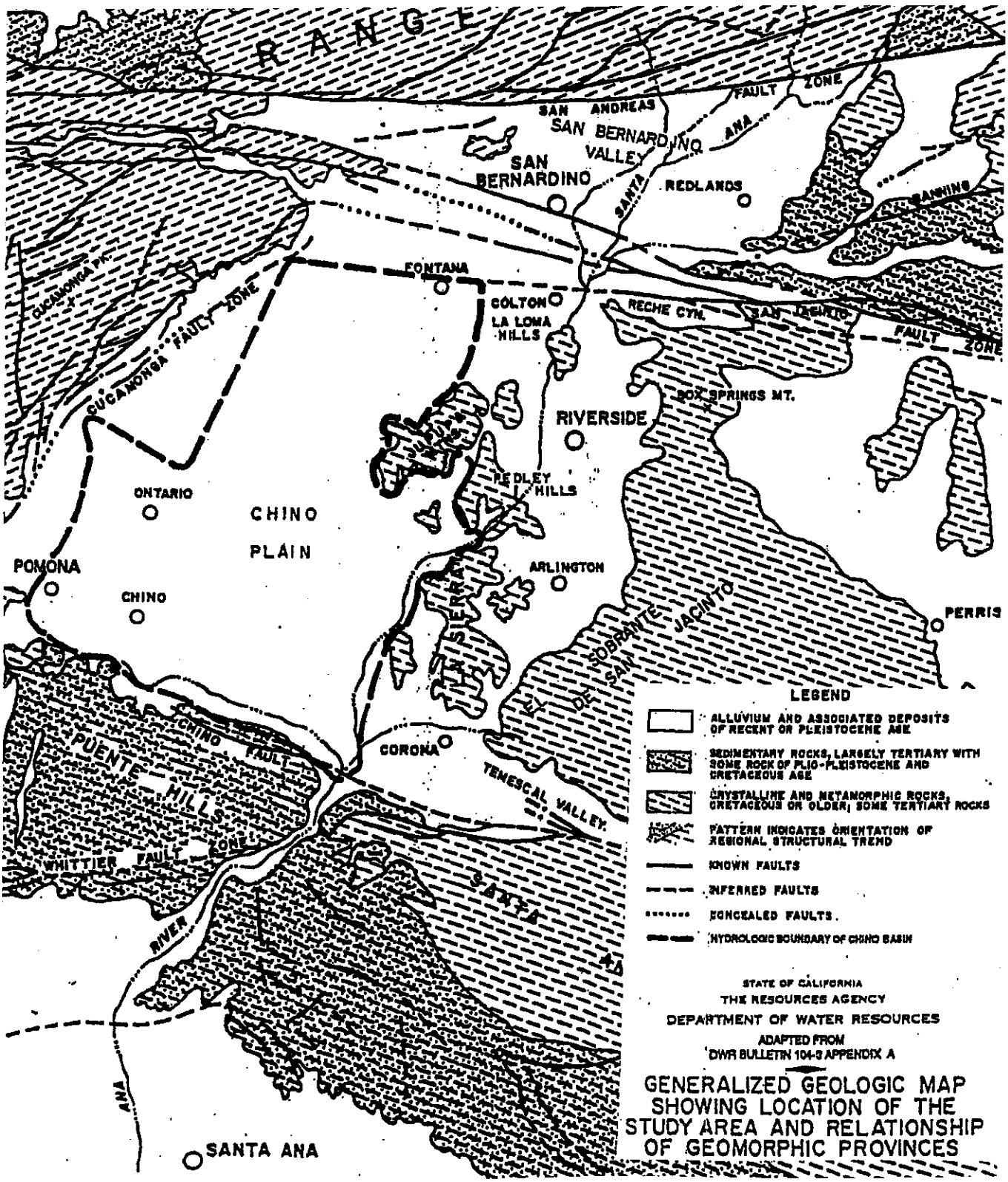
Source: Adapted from DWR Bulletin 104-3 Appendix A

FIGURE 4.3-3a
Regional Fault Map of Bunker Hill-San Timoteo Basins



Source: Wildermuth Environmental, Inc., 1997

FIGURE 4.3-3b
Regional Fault Map of Chino-Riverside Basins



Source: Adopted from DWR Bulletin 104-3 Appendix A

4.4 WATER RESOURCES / HYDROLOGY AND WATER QUALITY

4.4.1 Introduction

The California Environmental Quality Act (CEQA) was adopted to ensure that decision-makers are provided with sufficient information about all the potential environmental impacts of a proposed project, so that they are fully informed of potential environmental consequences before proceeding to approve and implement a project. In terms of a long-term program, when it is not possible to determine all of the physical changes that might be involved in the implementation of a program, it is necessary to characterize potential changes to the extent feasible, as well as describe further procedures for evaluating impacts when specific projects are defined.

The proposed marketing program being analyzed in this PEIR will result in the physical construction of new water management facilities and could further other reuse activities, such as planning documents. Generally, these impact from these facilities can be described without knowing site-specific impacts. Site-specific impacts must be studied by the proponent of the facility or activity. Such CEQA studies must be in the form of a subsequent environmental review document in accordance with Sections 15162 and 15168 of the State CEQA Guidelines. For those issues addressed in sufficient detail by this PEIR, subsequent documents may not need to be prepared. In the case of this program, subsequent review documents may be prepared by agencies other than San Bernardino Municipal Water Department (SBMWD). These agencies may have already addressed the increased use of recycled water and may have already developed specific facilities or activities, based on the assumption of obtaining recycled water from undefined sources.

In this instance, the role of this PEIR has been complicated by several NOP comment letters. Particularly, all "water issues," including hydrological and water quality, related to water reuse within the entire Santa Ana River Watershed and possibly without are requested to be included in the impact analyses. The following is a summary of those concerns and issues described in the NOP comment letters. Those questions relative to water quantity and quality that are within the responsibility of the SBMWD will be addressed in this section.

- *To provide enough information to properly account for any impact on River flows or water quality. Need to know when, where and how the physical delivery of the recycled water will be made in order to determine any additional data collection needs. Need to have detailed descriptions of physical facilities and operating plans for such facilities that are associated with the project. (Santa Ana River Watermaster)*

- *Request analyses of specific impacts to all sensitive species, particularly from direct impacts of water diversion. Future direct impacts from infrastructure used to transport diverted water must be addressed. Indirect and cumulative impacts to offsite habitats require analysis. (California Department of Fish and Game)*

- *Request analyses of proposed contract provisions, particularly those assurances that provided quantities of recycled water are actually reused. (San Bernardino Valley Municipal Water District)*

- *Request analyses of the consistency of the proposed program with other various regional plans, addressing: population growth and the need for more water and wastewater facilities, orderly and efficient arrangement of public infrastructure facilities and distribution/collection systems to serve existing and proposed land uses, protection of surface and groundwater from degradation, support the*

reclamation and reuse of wastewater, and protection of species and habitats. (Western Riverside Council of Governments)

- *Will this program affect the use of 18,000 acre-feet of RIX recycled water for groundwater recharge in connection with the Riverside-Colton Conjunctive Use Project (Bureau of Reclamation/Department of Water Resources identified project)? (California Department of Water Resources)*

- *Request that the EIR address potential flood hazards from the River and Rialto Channel, the adequacy of the Santa Ana River's levee at the site and upstream of Rialto Channel, any effects of proposed construction on adjacent or downstream properties. (County of San Bernardino Transportation/Flood Control Department)*

- *How does the proposed project impact groundwater supplies which the Watermaster appropriates? Will the project meet the proposed reduced groundwater basin water quality objectives by the Regional Board? (Chino Basin Watermaster)*

- *Request an analysis of the effects of the project on the hydrology of any and all riparian, wetland, or alluvial scrub communities within the sphere of influence of the project. Address all direct and indirect impacts to protected species and alternatives and mitigation. (U.S. Fish and Wildlife Service)*

- *Address the impacts of the project on the current replenishment of the OCWD groundwater basin. Address the potential impacts of new infrastructure that may be required to maintain replenishment. Address the impacts of exporting native water to areas outside of the Santa Ana River Watershed. (Orange County Water District).*

Appendix 8.2 of this document contains copies of the letters from which the above comments were summarized.

4.4.2 Environmental Setting

4.4.2.1 Surface Water

The Santa Ana River watershed is the system associated with the proposed project. It covers over 2,650 square miles, traversing from the San Bernardino Mountains 100 miles southwesterly to the Pacific Ocean in Huntington Beach. The watershed contains portions of three southern California counties: San Bernardino, Riverside and Orange.

For the purposes of water quality planning, the Santa Ana Regional Water Quality Control Board (SARWQCB) has divided the mainstem of the river into six reaches, each reach being considered a hydrologic and water quality unit (SARWQCB Basin Plan, 1995). These reaches are shown in Figure 4.4-1, Reaches of the Santa Ana River, and described as follows:

Reach 6 is the upstream portion of the system to the recently constructed Seven Oaks Dam. Flows consist of snowmelt from the San Bernardino Mountains and storm runoff. Water quality is good.

Reach 5 is that portion from Seven Oaks Dam to San Bernardino to the San Jacinto Fault (Bunker Hill Dike). Most of this reach is dry at the surface, except during storms. The channel is largely operated as a flood control facility. The downstream end of this reach includes rising groundwater (which typically percolates into the upper end of Reach 4) and intermittently, San Timoteo Creek surface flows.

Reach 4 consists of the river channel from the Bunker Hill Dike downstream to Mission Boulevard Bridge in the City of Riverside. The bridge marks the upstream limit of rising water induced by flow constriction at Riverside Narrows. The RIX facility is physically located at the upper end of this reach. Flows are now perennial, due to discharges from the RIX facility and the Rialto wastewater treatment plant. Much of this reach is operated as a flood control facility.

Reach 3 includes the river from Mission Bridge downstream to Prado Dam. Many tributaries enter the river in this section, including Temescal, Chino and Mill/Cucamonga Creeks. Additionally, effluent discharges from the City of Riverside, City of Corona, Inland Empire Utilities Agency and the Western Riverside Regional Wastewater Reclamation Authority facilities contribute to flows between Van Buren Boulevard and Prado Dam.

Reach 2 occurs from Prado Dam through the Santa Ana Canyon into Orange County. Flows are recharged into the Orange County groundwater basin. The downstream end of the fore-bay/recharge area, or the limit of surface flows, is at 17th Street in Santa Ana.

Reach 1 is a dry flood control facility, extending from 17th Street to the tidal prism at the Pacific Ocean.

For purposes of environmental analyses in this PEIR that are related to river mainstem effects, those reaches considered are limited to the upper Santa Ana River Reaches 3, 4, and 5. Reach 5 is included as potential uses will occur in this reach. Since some of the potential users of RIX recycled water are located in Orange County, some discussions also encompass portions of Reach 2.

Generally, the river has little surface flow, except in storm events. Rising groundwater in certain sections creates perennial flows. The other major sources of surface flows in the river are discharges from wastewater treatment plants. The locations of ephemeral and perennial sections in the upper Santa Ana River have changed historically. From 1960 to 1977, perennial flow occurred in the reach between Riverside Narrows and Prado Dam. Between 1978 and 1983, perennial flows extended to the Bunker Hill Basin along the river and Warm Creek. In 1996, when the City of San Bernardino moved its discharge point from the vicinity of E Street to the new RIX facility, the reach between the Bunker Hill Basin and the City of Rialto's reclaimed water discharge point became ephemeral (MJW, 1997).

Water quality standards are based on "beneficial uses" established for water bodies or portions thereof, and include "water quality objectives" which are deemed to protect the beneficial uses of specific segments of the river. The Basin Plan (SARWQCB, 1995) has designated beneficial uses for the Santa Ana River, shown in Table 4.4-1. Only those mainstem beneficial uses are shown (e.g., not all the tributaries) for surface waters.

Table 4.4-1
DESIGNATED BENEFICIAL USES FOR SURFACE WATERS
IN THE SANTA ANA RIVER SYSTEM

Beneficial Use	Reach 5 Seven Oaks Dam to San Jacinto Fault	Reach 4 San Jacinto Fault to Mission Blvd.	Reach 3 Mission Blvd. to Prado Dam
Municipal Water Supply	X *	+	+
Agricultural Water Supply		X	X
Groundwater Recharge	X	X	X
Recreational 1 (Swimming)	X	X **	X **
Recreational 2 (Boating)	X	X	X
Warm Water Aquatic Habitat	X	X	X
Wildlife Habitat	X	X	X
Rare Species Habitat	X		X

Notes: * Municipal water supply only partially applied to this reach; not in the area of the RIX facility.
** Access for recreational use is prohibited in some portions by San Bernardino County Flood Control.
+ These reaches have been specifically excepted from the municipal water supply designation.

Source: Basin Plan, 1995

Water quality parameters and limits are established by the Regional Board to protect the beneficial uses summarized above. The surface water beneficial uses are recreational, aquatic life and groundwater recharge (ultimately municipal water supply). The major recreational use issue in surface water is bacterial contamination in wastewater. Dissolved oxygen, temperature, turbidity, pH, metals and chlorine residuals affect aquatic life uses. Unionized ammonia, cadmium, lead and copper have been identified as particular fishery issues, as they can cause chronic toxicity in aquatic life. A site-specific water quality objective was established by the Regional Board for unionized ammonia in Reaches 2, 3, 4 and several tributaries. Site-specific objectives for the three metals were additionally developed, but have not been approved by the federal Environmental Protection Agency to date. Finally, nitrogen and salt loadings in the river system have diminished the quality of receiving groundwaters for use as drinking and agricultural water supply. Table 4.4-2 shows the current adopted objectives.

4.4.2.2 Groundwater

The RIX facility site physically overlies the Colton Groundwater Subbasin. Downstream basins in the mainstem that could be affected by the recycled water sales program are: Riverside Basin I and more remotely, Orange County Basins (Santa Ana Forebay and Pressure). In terms of the marketing alternatives, one option is to provide recycled water for recharge to the Bunker Hill Basin. Management Zone 3 of the Chino Basin (and possibly Management Zone 1) could be affected under other marketing alternatives. The current beneficial uses of all of these groundwater basins are four water supply categories: municipal and domestic supply, agricultural supply, industrial service supply, and industrial process supply.

Table 4.4-2
SELECTED SURFACE WATER QUALITY OBJECTIVES
IN THE SANTA ANA RIVER SYSTEM

Water Quality Objective	Primary Use Protected	River Portions Protected
Total dissolved solids 700 mg/l 550 mg/l 300 mg/l 200 mg/l	Municipal Supply**	Reach 3 Reach 4 Reach 5 Reach 6
Total inorganic nitrogen 10 mg/l 5 mg/l 1 mg/l	Municipal Supply**	Reaches 3, 4 and portions of Reach 5 Portion of Reach 5 Reach 6
*Total Recoverable Metals (with total hardness of 200 mg/l)** Cadmium 7.93 ug/l Copper 33.4 ug/l Lead 26.43 ug/l	Warmwater and Coldwater Aquatic Life	Reaches 2, 3 and 4 and some creeks
Residual chlorine 0.1 mg/l	Warmwater and Coldwater Aquatic Life	All inland surface waters
Unionized ammonia 0.098 mg/1 NH3-N as a 4-day average	Warmwater Aquatic Life	Reaches 2, 3, and 4, Chino Creek, Mill Creek, Temescal Creek, San Timoteo Creek
Total coliform bacteria Less than 100 organisms/100 ml *Fecal coliform bacteria* Less than 200 organisms/100 ml Less than 2000 organisms/100 ml	Municipal Supply** REC-1 REC-2	All inland surface waters
pH 6.5 - 8.5 pH units	Warmwater and Coldwater Aquatic Life	All inland surface waters
Dissolved oxygen Above 5 mg/l Above 6 mg/l	Warmwater Aquatic Life Coldwater Aquatic Life	All inland surface waters
Turbidity For natural 0-50 NTU, maximum increase of 20% For natural 50-100 NTU, maximum increase of 10 NTU For natural greater than 100 NTU, maximum increase of 10%	For all uses	All inland surface waters
Temperature Not to increase by more than 5°F Not to be raised above 90°F June-October or above 78°F the rest of the year	Coldwater Aquatic Life Warmwater Aquatic Life	All inland surface waters

Notes: * Site-specific objectives, revised according to California Toxics Rule
** Although specified as "Municipal" in the Basin Plans, the primary use is in the form of Groundwater Recharge
Source: Basin Plan, 1995

To protect water quality, the standards and limits are set dependent upon the beneficial uses. Surface and groundwater used for municipal water supply commonly has the most stringent objectives and standards apply. Total Dissolved Solids (TDS) and nitrogen have been identified as groundwater issues of concern in the Santa Ana watershed, such that the water quality objectives for all the basins are being closely examined and proposed for revision, as well as determination of new wasteload allocations for these. The sources of excess minerals and nutrients include historic irrigated agriculture, particularly of citrus, dairy farming, production of wastewater, and use of imported water supplies such as the Colorado River.

The groundwater basins potentially affected by the proposed project have current water quality objectives, as shown in Table 4.4-3.

Table 4.4-3
GROUNDWATER QUALITY OBJECTIVES IN SELECTED BASINS
IN THE SANTA ANA RIVER SYSTEM

Groundwater Subbasin	Total Dissolved Solids	Nitrate (as Nitrogen)
Bunker Hill I	260 mg/l	1 mg/l
Bunker Hill II	290 mg/l	5 mg/l
Bunker Hill Pressure	300 mg/l	1 mg/l
Colton	400 mg/l	3 mg/l
Riverside I	490 mg/l	4 mg/l
Chino I	220 mg/l	5 mg/l
Chino II	330 mg/l	6 mg/l
Chino III	740 mg/l	11 mg/l
Santa Ana Forebay	600 mg/l	3 mg/l
Santa Ana Pressure	500 mg/l	3 mg/l

Source: Basin Plan, 1995

4.4.2.3 Recycled Water

The "Title 22" standards for water reclamation were derived as public health regulations under the Department of Health Services (DHS). They are found under Title 22, Division 4, Environmental Health, Chapter 3, Water Recycling, in the California Code of Regulations as Article 3 Section 60305. These standards address the allowed uses for recycled water, treatment levels, and performance and design parameters both for treatment processes and uses. Two sets of standards have been developed which are applicable to the proposed project, the Water Recycling Criteria and Groundwater Recharge Guidelines. The Water Recycling Criteria have been applied to projects, replacing the 1978 Wastewater Reclamation Criteria, although they were in draft form until official adoption in December 2000. The Groundwater Recharge Guidelines are still in draft form, but have also been applied to subsurface injection and surface spreading of recycled water.

There are four levels of treatment specified for recycled water under the Water Recycling Criteria at this time, summarized as follows. The associated allowed uses of water treated at each level are also given.

Undisinfected Secondary Recycled Water – This is an oxidized wastewater in which the organic matter present in the wastewater has been stabilized, is nonputrescible and contains dissolved oxygen.

This water can be used for surface irrigation of non-edible crops and sewer flushing.

Disinfected Secondary 2.2 Recycled Water – This is recycled water that has been oxidized and disinfected so that the median concentration of total coliform bacteria in the disinfected effluent does not exceed a Most Probable Number (MPN) of 2.2 per 100 ml utilizing the bacteriological results of the last seven days for which analyses have been completed and the number of total coliform bacteria does not exceed MPN of 23 per 100 ml in more than one sample in any 30-day period.

This water can be used for surface irrigation of food crops and for impoundments with restricted access.

Disinfected Secondary 23 Recycled Water – This is recycled water that has been oxidized and disinfected so that the median concentration of total coliform bacteria in the disinfected effluent does not exceed an MPN of 23 per 100 ml utilizing the bacteriological results of the last seven days for which analyses have been completed and the number of total coliform bacteria does not exceed an MPN of 240 per 100 ml in more than one sample in any 30-day period.

This water can be used for surface irrigation with restricted access, landscape impoundments, non-misting type cooling towers, and secondary uses (road cleaning, dust control, nonstructural fire-fighting, industrial boiler feed).

Disinfected Tertiary Recycled Water – This is filtered and disinfected wastewater that meets the following criteria:

(a) the filtered wastewater has been disinfected by either:

  (1) a chlorine disinfection process that provides a CT (chlorine concentration times modal contact time) value of not less than 450 mg-minutes/liter at all times with a modal contact time of at least 90 minutes, based on peak dry weather design flow; or

  (2) a disinfection process that, when combined with the filtration process, has been demonstrated to reduce plaque-forming units of F-specific bacteriophage MS2, or polio virus, per unit volume of water in the wastewater to one hundred thousandths (1/100,000) of the initial concentration in the filter influent through the range of qualities of wastewater that will occur during the recycling process. A virus that is at least as resistant to disinfection as polio virus may be used for purposes of the demonstration.

(b) the median concentration of total coliform bacteria measured in the disinfected effluent does not exceed a MPN 2.2 per 100 ml utilizing the bacteriological results of the last seven days for which analyses have been completed and the number of total coliform

bacteria does not exceed a MPN of 23 per 100 ml in more than one sample in any 30-day period. No sample shall exceed an MPN of 240 total coliform bacteria per 100 ml.

This water can be used for surface irrigation with non-restricted access, irrigation of food crops, for impoundments with non-restricted access, misting and non-misting cooling towers, flushing of toilets and urinals, structural fire-fighting, decorative fountains, commercial laundries and car washes

The criteria also address filtration requirements. An oxidized wastewater that is coagulated and passed through either natural undisturbed soils, or a filter media bed must: (1) have a filtration rate that does not exceed 5 gallons per minute per square foot (gpm/sf) of filter media area for mono, dual and mixed media filters, and 2 gpm/sf of filter media area for traveling bridge automatic backwash filters, and (2) turbidity of the filtered wastewater does not exceed an average of 2 nephelometric turbidity unit (NTU) in a 24-hour period; 5 NTU more than 5 percent of the time during a 24-hour period, and 10 NTU at any time. If the wastewater is passed through a microfiltration, ultrafiltration, nanofiltration or reverse osmosis membrane, the turbidity of the filtered wastewater cannot exceed 0.2 NTU more than 5 percent of the time in a 24-hour period, or 0.5 NTU at any time.

The criteria also specify some use area requirements, particularly setbacks for irrigation activities and impoundments. No irrigation with disinfected tertiary recycled water can take place within 50 feet of any domestic water supply well, unless all of the following conditions are met: that a geological investigation shows that an aquitard exists at the well between the uppermost aquifer being drawn from and the ground surface; that the well has a seal extending from the surface into the aquitard; that the well is housed; the that ground surface around the wellhead allows surface water to drain away from the well; and that the well owner approves of the elimination of the buffer zone requirements. No irrigation or impoundment of disinfected secondary 2.2 or disinfected secondary 23 recycled water can take place within 100 feet of any domestic water supply well. No irrigation or impoundment of undisinfected secondary recycled water can take place within 150 feet of any domestic water supply well. Recycled water systems must be separate from potable water systems for irrigation and other uses. Standards are referenced for dual-plumbed recycled water systems.

The Groundwater Recharge Guidelines are still in draft form, most recently revised in August 2002 (www.dhs.ca.gov/ps/ddwem/publications/waterrecycling/index.htm). These Draft Guidelines apply to Planned Groundwater Recharge Reuse Projects, where projects are defined as those using recycled water designed, constructed, or operated for the purpose of recharging by infiltration (via surface spreading) or injection (via subsurface injection) of recycled water to a groundwater basin designated in the Water Quality Control Plan. The Draft Guidelines require that water be filtered and disinfected tertiary recycled water for surface spreading projects and advanced wastewater treatment using a reverse osmosis process for subsurface injection projects.

Nitrogen, regulated contaminants, physical characteristics, and total organic carbon (TOC) provisions are also included in the Draft Guidelines. Total nitrogen is measured as the summation of ammonia, nitrite, nitrate, and organic nitrogen, expressed in units of nitrogen. The allowed concentration is still under consideration. Previous drafts of the Guidelines used the 10 mg/l nitrate-nitrogen standard in drinking water as the basis for a 10 mg/l total inorganic nitrogen (TIN) limit.

With a new 1 mg/l nitrite standard, 3 mg/l TIN is specified as the DHS is "unsure what total nitrogen limit in recharge water is necessary to assure that the nitrite standard will not be exceeded." However, the project sponsor is allowed to demonstrate that the recharge water can meet the 10 mg/l nitrite and the 1 mg/l nitrate standards. The nitrogen limit is to be met before the recycled water reaches the groundwater table, thus, nitrogen removal in soil during percolation can be considered part of the nitrogen control process.

Concerning contaminants and physical characteristics, recycled water must comply with the state's drinking water standards, Basin Plan water quality objectives, and public health goals for regulated compounds and pending regulations for arsenic, uranium, radon and disinfection by-products. It is proposed that TOC levels in filtered wastewater not exceed 0.016 g/l for more than two consecutive days or recharge will be suspended until TOC is less than 0.01 g/l. Also, the allowable maximum recycled water contribution cannot cause the TOC level to exceed 0.5 mg/l. There are other TOC requirements for surface spreading projects.

4.4.2.4 Water Supply and Demand

According to the Water Resources Plan prepared for the Santa Ana Watershed (SAWPA, 1998; Draft Update, 2002), the use of recycled water to meet consumptive water demands will more than triple by the planning year of 2050, with supplies of this water for groundwater recharge expected to increase approximately seven times (refer to Table 4.4-4).

The document indicates that recycled water is projected to surpass surface water to become the third largest water supply source in the Santa Ana watershed. The direct use applications include landscape and agricultural irrigation, as well as commercial and industrial uses. In terms or groundwater recharge supply, surface water is expected to be the major source for the next 50 years. This surface supply source is considered to come from storm and river flows.

Groundwater recharge is the replenishment of groundwater basins. Additionally, one of the focal points of groundwater recharge is "conjunctive use," where water is stored underground during wet periods and is pumped out during dry or drought periods. The water source is usually imported water or recycled water. The estimated ultimate water storage capacity of the groundwater basins potentially affected by the proposed program is shown in Table 4.4-5.

Table 4.4-4
WATER SUPPLY SOURCES EXPECTED TO MEET WATER DEMAND IN THE SANTA ANA WATERSHED

Water Supply Sources	2000* AFY	2010 AFY	2025 AFY	2050 AFY
Direct Use:				
Groundwater	1,017,476	1,119,720	1,212,398	1,319,544
Imported Water	315,534	349,271	400,117	470,754
Surface Water	78,758	98,427	96,763	96,763
Recycled Water	74,507	139,520	179,468	222,153
Percentage Increase	0	15	27	42
GW Recharge:				
Imported Water	159,600	115,500	106,000	108,500
Surface Water	252,398	304,009	355,134	360,034
Recycled Water	28,865	142,473	182,454	207,265
Percentage Increase	0	27	46	53

Notes: AFY = acre-feet per year
* Base Year
Source: Draft Integrated Water Resources Plan, SAWPA, 2002.

Table 4.4-5
GROUNDWATER STORAGE CAPACITY IN SELECTED BASINS IN THE SANTA ANA RIVER SYSTEM

Groundwater Subbasin	Ultimate Storage Capacity (AF)
Bunker Hill I	406,000
Bunker Hill II	1,026,000
Colton	51,000
Riverside I	47,000
Chino I	2,848,000
Chino II	1,681,000
Chino III	165,000
Santa Ana Forebay	400,000
Santa Ana Pressure	400,000

Source: Integrated Water Resources Plan, SAWPA, 1998

Water supply in the Santa Ana watershed is regulated in part under a 1969 court judgment (Orange County Water District (OCWD) vs. City of Chino, et al., Case No. 117628-County of Orange). The judgment requires an annual accounting and reporting of various surface flow and water quality parameters. Reports are released in April for the previous water year. The judgment recognizes the river as consisting of an Upper Area and a Lower Area, separated by Prado Dam. The judgment sets forth a declaration of rights as to water users in each area, providing that users in the

Lower Area have rights to receive certain average and minimum amounts of non-storm flows reaching Prado Dam, together with the right to all storm flows reaching Prado Dam.

The judgment establishes minimum surface water flow obligations at two locations, Riverside Narrows and Prado Dam. The minimum flow obligations are adjusted annually depending upon water quality and accumulated volumes. The current minimum flow obligation is 12,420 acre-feet at Riverside Narrows and 34,000 acre-feet at Prado Dam. San Bernardino Valley Municipal Water District is responsible for ensuring that the Riverside Narrows obligation is met; Western Municipal Water District and Inland Empire Utilities Agency (formerly Chino Basin Municipal Water District) are jointly responsible for ensuring that the minimum obligation at Prado Dam is met. By agreement with San Bernardino Valley Municipal Water District, the City of San Bernardino is contractually obligated to deliver 16,000 acre-feet per year to the river. The judgment further provides that the acquisition of upper area water rights by OCWD or other Lower Area entities shall be deemed to be included in the aggregate entitlement of the Lower Area, i.e., shall not increase said entitlement.

4.4.3 Environmental Impacts

The proposed project, RIX Recycled Water Sales Program, envisions the diversion of up to 18,000 acre-feet of RIX recycled water per year to recycled water users within the region. The 18,000 acre-feet of potential diversion is equivalent to an average of about 25 cubic feet per second (cfs) of flow (an average flow of 1 cfs over 24 hours equates to 1.983 acre-feet). The maximum diversion to future users under this proposed project at any given time is proposed to be 35 cfs of flow. Impacts to water resources are considered to be significant according to CEQA Guidelines (§15064 and Appendix G) if the direct, indirect or cumulative effects of the proposed project (in this case, proposed recycled water diversions outlined above):

- Violate any water quality standards or waste discharge requirements.

- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted).

- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation onsite or offsite.

- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding onsite or offsite.

- Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.

- Otherwise substantially degrade water quality.

- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood flows.

- Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.

- Cause inundation by seiche, tsunami, or mudflow.

Each of the above issues will be addressed individually, although they can generally be organized into water quantity and water quality impacts.

a. Will the program violate any water quality standards or waste discharge requirements?

The quality of the recycled water "product" from the RIX facility is regulated under the Department of Health Services Water Recycling Criteria (Article 3, § 60305, Title 22, Division 4, Chapter 3 of the California Code of Regulations) and Wastewater Disinfection Guidelines. Where the product is used or discharged is regulated under the California Regional Water Quality Control Board as Water Reclamation Requirements (WRRs), Waste Discharge Requirements (WDRs) and/or National Pollutant Discharge Elimination System (NPDES) permits.

The discharge of treated wastewater from the RIX facility to the Santa Ana River is regulated under Order No. 01-45, NPDES No. CA8000304, issued by the Santa Ana Regional Water Quality Control Board in October of 2001. As a recently adopted Order, it encompasses requirements contained in the U.S. EPA National Toxics Rule, California Toxics Rule, and the State Policy for Implementation of the Toxics Rule provisions. This Order contains extensive discussion on the development of numeric effluent limitations and protection of the beneficial uses of the river. The Order is considered consistent with both Federal 40 CFR 131.12 and State Board Resolution No. 68-16 antidegradation policies. The Order does not permit any increase in the concentration and mass loading of pollutants over that currently permitted. The Order's permitted constituent concentrations in the discharge and mass loadings were established so as not to adversely affect the beneficial uses of the receiving waters.

The Initial Study conducted for the program, dated October 1999, stated that the RIX plant operated in compliance with its waste discharge permit and that reclamation use of the plant's water is subject to approval of separate water reclamation requirements. The issue was not intended to be addressed further in the forthcoming PEIR. However, in light of the fact that the Department has received a new permit since that time and that this permit discusses several issues regarding water quality, the new permit (or Order) merits discussion in this document. Uses of the recycled water may also be limited by pending DHS groundwater recharge guidelines summarized above.

Table 4.4-6 summarizes the effluent limitations contained in the Order.

Table 4.4-6
DISCHARGE SPECIFICATIONS FOR THE RIX FACILITY
ORDER NO. 01-45, NPDES NO. CA8000304

Constituent	Limitations	Mass Emission Rates
Suspended Solids	30 mg/l avg weekly 20 mg/l avg monthly	10,008 lbs/day avg weekly 6,672 lbs/day avg monthly
Biochemical Oxygen Demand (BOD)	30 mg/l avg weekly 20 mg/l avg monthly	10,008 lbs/day avg weekly 6,672 lbs/day avg monthly
Chloride*	35 mg/l avg 12-month	11,676 lbs/day avg 12-month
Sodium*	35 mg/l avg 12-month	11,676 lbs/day avg 12-month
Sulfate*	64 mg/l avg 12-month	21,350 lbs/day avg 12-month
Total Hardness	240 mg/l avg 12-month	80,064 lbs/day avg 12-month
Total Dissolved Solids (TDS)*	400 mg/l avg 12-month and no more than 250 mg/l over the 12-month average concentration of water supply	133,440 lbs/day avg 12-month
Total Inorganic Nitrogen (TIN)	10 mg/l avg 12-month	3,336 lbs/day avg 12-month
Turbidity for filtered wastewater	2 NTUs avg daily and no more than 5 NTUs more than 5% of the time daily and 10 NTU maximum	
Turbidity for microfiltered or reverse osmosis wastewater	No more than 0.2 NTU more than 5% of the time daily and 0.5 NTU maximum	
Total coliform bacteria	2.2 MPN/100 ml avg weekly 23 MPN/100 ml maximum in one sample monthly 240 MPN/100 ml maximum	
Toxicity	No numeric limitations, but no toxics in toxic amounts	
Total residual chlorine	0.1 mg/l maximum	
pH	6.5 - 8.5 pH units	

Note: * Not enforced because of offset program.

The suspended solids and biochemical oxygen demand (BOD) limits are based on values that are considered achievable with tertiary treatment. The TDS and inorganic mineral limits are based on the water quality objective for TDS of 400 mg/l for the Colton groundwater subbasin. TDS is essentially the summation of the concentrations of sodium, sulfate, chloride and total hardness (carbonates) in water. The Regional Board has varied over the last 30 years in applying individual mineral constituent limits as a basis for TDS, along with a TDS limit. At this time, the Regional Board has determined that both are necessary for this Order, although the San Bernardino Municipal Water Department has disagreed. It is recognized in the Order that RIX operations may

have difficulty meeting the TDS limits, due to the TDS of the source water supply and the increment of TDS added to wastewater which is typically about 250 mg/l. This situation is not SBMWD's problem alone. The Water Department is participating with other agencies and the Regional Board in a watershed-wide study of TDS to develop acceptable TDS offsets and water quality objectives.

Particularly, there are issues regarding the TDS compliance. The discharge specifications include both a 12-month average constituent concentration and mass emission rate for TDS and a second limit, the 12-month average TDS concentration in the water supply with an increment of 250 mg/l allowed. If unable to meet this, TDS offsets are allowed upon approval by the Regional Board. A letter was sent to the Regional Board by the Water Department in December of 2001 (Stacey Aldstadt, Dec. 5), with a response received from the Regional Board in February of 2002 (Gerard Thibeault, Feb. 7). The Regional Board indicated that the numeric TDS effluent limitation of 400 mg/l does not apply, conditioned that offset programs must address TDS discharges in excess of that value. The 250 mg/l TDS increment would also be examined on a case-specific basis, as the RIX facility actual increment has been shown to be less than that. The Discharge Monitoring Reports include TDS data on water supply wells. For a representation of the wells, see Table 4.4-7. Generally, effluent data given later in the section show that RIX produces TDS at approximately the 500 mg/l level.

Table 4.4-7
WATER SUPPLY SOURCE QUALITY IN
RELATION TO TOTAL DISSOLVED SOLIDS

Representative Month	Well Sources	TDS Range (mg/l)	TDS Weighted Average (mg/l)
January 2001	City of San Bernardino Wells	230 - 517	349
January 2002	City of San Bernardino Wells	225 - 517	334
January 2001	City of Loma Linda	180 - 446	225
January 2002	City of Loma Linda	180 - 446	236
January 2001	East Valley Water District	174 - 449	207
January 2002	East Valley Water District	174 - 449	193
January 2001	Norton Air Force Base	160 - 307	182
January 2002	Norton Air Force Base	160 - 307	165
January 2001	Patton State Hospital	300 - 380	311
January 2002	Patton State Hospital	300 - 380	300
January 2001	University of Loma Linda	300 - 310	305
January 2002	University of Loma Linda	300 - 310	305
January 2001	All wells	160 - 517	295
January 2002	All wells	160 - 517	285

Source: City of San Bernardino Municipal Water Department, Discharge Monitoring Reports.

In conformance with the nitrogen wasteload allocation specified in the 1995 Basin Plan, the Order establishes a limit of 10 mg/l TIN for the discharge. This allocation is currently being studied for possible revision at the end of 2002. The 10 mg/l value is based on current standards for drinking water supply. Recent RIX effluent data show that the 10 mg/l can be met, but the concentration has reached 11 mg/l on more than one occasion in 1996-2000 operations.

Some of the requirements above are based on the Department of Health Services Recycled Water Criteria (Article 3, §60305 of Title 22 Division 4, Chapter 3) and Disinfection Guidelines. Turbidity reflects the efficiency of filtering of the wastewater. The limits vary according to the type of filtering system and its ability to remove particles that might contain pathogens. Total coliform bacteria are allowed only at 2.2 MPN (Most Probable Number)/100 ml, based on REC-1 use, although the Basin Plan allows a less stringent fecal coliform objective of 200 MPN/100 ml. Compliance with the 2.2 total coliform limit is considered by the Regional Board to not only address fecal coliform bacteria, but also a requisite 5-log virus reduction (pathogen reduction).

Toxicity to aquatic organisms is to be measured in this Order through chronic toxicity testing via WET (Whole Effluent Toxicity) methods. The representative organism is the water flea, *Cerio-daphnia dubia*. Chlorine can be toxic to aquatic organisms. Its use is necessary in the wastewater treatment process in order to disinfect the wastewater for pathogen reduction (human health protection). Where chlorine disinfection is used, It is removed before discharge to surface waters in order to obtain a total residual chlorine level below one mg/l, which is considered protective of aquatic life in the receiving waters. Since the RIX facility uses Ultraviolet (UV) disinfection, the chlorine residual is not an issue of concern. Finally, the prescribed pH limits are those within the range of waters supporting normal fish populations.

Additionally, there are several specifications in the Order applicable to the receiving waters (Santa Ana River surface waters). Those with numeric limitations are shown in Table 4.4-8.

Table 4.4-8
RECEIVING WATER LIMITATIONS
ORDER NO. 01-45, NPDES NO. CA8000304

Parameter	Limitations
Dissolved Oxygen	Not below 5 mg/l
Temperature	Not to be raised above 90°F (32°C) June-October and not to be raised above 78°F (26°C) the rest of the year
Mercury	Fish flesh tissue not greater than 0.3 mg methyl-mercury/kg fish

Dissolved oxygen and temperature levels are those required for maintaining normal fish populations in the Santa Ana River. Mercury is a particular toxic pollutant in the river system that bio-accumulates through fish populations. As it is easier to measure bioaccumulated concentrations of mercury than concentrations in water, fish flesh testing has been substituted for water analyses. Additionally, this sampling and analytical effort is sponsored by several agencies in the watershed.

Unionized ammonia (NH3) was identified in the Basin Plan (RWQCB, Santa Ana Region, 1995) as a toxicity issue in regards to aquatic life. A site-specific unionized ammonia water quality objectives was subsequently developed for the middle Santa Ana River (Reaches 2,3, and 4), and some tributaries to the Santa Ana River. This objective is 0.098 mg/l unionzed ammonia (or approximately 13 mg/l total ammonia, dependent upon pH and temperature) as a 4-day average. However, in the Order, no ammonia objective was specified. Table 4.4-9 gives effluent data for

ammonia for comparative purposes. Regardless, a composite ammonia value is reported as a monthly average and maximum.

Two tables, Table 4.4-9 and Table 4.4-10 show RIX effluent water quality data for some parameters. Table 4.4-11 shows receiving water data as gathered from Discharge Monitoring Reports.

RIX effluent is considered good quality in terms of TDS (i.e., anything near 500 mg/l or less is good for drinking water supply and agricultural supply to the most sensitive plants, such as citrus, strawberries and certain grasses). However, the TDS levels shown are in the range of 470 to 530 mg/l, which is above the current water quality objective of the Colton groundwater subbasin and other potentially affected subbasins (refer to Table 4.4-3). The difference will be that other potentially affected subbasins have some assimilative capacity for TDS, whereas the Colton subbasin does not. The current Discharge Order allows for these levels of production from RIX, as being within the 250 mg/l increment due to the water supply quality and by the provision of suitable offsets. Should RIX effluent be transported to other basins via groundwater recharge projects, the waste discharge requirements and water reclamation requirements issued for each project would address limits, other conditions and required mitigation through the agency sponsoring the project. Assessing the potential impacts in other basins in this document is not feasible because the actual method of utilizing the recycled water in other basins and their standards are not known. For example, the consuming agency will likely be blending RIX water with other sources, both surface and groundwater, for these projects. The sources and blending ratios are not known at this time, nor are all of the subbasins that would be affected.

4.4.3.1 Total Dissolved Solids (TDS)

For a cursory analysis of both surface water and groundwater impacts, two downstream U.S. Geological Survey gauging stations are used: MWD Crossing (#11066460) and below Prado Dam (#11074000). Data from the Santa Ana River Watermaster reports for these stations is shown in Table 4.4-12, TDS Concentrations at USGS Gauging Stations. Using water years 1990-2000 and excluding the water year that RIX operations started (Oct. 1995-Sept. 1996), the annual weighted TDS in base flows at MWD Crossing averaged 639 mg/l pre-RIX and 607 mg/l post-RIX. For Below Prado Dam, the annual weighted TDS in base and storm flows averaged 481 mg/l pre-RIX and 508 mg/l post-RIX. For MWD Crossing, these TDS concentrations fall below the surface water quality objective of 700 mg/l for Reach 3 (in which this gauging station is located). The TDS levels at Prado Dam gauging station remain below the water quality objective of 700 mg/l.

Table 4.4-9
RECENT RIX EFFLUENT DATA (2001-2002)

Month/Year	TIN (mg/l)	Ammonia Composite (mg/l)	pH	TDS (mg/l)	Turbidity (NTU)	Flow (MGD)	TOC (mg/l)
03/2002	7.13 avg 7.7 max	0.93 avg 1.2 max	7.32 avg 7.6 max 7.0 min	510 max	0.43 avg 0.86 max 0.24 min	39.01 avg 42.64 max	3.9 max
02/2002	7.43 avg 8.5 max	1.15 avg 2.0 max	7.22 avg 7.6 max 6.8 min	510 max	0.5 avg 1.3 max 0.29 min	38.62 avg 41.41 max	4.8 max
01/2002	7.52 avg 8.1 max	1.13 avg 1.5 max	7.23 avg 7.5 max 6.7 min	500 max	0.51 avg 1.4 max 0.25 min	38.66 avg 42.41 max	3.2 max
12/2001	6.63 avg 6.7 max	0.58 avg 1.1 max	7.26 avg 7.4 max 6.9 min	490 max	0.52 avg 1.5 max 0.25 min	39.84 avg 43.66 max	3.1 max
11/2001	4.83 avg 6.5 max	0.55 avg 0.9 max	7.24 avg 7.6 max 7.0 min	530 avg & max	0.33 avg 0.55 max 0.19 min	43.85 avg 48.71 max	2.9 max
10/2001	5.06 avg 6.2 max	0.72 avg 1.4 max	7.55 avg 7.7 max 7.2 min	510 max	0.40 avg 1.2 max 0.15 min	42.79 avg 47.24 max	3.6 max
09/2001	4.88 avg 5.9 max	0.44 avg 0.50 max	7.15 avg 7.56 max 6.72 min	490 max	0.22 avg 2.4 max 0.05 min	42.24 avg 45.44 max	3.1 max
08/2001	4.73 avg 5.0 max	0.98 avg 1.2 max	7.23 avg 7.7 max 6.8 min	520 max	0.81 avg 2.0 max 0.28 min	40.16 avg 41.91 max	3.0 max
07/2001	3.9 avg 5.5 max	1.02 avg 1.8 max	7.15 avg 7.7 max 7.0 min	500 max	0.92 avg 3.4 max 0.25 min	38.27 avg 44.19 max	2.9 max
06/2001	5.3 avg 6.6 max	1.06 avg 1.5 max	7.19 avg 7.7 max 7.0 min	480 max	0.60 avg 2.7 max 0.26 min	37.74 avg 43.97 max	4.2 max
05/2001	5.9 avg 6.4 max	1.86 avg 2.3 max	7.31 avg 7.8 max 7.0 min	490 max	0.54 avg 1.00 max 0.27 min	37.24 avg 42.57 max	3.7 max
04/2001	6.9 avg 7.2 max	1.98 avg 2.6 max	7.3 avg 8.0 max 6.9 min	470 max	0.64 avg 1.8 max 0.29 min	44.5 avg 49.93 max	7 max
03/2001	6.23 avg 6.6 max	2.3 avg 3.4 max	7.34 avg 7.6 max 7.1 min	490 max	0.87 avg 2.5 max 0.36 min	44.47 avg 50.36 max	5.9 max
02/2001	6.35 avg 6.6 max	0.95 avg 1.8 max	7.48 avg 7.7 max 7.2 min	480 max	0.63 avg 1.8 max 0.17 min	49.73 avg 56.22 max	3.9 max
01/2001	6.18 avg 7.6 max	0.69 avg 1.4 max	7.44 avg 7.7 max 6.7 min	500 max	0.41 avg 0.93 max 0.20 min	46.04 avg 53.89 max	2.2 max

Source: Monthly Discharge Monitoring Reports, City of San Bernardino Municipal Water Department.

Table 4.4-10
RECENT RIX EFFLUENT COLIFORM DATA

Month	Total Coliform (MPN/100 ml)	Total Coliform 7-day Medians* (MPN/100 ml)	Fecal Coliform (MPN/100 ml)
January 2001	50 maximum < 2.00 minimum	2.00 1st week 2.00 2nd week 2.00 3rd week 4.00 4th week	< 2 maximum < 2 minimum < 2 average**
February 2001	50 maximum < 2.00 minimum	4.00 1st week 7.00 2nd week 2.00 3rd week 11.00 4th week	13 maximum < 2 minimum < 2 average
March 2001	900 maximum < 2.00 minimum	13.00 1st week 4.00 2nd week 23.00 3rd week 21.00 4th week	240 maximum < 2.00 minimum 2.56 average
April 2001	30 maximum < 2.00 minimum	11.00 1st week 4.00 2nd week 4.00 3rd week 7.00 4th week	17 maximum < 2 minimum < 2 average
May 2001	300 maximum < 2.00 minimum	4.00 1st week 4.00 2nd week 4.00 3rd week 7.00 4th week	4 maximum < 2 minimum < 2 average
June 2001	23 maximum < 2.00 minimum	2.00 1st week 2.00 2nd week 2.00 3rd week 4.00 4th week	4 maximum < 2 minimum < 2 average
July 2001	11 maximum < 2.00 minimum	2.00 1st week 2.00 2nd week 2.00 3rd week 2.00 4th week	4 maximum < 2 minimum < 2 average
August 2001	70 maximum < 2 minimum	2.00 1st week 2.00 2nd week 2.00 3rd week 2.00 4th week	8 maximum < 2 minimum < 2 average
September 2001	50 maximum < 2.00 minimum	2.00 1st week 2.00 2nd week 2.00 3rd week 2.00 4th week	2 maximum < 2 minimum < 2 average
October 2001	130 maximum < 2.00 minimum	2.00 1st week 2.00 2nd week 2.00 3rd week 4.00 4th week	13 maximum < 2 minimum < 2 average

Table 4.4-10 (continued)

Month	Total Coliform (MPN/100 ml)	Total Coliform 7-day Medians* (MPN/100 ml)	Fecal Coliform (MPN/100 ml)
November 2001	9 maximum < 2 minimum	<2.00 1st week 2.00 2nd week 2.00 3rd week <2.00 4th week	2 maximum < 2 minimum
December 2001	22 maximum < 2 minimum	2.00 1st week 4.00 2nd week 2.00 3rd week 4.00 4th week	4 maximum < 2 minimum
January 2002	13 maximum < 2 minimum	7.00 1st week 2.00 2nd week 4.00 3rd week 2.00 4th week	2 maximum < 2 minimum
February 2002	13 maximum < 2 minimum	2.00 1st week 6.00 2nd week 4.00 3rd week 2.00 4th week	2 maximum < 2 minimum
March 2002	7 maximum < 2 minimum	2.00 1st week <2.00 2nd week <2.00 3rd week 2.00 4th week	2 maximum < 2 minimum

Notes: * Maximum 7-day running medians are reviewed weekly from Monday-Sunday, with any one value over 2.00 counting as a violation; highest value is shown for week.
** Average is 30-days

Source: City of San Bernardino Municipal Water Department, Discharge Monitoring Reports.

Table 4.4-11
RECENT RECEIVING WATER DATA (2001-2002)

Date	Outfall	100' Upstream*	500' Downstream
03/28/02	6.49 mg/l D.O. 20.8° C 6.98 pH	8.37 mg/l D.O. 21.8° C 7.88 pH	6.81 mg/l D.O. 20.7° C 7.26 pH
03/20/02	6.30 mg/l D.O. 20.9° C 7.27 pH	6.96 mg/l D.O. 24.9° C 7.87 pH	6.39 mg/l D.O. 22.3° C 7.26 pH
03/13/02	6.43 mg/l D.O. 20.8° C 7.02 pH	8.27 mg/l D.O. 22.5° C 7.76 pH	6.78 mg/l D.O. 21.3° C 7.26 pH
03/06/02	6.25 mg/l D.O. 20.9° C 7.03 pH	9.07 mg/l D.O. 23.2° C 8.18 pH	8.02 mg/l D.O. 21.5° C 7.24 pH
02/27/02	6.39 mg/l D.O. 20.7° C 7.2 pH	9.42 mg/l D.O. 23.2° C 8.2 pH	7.70 mg/l D.O. 21.6° C 7.7 pH
02/20/02	6.27 mg/l D.O. 20.4° C 7.04 pH	8.25 mg/l D.O. 23.9° C 8.1 pH	7.15 mg/l D.O. 21.7° C 7.34 pH
02/14/02	6.38 mg/l D.O. 20.6° C 6.78 pH	8.95 mg/l D.O. 23° C 7.83 pH	6.88 mg/l D.O. 21.3° C 6.93 pH
02/07/02	6.24 mg/l D.O. 20.8° C 7.08 pH	9.13 mg/l D.O. 22.6° C 8.28 pH	6.84 mg/l D.O. 21.1° C 7.31 pH
01/30/02	6.38 mg/l D.O. 20.8° C 7.12 pH	8.54 mg/l D.O. 15.6° C 7.27 pH	6.78 mg/l D.O. 19.6° C 7.03 pH
01/23/02	6.57 mg/l D.O. 21.1° C 7.11 pH	9.02 mg/l D.O. 18.9° C 7.84 pH	7.20 mg/l D.O. 20.6° C 6.98 pH
01/15/02	6.36 mg/l D.O. 21.7° C 7.02 pH	8.33 mg/l D.O. 21.5° C 7.98 pH	7.11 mg/l D.O. 21.5° C 7.02 pH
01/09/02	6.23 mg/l D.O. 21.7° C 7.07 pH	7.98 mg/l D.O. 21.6° C 7.0 pH	7.63 mg/l D.O. 21.6° C 7.18 pH
01/04/02	6.52 mg/l D.O. 21.7° C 7.07 pH	7.4 mg/l D.O. 21.9° C 7.2 pH	8.57 mg/l D.O. 22.1° C 7.98 pH
12/27/01	6.10 mg/l D.O. 22.1° C 6.92 pH	8.22 mg/l D.O. 20.9° C 7.73 pH	7.73 mg/l D.O. 21.7° C 7.09 pH

Table 4.4-11 (continued)

Date	Outfall	100' Upstream*	500' Downstream
12/19/01	6.36 mg/l D.O. 22.9° C 6.93 pH	7.76 mg/l D.O. 23.3° C 7.78 pH	5.99 mg/l D.O. 22.8° C 7.03 pH
12/12/01	6.01 mg/l D.O. 23.1° C 6.92 pH	8.83 mg/l D.O. 21.1° C 7.86 pH	7.38 mg/l D.O. 22.4° C 7.01 pH
12/06/01	5.89 mg/l D.O. 23.7° C 6.94 pH	9.21 mg/l D.O. 22.6° C 8.03 pH	6.65 mg/l D.O. 23.4° C 7.18 pH
11/28/02	5.72 mg/l D.O. 24.0° C	7.96 mg/l D.O. 22.6° C	6.9 mg/l D.O. 22.8° C
11/21/01	5.74 mg/l D.O. 24.6° C	7.13 mg/l D.O. 24.1° C	6.95 mg/l D.O. 24.2° C
11/15/01	6.10 mg/l D.O. 25° C	7.61 mg/l D.O. 25.4° C	7.34 mg/l D.O. 25.6° C
11/08/01	6.06 mg/l D.O. 25.4° C	7.86 mg/l D.O. 25.4° C	6.62 mg/l D.O. 26.1° C
10/19/01	6.10 mg/l D.O. 26.9° C	8.24 mg/l D.O. 27.3° C	6.5 mg/l D.O. 26.5° C
10/10/01	5.53 mg/l D.O. 26.4° C	8.03 mg/l D.O. 28.8° C	6.02 mg/l D.O. 27.5° C
10/02/01	3.96 mg/l D.O. 26.6° C	7.56 mg/l D.O. 30.5° C	4.78 mg/l D.O. 27.0° C
09/11/01	4.92 mg/l D.O. 26.8° C	7.41 mg/l D.O. 30.8° C	5.01 mg/l D.O. 27.4° C
09/05/01	5.54 mg/l D.O. 27° C	7.83 mg/l D.O. 30.9° C	5.0 mg/l D.O. 27.7° C
08/23/01	5.33 mg/l D.O. 26.6° C	8.66 mg/l D.O. 31.3° C	6.1 mg/l D.O. 28.3° C
08/14/01	5.28 mg/l D.O. 26.6° C	7.74 mg/l D.O. 32.5° C	4.78 mg/l D.O. 27.5° C
08/01/01	4.63 mg/l D.O. 26.2° C	8.37 mg/l D.O. 31.3° C	5.2 mg/l D.O. 26.9° C
07/11/01	5.40 mg/l D.O. 24.9° C	7.95 mg/l D.O. 31.2° C	5.76 mg/l D.O. 25.8° C
07/05/01	5.83 mg/l D.O. 24.8° C	5.33 mg/l D.O. 30.7° C	4.7 mg/l D.O. 25.4° C
06/07/01	6.15 mg/l D.O. 24° C	7.43 mg/l D.O. 31° C	7.36 mg/l D.O. 26.8° C
05/24/01	6.84 mg/l D.O. 23.5° C	7.29 mg/l D.O. 30.4° C	5.8 mg/l D.O. 25.9° C

Table 4.4-11 (continued)

Date	Outfall	100' Upstream*	500' Downstream
05/10/01	5.1 mg/l D.O. 21.5° C	7.45 mg/l D.O. 30.4° C	5.6 mg/l D.O. 22.4° C
04/25/01	6.6 mg/l D.O. 21.5° C	7.56 mg/l D.O. 18.7° C	5.74 mg/l D.O. 21.9° C
04/04/01	6.48 mg/l D.O. 20.8° C	8.97 mg/l D.O. 21.1° C	6.95 mg/l D.O. 20.8° C
03/23/01	6.98 mg/l D.O. 20.6° C	8.67 mg/l D.O. 25.4° C	8.74 mg/l D.O. 22.2° C
03/15/01	7.19 mg/l D.O. 20.5° C	9.18 mg/l D.O. 24.2° C	7.49 mg/l D.O. 21.4° C
09/09/01	6.96 mg/l D.O. 20.5° C	ND	ND
03/04/01	6.81 mg/l D.O. 20.5° C	ND	ND
02/22/01	7.27 mg/l D.O. 20.3° C	8.38 mg/l D.O. 22.3° C	7.4 mg/l D.O. 20.9° C
02/15/01	6.69 mg/l D.O. 20.2° C	8.03 mg/l D.O. 21.4° C	7.78 mg/l D.O. 20.6° C
02/07/01	7.21 mg/l D.O. 20.4° C	10.08mg/l D.O. 19.8° C	7.65 mg/l D.O. 20.1° C
01/31/01	7.57 mg/l D.O. 20.6° C	8.77 mg/l D.O. 18.5° C	7.65 mg/l D.O. 20.1° C
01/25/01	6.89 mg/l D.O. 20.8° C	8.5 mg/l D.O. 21.2° C	7.4 mg/l D.O. 20.9° C
01/17/01	7.53 mg/l D.O. 21° C	8.61 mg/l D.O. 18.7° C	7.44 mg/l D.O. 20.4° C
01/04/01	7.22 mg/l D.O. 21.5° C	8.44 mg/l D.O. 21.9° C	7.83 mg/l D.O. 21.6° C

Notes: *True upstream receiving water location is Station A, which did not have enough flow for sampling. Locations noted at 100' upstream and 500' downstream are benchmarked where RIX flows commingle with Rialto drain flows. The 100 upstream location, then, generally consists of Rialto WWTP flows. Station B is the outfall.

Source: Monthly Discharge Monitoring Reports, City of San Bernardino Municipal Water Department

It appears that RIX flows have slightly reduced TDS (in a dilutive function) in the section downstream to MWD Crossing. The cause of the slight increase in TDS below Prado Dam is not clear, but the TDS concentrations from the RIX facility, ranging between 470 and 530, do not appear to be responsible for the increase.

Table 4.4-12
TDS CONCENTRATIONS AT USGS GAUGING STATIONS

Water Year (Oct - Sep)	MWD Crossing* #11066460 TDA (mg/l)	Below Prado Dam** #11074000 TDS (mg/l)
2000-2001	603	525
1999-2000	602	527
1998-1999	603	581
1997-1998	601	392
1996-1997	624	514
1995-1996	625	514
1994-1995	646	415
1993-1994	681	611
1992-1993	634	368
1991-1992	620	499
1990-1991	616	514

Notes: * Annual weighted TDS in base flows.
** Annual weighted TDS in base and storm flows (total flow).

Source: Santa Ana River Watermaster Reports, 1992-2001.

A comprehensive study of water quality trends at these gauging stations was prepared for the water years 1970 through 1995 (USGS, 1997). This study provides good information on the river system for several wet and dry periods prior to the start of RIX operations. Highly significant relationships were found between dissolved solids levels and streamflow, with dissolved solids concentrations decreasing with increasing streamflow. It was found that dissolved solids concentrations were higher below Prado Dam than at MWD crossing at a given streamflow generally. Regulation of streamflow at Prado Dam caused these data to have greater variability, however. The study also addressed dissolved solids levels without flow-weighting, as is done for the Santa Ana River Watermaster reports. Results were considered comparable. Results indicated that dissolved solids decreased 6 to 7.4 mg/l per year at the gauging station below Prado Dam and 2.2 to 5.9 mg/l per year at the MWD Crossing gauging station. The use of the study to predict recent trends was qualified, in that the earlier year trends might not reflect the current flow regimes in the river system due to "management activities," such as flood control and new discharges.

Wildermuth Environmental, Inc. (WE, Inc.) completed a technical study on potential TDS and TIN impacts for the RIX Water Sales Program, finalized in March 2001. The report is included in Technical Appendix A of this document. Although the overall impacts can be estimated using this report, there have been some changes since the preparation of this study. As mentioned previously, SAWPA and several agencies have been updating their facilities plans, such that facilities and amount of projected recycled water to be produced and used in the upper Santa Ana River

system have been revised, generally upwards. WE, Inc. recently completed a much more thorough investigation, a TIN/TDS wasteload allocation investigation for the upper Santa Ana River system (WE, Inc., October 2002). Both the technical study and the Wasteload Allocation study forecast the TDS and TIN concentrations in surface water discharge of the Santa Ana River based on future recycled water discharge alternatives. The Wasteload Allocation study also computes the TDS and TIN in the streambed recharge. The technical study uses a 10-year monthly hydrologic period (1990-1999), and the Wasteload Allocation study uses a 50-year daily hydrologic period (1950-1999) adjusted to 1993 land use conditions. The technical study uses recycled water use projections contained in the CH2M Hill study (CH2M Hill 1998), and the Wasteload Allocation study used recycled water use projections provided by the recycled water generators in early 2002 and recycled water use projections in the 1995 Basin Plan – two future alternatives. The results of the technical study are summarized as follows.

Under the baseline condition evaluated in the technical study, TDS concentrations remain relatively unchanged from 2010 to 2040 at the key gauging stations used. Baseline ten-year average TDS concentrations in mg/l for these years were reported as:

	2010	**2040**
MWD Crossing	534	519
Below Prado Dam	539	537

The primary alternative evaluation was Alternative 7 (removing 18,000 acre-feet/year from RIX discharges to the Santa Ana River and assuming the maximum diversion from other wastewater facilities). TDS concentrations with Alternative 7 are:

	2010	**2040**
MWD Crossing	561	532
Below Prado Dam	536	532

The difference between Alternative 7 and baseline TDS concentrations, then, are:

	2010	**2040**
MWD Crossing	+27	+13
Below Prado Dam	-3	-6

This shows that TDS concentrations will increase slightly at MWD Crossing, due to the water diverted from the river at the RIX facility. RIX effluent, although discharged at a level of 500 mg/l, acts to dilute the TDS concentrations from other sources, which are mostly comprised of urban runoff, rising water and Rialto effluent discharges. Below Prado Dam there is a nominal decrease in TDS concentrations.

The recently completed wasteload allocation investigation by WE, Inc. (October 2002), developed "baseline" conditions for the years 2001 and 2010. Baseline conditions consist of historic and future recycled water production, reuse and discharge scenarios, as well as hydrologic conditions (precipitation, stormflows, and recharge trends). These conditions are to be assessed to either retain or change the water quality objectives contained in the 1995 Basin Plan. For the Santa Ana River Reach 4 (San Jacinto Fault downstream to Mission Boulevard in Riverside), estimated recharge or discharge TDS concentrations under current (2001) and future (2010) baseline

conditions of 253 to 272 mg/l are substantially lower than the proposed water quality objectives of 560 mg/l for Riverside A (a proposed groundwater basin boundary). Thus, assimilative capacity is expected to exist in Riverside A. For Reach 3 (Mission Boulevard downstream to Prado Dam), the current and future baseline scenarios have TDS concentrations of 454 to 462 mg/l, which are lower than the proposed water quality objective of 680 mg/l for Chino South (a proposed groundwater basin boundary). For comparison, the existing Basin Plan objective is 740 mg/l for Chino III, and the current ambient is 714 mg/l (Table 3-23 of WE, Inc. October 2002 study). It is considered that there is no assimilative capacity for TDS in Chino South, however, based on using a volume-weighted average of 504 to 539 mg/l of recharge water instead of the arithmetic average.

All of the above analyses show that surface water quality, in terms of TDS concentrations, will change "slightly," either upwards or downwards. Trends are difficult to assess, due to management activities within the river system. The various analyses indicate that RIX diversion will be less than a significant impact downstream to MWD Crossing and could be mitigated by planned groundwater discharges to the river (pumping of alluvial groundwater further upstream of RIX, to be discharged below RIX, by Riverside), as this will be another major source of dilution for TDS concentrations (SAWPA, 2002). All scenarios using existing and proposed projects of other agencies, along with those of San Bernardino Municipal Water Department, show a reduction in TDS concentrations at MWD Crossing and either a slight increase or slight decrease in TDS concentrations at Prado Dam.

4.4.3.2 Total Inorganic Nitrogen (TIN)

From recent effluent data, it can be seen that RIX effluent meets the 10 mg/l TIN limit for discharge into surface water. However, the TIN objectives for many groundwater basins are more stringent at this time, including that of the currently receiving Colton groundwater subbasin. These may be also changing in the near future either upwards or downwards, dependent upon the final results of the TIN/TDS Task Force studies and subsequent wasteload allocations. At this time, the Water Department is participating in these studies, along with several other agencies, for addressing the watershed-wide nitrogen loading problems.

At this time, the WE, Inc. wasteload allocation investigation (October 2002), has results for TIN similar to those of TDS for Riverside area. For the Santa Ana River, Reach 4 (San Jacinto Fault downstream to Mission Boulevard in Riverside), TIN concentrations under current (2001) and future (2010) baseline scenarios are substantially less at 2.8 to 3.2 mg/l than the proposed water quality objective at 6.2 mg/l at Riverside A (a proposed groundwater basin boundary). Assimilative capacity in Riverside A will remain. For Reach 3 (Mission Boulevard downstream to Prado Dam), the baseline conditions have TIN concentrations of 8.5 to 9.0 mg/l as arithmetic averages and 5.1 to 5.3 mg/l as volume weighted averages. The proposed objective for Chino South (the underlying proposed groundwater basin boundary) is 4.2 mg/l. Therefore, Chino South will not have assimilative capacity for TIN. The wasteload allocation study also includes estimates of nitrogen loss in surface discharge, at 10 percent upstream of Riverside Narrows and 25 percent downstream of the Narrows. TIN of rising water components near Riverside Narrows and Prado Dam is 11 mg/l.

The WE, Inc. evaluation for the RIX Water Sales Program (Technical Appendix A), shows that baseline TIN concentrations (in mg/l) remain relatively unchanged from 2010 to 2040 at both gauging stations evaluated:

	2010	**2040**
MWD Crossing	7.5	8.0
Below Prado Dam	7.3	8.1

With Alternative 7, i.e., removing 18,000 acre-feet/year from RIX discharges to the river and maximum diversion from other facilities, concentrations might change as follows:

	2010	**2040**
MWD Crossing	6.8	7.6
Below Prado Dam	6.7	7.2

This shows a decrease in TIN concentrations:

	2010	**2040**
MWD Crossing	-0.7	-0.5
Below Prado Dam	-0.6	-0.9

A reduction in TIN concentration, even with diversion of water from the RIX facility, is expected due to the fraction of low TIN in stormwater which will increase over time and become a larger component of the flow as more effluent is diverted. The Basin Plan water quality objectives (10 mg/l) will be met, such that there are less than significant impacts to water quality from TIN.

Concerning the DHS's Draft Groundwater Recharge Guidelines, RIX effluent can meet the 10 mg/l nitrate as N limit and the 1 mg/l nitrite limit. It would be difficult for any agency to meet the 3 mg/l TIN limit that is being proposed and this is a current topic of great concern to all agencies, even with the condition of blending allowed.

Until specific projects are defined for use of the RIX water, such as for groundwater recharge, site-specific impacts (such as to underlying groundwater basins) cannot be determined. Agencies sponsoring the projects will need to identify water sources and address quality changes and recharge rates, governed under the permits needed for their projects.

4.4.3.3 Other Water Quality Parameters

In terms of the other parameters shown on Table 4.4-9, total ammonia monthly averages ranged from 0.55-2.3 mg/l. This would equate to a 0.018-0.073 mg/l daily average, which would be sufficient to meet the 0.098 mg/l four-day average unionized-ammonia (or 0.12 mg/l total ammonia) site-specific water quality objective to protect fisheries in Reaches 2, 3 and 4. In terms of pH, the 6.5-8.5 range (in pH units) is considered protective of most aquatic organisms. The only recent effluent data not being in this range was for January 2001 (at 5.9 minimum). This value was revised to 6.7 in a correction to the Discharge Monitoring Report, based on continuous monitoring data. However, since receiving water monitoring did not consistently include this parameter, it is not known if pH correlated between effluent and river or if this value was affected by other flows or conditions in the river.

Turbidity in the effluent was quite low, measured more for possible pathogen contamination (up to 2 NTUs) than for impacts on fisheries resources (more than 50 NTUs in "clear" waters). These data are important to include for further discussion of biological resources issues (potential impacts to

the Santa Ana Sucker), where turbidity has been considered a water quality parameter of concern. The effluent data indicate that RIX effluent is not a source of turbidity that could affect this species.

From a review of these limited data, the impact of the RIX effluent on receiving waters in regards to dissolved oxygen levels is not clear. In some cases, especially in the summer and fall months, dissolved oxygen levels in the river are below the prescribed 5 mg/l, but this may be due to factors other than just the outfall, such as higher water temperatures (which lower dissolved oxygen saturation) and the influence of other conditions. Temperature effects are either raising temperature slightly in winter months, or reducing temperature slightly in summer months. In examining the data, however, there is often no clear relationship between addition of the discharge and effect on either temperature or dissolved oxygen, due to other effects, as from Rialto drain flows which have Rialto WWTP effluent and storm flow. For example, in January of 2002, the downstream dissolved oxygen level was higher than that of either the upstream or outfall sampling points.

To conclude, RIX effluent is protective of the beneficial uses for its current discharge to the Santa Ana River mainstem surface water and Colton groundwater basin, with some of the caveats and offsets allowed for in the current permit. The caveats and offsets are likely to apply to other uses of RIX water as proposed in the marketing plan, but these would have to be determined on a case-by-case basis.

However, regarding coliform bacteria results, a conventional sand filtration unit (Dynasand system) was constructed and placed in service in mid-January, 2001. The unit increased the amount of coliform bacteria in pre-UV samples and also in the final effluent. Because of these changed and new operations, the RIX facility has continuing problems in meeting its coliform requirements. Under the older NPDES Order No. 93-45, effective through October, 2001, 7 day medians were used to determine compliance with the coliform limit of 2.2 MPN 7 day median and with 23 MPN as daily maximum limit. Starting in November, 2001, the new Order No. 01-45 had a different method for determining compliance with the 7-day median value of 2.2 MPN. From Table 4.4-11, it can be seen that compliance with coliform is a current water quality issue that may affect marketing of the recycled water.

Other issues of potential concern, should recycled water from the RIX facility be recharged into groundwater and required to meet Title 22 drinking water standards, are those of manganese and TOC. RIX effluent does not always meet the 50 ug/l secondary drinking water standard for manganese. The TOC ranges from 2.2 to 5.9 mg/l (see Table 4.4-9). The Order only specifies that TOC be reported as a monthly maximum, such that this is not a compliance issue. However, the proposed recharge guidelines request 1 to 5 mg/l for various conditions of recharge.

4.4.3.4 Summary of Water Quality Impacts

Water quality of the recycled water produced by the RIX facility is generally typical of recycled water in the region. However, recycled water must comply with applicable Title 22 requirements in order to be an acceptable product for use by other agencies. Water quality may not meet Title 22 requirements or Basin Plan objectives at all times. Additionally, some water quality parameters need to be characterized in detail for use by other agencies in site-specific studies in order to implement projects should Basin Plan objectives apply (such as for groundwater recharge). To ensure no adverse water quality impacts occur at points of recycled water use, mitigation is

presented below to ensure that effects on surface and groundwater at the point of use is fully identified before delivery of RIX recycled water.

Water quality parameters important to fisheries/habitat are not forecast to change significantly in the river at the point of discharge due to reductions in flows. The RIX discharges reduce temperatures during summer months and this condition is forecast to continue in the future, which has been beneficial for fish populations since RIX began operations. Several agencies are working on issues related to water quantity and quality, with some efforts towards establishing minimum flows, refining water quality parameters (particularly temperature regimes), and riparian habitat creation/restoration. The Department will continue to work with these agencies as part of its ongoing operations. Therefore, significant water quality degradation is not forecast to result from reducing discharges by up to 35 cfs and 18,000 afy (residual flows would remain at 20 to 41 cfs and 14,476 afy to 298,675 afy based on existing monthly average flows, which should increase in the future. No mitigation is required to maintain existing water quality of the proposed reduced discharges from the RIX facility.

4.4.3.5 Water Quantity Impacts

The following CEQA questions and responses address potential changes in surface water and ground water quantities from the proposed program, primarily from the reductions in flow to the mainstem Santa Ana River.

b. Will the program substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?

The proposed project will reduce surface flows into the river at the point of the RIX discharge, which could affect recharge in those aquifers directly or indirectly receiving water downstream of the RIX outfall. The Orange County judgment of 1969, described earlier in this section, is considered protective of groundwater supplies and groundwater recharge. As long as minimum downstream flows (measured as surface flows) are met, upstream users are allowed to divert, pump, extract, conserve, store and use surface or groundwater which originates in the upper watershed. The judgment also addresses interbasin acquisition of rights, providing that acquisition of upper area rights by downstream users, or downstream rights by upper area users, would not alter the obligations and entitlements provided for under the judgment. Further, the City of San Bernardino is contractually obligated at this time to deliver 16,000 acre-feet per year to the river. It should be noted here that, by meeting contractual and judgment obligations, only hydrological aspects are assured “protection”. The volumes of water needed for other aspects (such as maintenance or enhancement of biological resources) is not addressed here. The current discharge from the RIX facility, which is comprised of effluent flows from both San Bernardino and Colton treatment plants, is calculated to be 49,407 afy. Sale of up to 18,000 afy of the recycled water from the RIX facility will leave a residual discharge of 31,407 afy, which is deemed protective of the discharge requirements discussed above since flows will be approximately twice the 16,000 afy volume.

Table 4.4-13 and Table 4.4-14 show actual downstream flow volumes (in acre-feet) at two locations, both downstream of the RIX facility, i.e., Riverside Narrows and Prado Dam, as well as

required flows at these points to satisfy the judgment (Santa Ana Watermaster Reports). In comparison with actual base flows (which do not include storm flows, but do include treatment facility discharges), it can be seen that the proposed flow reduction of 18,000, based on recent trends, would not adversely affect either current contractual or judgment-stipulated minimum base flow requirements (i.e., the reduction in base flow at Riverside Narrows would be less than 50 percent and at Prado Dam less than 20%). It should be qualified that these calculations do not address increases in wastewater flows in the future from RIX and other facilities/projects, which would further minimize any impacts. Note also, that the recycled water sold to other entities has an actual benefit because it reduces the need to extract a comparable volume of groundwater (typically potable in quality) from aquifers in the area of use.

Additionally, in light of other agency reclamation projects, in particular Inland Empire Utilities Agency, specifically affecting the mainstem of the river, with and without the influence of the RIX facility, a short-term cumulative reduction of "outflows" (to 2010) will be countered by the long-term increase in recycled water production, or "inflows" in 2025 through 2050, based on updated individual water resources plans of these agencies (being compiled currently by SAWPA for its updated plan). Refer to Table 4.4-15 and Table 4.4-16. As long as downstream flow requirements are met by the Upper Santa Ana Watershed agencies, no significant adverse impact to groundwater is forecast to result from implementing the RIX Recycled Water Sales Program.

c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation onsite or offsite.

The proposed project does not include activities that would alter the course of any stream or river in a manner which would result in significant erosion or siltation onsite or offsite. The effect in the river channel from potential reductions in flow would reduce, rather than increase the potential for downstream erosion. No mitigation is required.

d. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding onsite or offsite.

The proposed project would reduce flows being delivered to the Santa Ana River. No alteration of drainage patterns will occur on- or offsite and no significant increase in runoff will occur as a result of implementing the proposed project which could cause significant on- or offsite flooding. The Santa Ana River contains water that can be considered baseflow or storm flow. Baseflow includes those discharges from treatment plants. Both of these contribute to surface flows. To show the contributions to the River from municipal wastewater plant effluent, Santa Ana River Watermaster reports were examined, as well as USGS data. These were examined for water year data used to represent typical annual discharges. The flow data are presented over a representative period, for the purpose of showing that effluent flows and, therefore, surface flows, have generally increased into the river system. The representative period of 1990-2001 is given to show RIX flows in relation to pre-RIX facility flows (Colton and San Bernardino flows combined might represent comparable flows prior to March of 1996; RIX operations began in March 1996 and RIX flows include Colton and San Bernardino flows and also over-extraction of groundwater).

Table 4.4-13
EFFLUENT FLOW DATA INTO SANTA ANA RIVER (Acre-Feet)

Water Year	San Bernardino WRP	Colton WRP	RIX	Rialto WRP	Subtotal (above Riverside Narrows)	Total (above Prado Dam)*
1970-71	17,860	2,520	- -	2,270	22,650	47,110
1971-72	16,020	2,230	- -	2,400	20,650	52,460
1972-73	18,670	2,530	- -	2,260	23,460	59,500
1973-74	17,680	2,530	- -	2,320	22,530	62,730
1974-75	16,750	1,980	- -	2,320	21,050	64,760
1975-76	17,250	2,540	- -	2,240	22,030	67,780
1976-77	17,650	3,260	- -	2,330	23,240	68,790
1977-78	18,590	3,810	- -	2,380	24,780	72,900
1978-79	19,040	3,850	- -	3,050	25,940	76,920
1979-80	20,360	4,190	- -	2,990	27,540	80,620
1980-81	20,550	3,930	- -	3,370	27,850	85,250
1981-82	23,340	3,780	- -	3,470	30,590	91,700
1982-83	24,160	3,600	- -	3,620	31,380	92,580
1983-84	22,080	3,700	- -	3,830	29,610	92,750
1984-85	23,270	3,830	- -	4,070	31,170	100,440
1985-86	24,720	4,010	- -	4,720	33,450	105,090
1986-87	26,810	4,170	- -	5,350	36,330	112,460
1987-88	27,880	5,240	- -	6,040	39,160	25,510
1988-89	27,640	5,550	- -	6,280	39,470	133,270
1989-90	28,350	5,810	- -	6,260	40,420	133,090
1990-91	27,570	5,670	- -	6,290	39,530	134,060
1991-92	25,060	5,660	- -	6,360	37,080	136,400
1992-93	25,550	6,210	- -	6,460	38,220	144,430
1993-94	23,800	5,830	- -	6,540	36,170	136,650
1994-95	26,330	5,500	- -	6,820	38,650	144,130
1995-96	13,240	2,770	20,760	6,890	43,660	149,380
1996-97	- -	- -	42,800	7,160	49,960	154,290
1997-98	- -	- -	49,683	7,063	56,746	173,014
1998-99	- -	- -	47,587	6,524	54,111	175,285
1999-00	- -	- -	45,012	7,392	52,404	172,952
2000-01	- -	- -	49,407	8,346	57,753	180,706

Note: * Represents those discharges upstream of RIX that generally don't produce continuous flows, as well as discharges downstream that affect tributaries as well as the mainstream of the river.

Source: Santa Ana River Watermaster Report, April 2002.

Table 4.4-14
FLOW PARAMETERS IN THE SANTA ANA RIVER
IN RELATION TO RIX DISCHARGES (Acre-Feet)

Water Year	Actual/Required Base Flow at Riverside Narrows	Actual/Required Base Flow at Prado Dam	Actual RIX Discharges	RIX Discharges with Proposed Reduction
1995-96	54,548 / 12,420	131,181 / 34,000	20,760*	13,500*
1996-97	62,628 / 12,420	136,676 / 34,000	42,800	24,800
1997-98	65,013 / 12,420	155,711 / 34,000	49,683	31,683
1998-99	73,094 / 12,420	158,637 / 34,000	47,587	29,578
1999-00	63,499 / 12,420	148,269 / 34,000	45,012	27,012
2000-01	61,872 / 12,420	153,914 / 34,000	49,407	31,407

Notes: * RIX operations began in March 1996; discharge represents three-fourth of annum.

Source: Santa Ana River Watermaster Reports, 1997-2002.

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Table 4.4-15
WATER PROJECTS OF POTENTIAL CUMULATIVE EFFECT ON RIX DISCHARGES TO SANTA ANA RIVER

Implementing Agency	Planning Period	Name of Project	Inflow/Outflow to SAR Mainstem	Amount* of Water Involved (units vary)	Possible Impact on Flows to SAR (downstream to Prado Dam)
Inland Empire Utilities Agency (IEUA)	By 2010	Cactus Basins #4 and #5	Outflow – capture of stormwater and GW recharge	- ?	Reduction of stormwater flows to the river below RIX
IEUA	By 2010	Potato Creek Spreading Grounds	Outflow – capture of stormwater and GW recharge	- ?	Reduction of stormwater flows to the river below RIX
IEUA	By 2010	Randall Basin (CSDP 305)	Outflow – capture of more stormwater through expansion of existing basin	- ?	Reduction of stormwater flows to the river below RIX
IEUA	By 2010	RP #1 and #4 Water Recycling Plant	Outflow – increase in recycled water use	- 21.96 MGD	Reduction of recycled water discharges to the river below RIX
IEUA	By 2025 By 2050	RP #1 and #4 Water Recycling Plant and Satellite Plants	Inflow – increased recycled water discharges to river	+ 1.46 MGD + 15.74 MGD	Increase in recycled water discharges to the river below RIX
IEUA	By 2010 By 2025 By 2050	RP #5 and Carbon Cayon Plant	Inflow – increased capacity and new plant construction	+10.7 MGD +24.8 MGD +50.6 MGD	Increase in recycled water discharges to the river below RIX
IEUA	By 2010	RP #2	Outflow – shutdown of facility	- 4.40 MGD	Reduction of recycled water discharges to the river below RIX
City of Beaumont	By 2010	WWTP #1	Outflow – increase in recycled water use	- 0.29 MGD	Reduction in recycled water discharges to river upstream of RIX
City of Beaumont	By 2025 By 2050	WWTP #1	Inflow - increase in recycled water flows into river	+ 0.46 MGD + 2.21 MGD	Increase in recycled water discharges to the river below RIX
City of Corona	By 2010 By 2025 By 2050	WWTP #1A	Outflow – increase in recycled water use	- 3.0 MGD - 3.0 MGD - 3.0 MGD	Reduction of recycled water discharges to the river below RIX
City of Corona	By 2010 By 2025 By 2050	WWTP #1B	Outflow – increase in recycled water use	- 5.75 MGD - 5.75 MGD - 5.75 MGD	Reduction of recycled water discharges to the river below RIX

Table 4.4-15 (continued)

Implementing Agency	Planning Period	Name of Project	Inflow/Outflow to SAR Mainstem	Amount* of Water Involved (units vary)	Possible Impact on Flows to SAR (downstream to Prado Dam)
City of Corona	By 2010 By 2025 By 2050	WWTP #3	Outflow – increase in recycled water use	- 0.14 MGD - 0.14 MGD - 0.14 MGD	Reduction of recycled water discharges to the river below RIX
Elsinore Valley Municipal Water District (EVMWD)	By 2010 By 2025 By 2050	Lake Elsinore Regional WWTP	Outflow – increase in recycled water use	- 1.77 MGD - 1.77 MGD - 1.77 MGD	Reduction of recycled water discharges below RIX
Lee Lake Water District	By 2010 By 2025 By 2050	Lee Lake WRF	Outflow – increase in recycled water use	- 0.36 MGD - 0.36 MGD - 0.36 MGD	Reduction of recycled water discharges below RIX
City of Rialto (OMI)	By 2010 By 2025 By 2050	Rialto WWTP	Outflow – increase in recycled water use	- 1.8 MGD - 2.3 MGD - 2.3 MGD	Reduction of recycled water discharges below RIX
City of Riverside	By 2010 By 2025 By 2050	Riverside RWQCB	Outflow – increase in recycled water use	- 1.2 MGD - 5.6 MGD - 5.6 MGD	Reduction of recycled water discharges below RIX
Western MWD	By 2010 By 2025 By 2050	Western Riverside County Regional WWTP	Inflow – increase in discharges to the river	+ 0.8 MGD + 2.0 MGD + 13.0 MGD	Increase in recycled water discharges to the river below RIX
Yucaipa Valley Water District	By 2010 By 2025 By 2050	Wochholz WWTP	Outflow – increase in recycled water use	- 0.95 MGD - 2.55 MGD - 3.25 MGD	Reduction of recycled water discharges above RIX
San Bernardino Valley MWD	By 2010	High Groundwater Pumpout to Riverside Canal	Inflow – increase in river flows	+ 20,000 AFY	Increase in water discharges to river upstream of RIX
San Timoteo Watershed Project Authority	By ??	New instream flows to San Timoteo Creek	Inflow – increase in river flows	+ ?	Increase in water discharges to river upstream of RIX

Notes: * From Year 2000 Baseline

Source: SAWPA, 2002. Draft Integrated Water Resources Plan.

Table 4.4-16
SUMMARY OF WATER PROJECTS OF POTENTIAL CUMULATIVE EFFECT ON RIX DISCHARGES TO SANTA ANA RIVER

Flows	By 2010	By 2025	By 2050
Upstream Inflows	+ 20,000 AFY (+ 17.84 MGD)	+ 20,515 AFY (+ 18.3 MGD)	+ 22,477 AFY (+ 20.05 MGD)
Downstream Inflows	+ 12,892 AFY (+ 11.5 MGD)	+ 31,682 AFY (+ 28.26 MGD)	+ 88,946 AFY (+ 79.34 MGD)
Upstream Outflows	- 1,390 AFY (- 1.24 MGD)	- 2,859 AFY (- 2.55 MGD)	- 3,643 AFY (- 3.25 MGD)
Downstream Outflows	- 45,269 AFY (- 40.38 MGD)	- 24,069 AFY (- 21.47 MGD)	- 18,632 AFY (- 16.62 MGD)
Total Net Flows at Other Projects	- 13,767 AFY (- 12.28 MGD)	+ 25,269 AFY (+ 22.54 MGD)	+ 89,148 AFY (+ 79.5 MGD)
Total Net Flows at RIX Outflows	1 31,767 AFY (- 28.34 MGD)	+ 7,269 AFY (+ 6.48 MGD)	+ 71,148 AFY (+ 63.46 MGD)

Source: SAWPA, 2002. Draft Integrated Water Resources Plan.

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Refer to Table 4.4-13, previously mentioned, for the overall trends and to the several tables in Appendix 8.2, SAR Average Monthly Flows and Comparisons, for a more detailed presentation.

These data clearly indicate significant increases in surface effluent flows in the upper watershed, of which the RIX facility is only a part. The trend has been gradual and coupled with increased consumptive uses of this water, as described in the environmental setting of this section. In terms of flooding, the reduction in RIX effluent to the river at its discharge point would somewhat alleviate impacts of flooding (base flows plus storm flows) in the river. Refer to Figure 4.4-2, Relationship of Storm Flows to Base Flows at Riverside Narrows. Regarding uses of RIX water for projects such as groundwater recharge, projects are required to be implemented so as not to cause or contribute to flooding.

For specific issues raised during the NOP:

- *Request that the EIR address potential flood hazards from the River and Rialto Channel, the adequacy of the Santa Ana River's levee at the site and upstream of Rialto Channel, any effects of proposed construction on adjacent or downstream properties. (County of San Bernardino Transportation/Flood Control Department)*

The RIX facility was designed to protect the facility from the 100-year storm event on the Santa Ana River. It was reviewed and approved by County Flood Control. No new construction under this program is proposed that would affect structures already in or near the river discharge point, such that this would be an issue. The existing levee will not be affected. It was built to protect the RIX facility from a 100-year storm event, in conjunction with protection from the Seven Oaks Dam. Reductions of RIX flows into the river would reduce impacts from storm flows during storm events. Refer to the Figure 4.4-2, showing baseflows relative to storm flows at Riverside Narrows.

e. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.

This project will not generate additional surface runoff that would exceed any stormwater drainage system. The project will also not cause an additional source of “polluted” runoff. However, the use of recycled water may have water quality impacts as outlined above. Mitigation is identified to address these potential recycled water use impacts to a level of nonsignificant impact. No additional mitigation is required.

Site-specific impacts of constructed facilities, such as pipelines, reservoirs or spreading grounds, is not forecast to increase runoff because facilities are proposed to be installed within existing public road rights-of-way or existing public facilities. However, it is possible that some facility locations could increase surface runoff.

Site-specific engineering studies are generally required for all specific facilities to be developed under the program. Local ordinances, local flood control district guidelines, and standard engineering practices cover these. Until specific locations and facilities are identified and developed to the point where engineering information can be generated, mitigation measures can't be devised.

Any facilities resulting from implementation of the proposed program will be required to meet the local city or flood control district runoff requirements, which are usually that surface water runoff

volumes leaving a site are at no more than pre-construction levels. Sediment and other pollutant discharges from sites must also be contained. Each project must comply with local and state requirements for nonpoint source pollution control through the preparation and implementation of Storm Water Pollution Prevention Plans (SWPPPs) under the National Pollutant Discharge Elimination System (NPDES) permit program for sites more than 2.5 acres in size. These plans are mandatory and must contain best management practices for water quality and sediment control. Mitigation is provided below to address the level of pollution control required.

f. Otherwise substantially degrade water quality.

Aside from the groundwater recharge activities previously discussed, no other activities associated with the use of recycled water are forecast to have a potential to substantially degrade water quality. No additional mitigation is required.

g. Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood flows.

The proposed project does not include any housing component. Therefore, the proposed project cannot expose any housing to any flood hazards. No mitigation is required.

h. Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.

The proposed project does not include any activities or facilities that would be exposed to significant risk of loss, injury or death involving flooding, including failure of a levee or dam. No mitigation is required.

i. Cause inundation by seiche, tsunami, or mudflow.

None of the proposed project's facilities will be located in an area exposed to inundation by seiche, tsunami or mudflow. Therefore, no inundation hazards can affect the project and no mitigation is required.

In terms of specific issues raised in the NOP:

- *Request analyses of the consistency of the proposed program with other various regional plans, addressing: population growth and the need for more water and wastewater facilities, orderly and efficient arrangement of public infrastructure facilities and distribution/collection systems to serve existing and proposed land uses, protection of surface and groundwater from degradation, support the reclamation and reuse of wastewater, and protection of species and habitats. (Western Riverside Council of Governments)*

The projections for water supply and demand in the environmental setting show that the program is consistent with regional needs, particularly for increased recycled water use and storage thereof. As indicated by the cumulative impacts tables and discussion above, the RIX program is in line with other watershed projects.

- *Will this program affect the use of 18,000 acre-feet of RIX recycled water for groundwater recharge in connection with the Riverside-Colton Conjunctive Use Project (Bureau of Reclamation/Dept. of Water Resources identified project)? (California Department of Water Resources)*

As shown in Table 4.4-14, the proposed sale of recycled water will not reduce flows into the river such that downstream groundwater recharge will be adversely affected. This assumes that the adjudicated baseflow requirements are protective of groundwater recharge throughout the river system. Based on the most current data, the residual flow to the Santa Ana River after sale of RIX recycled water is projected to be about 31,000 afy. This is considered sufficient to meet downstream water demand for all identified uses.

- *How does the proposed project impact groundwater supplies which the Watermaster appropriates? Will the project meet the proposed reduced groundwater basin water quality objectives by the Regional Board? (Chino Basin Watermaster)*

- *Address the impacts of the project on the current replenishment of the OCWD groundwater basin. Address the potential impacts of new infrastructure that may be required to maintain replenishment. Address the impacts of exporting native water to areas outside of the Santa Ana River Watershed. (Orange County Water District)*

As shown in Table 4.4-14, the proposed reduction will not reduce flows into the river such that current obligations will be adversely affected. Some measures will be required to address both current and future groundwater basin water quality objectives (refer to section above on water quality).

4.4.4 Mitigation Measures

The water resource impacts (quality and quantity) of the RIX Recycled Water Sales Program generally fall below a level of significance, except for those issues that are site specific and must be addressed in the future when specific projects are considered. The following mitigation measures for potentially significant water resource impacts will be implemented by the SBMWD or other responsible agencies when future specific projects are identified.

4.4-1 SBMWD will provide adequate notice to purchaser if recycled water delivered does not meet Title 22 requirements, particularly coliform. SBMWD will provide all information available for TDS and TIN for determining groundwater recharge needs (such as long-term or corrective blending requirements) in affected groundwater basins. Prior to delivery of recycled water, the purchasing agency shall provide SBMWD with a report that verifies RIX recycled water will not cause significant water quality degradation or violation of water quality objectives for the use location.

4.4-2 SBMWD will advise other agencies as needed in the engineering studies and standards for specific facilities developed under the program. Restoration of pre-existing conditions will be the minimum goal for surface runoff control. Copies of studies demonstrating compliance with standards shall be provided to SBMWD for review and retention.

4.4-3 For each project construction site, a SWPPP shall be prepared and implemented. Each plan shall identify the specific best management practices that will be used for the site to control pollutant discharges to a 60-percent or greater removal of sediment and other pollutants. In addition, the SWPPP shall identify those measures required to control

accidental releases of chemicals or materials that could degrade water quality. Any accidental releases shall be cleaned up; the contaminated material properly disposed of; and the site returned to pre-discharge condition, or in full compliance with regulatory limits for the discharged material.

4.4-4 Pursuant to proposed DHS regulations, an engineering report must be submitted for each planned recycled water recharge project. The engineering report will include, at a minimum, a hydrogeologic study that will evaluate and describe, in detail, the vertical and horizontal extent of the underground zone that defines six months of underground retention of the applied recycled water and the 500 foot horizontal buffer zone around the recharge facility.

4.4.5 Cumulative Impact

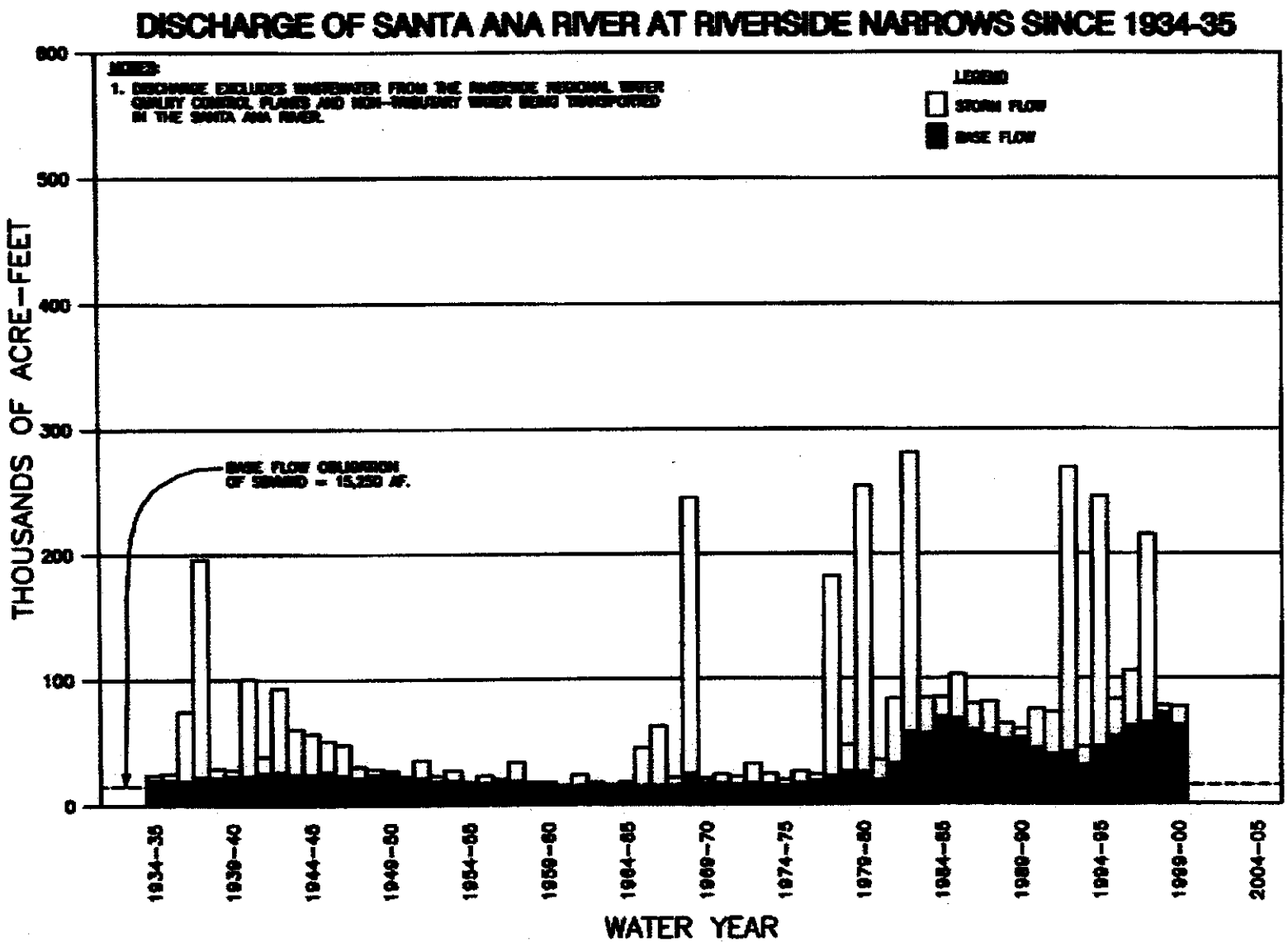
The proposed sale of up to 18,000 afy and up to 35 cfs of recycled water from the RIX facility will affect water volumes and water quality within Reaches 3 and 4 of the Santa Ana River. Within Reach 4, no other recycled water sales programs are proposed. Within Reach 4, which extends to the flows from the West San Bernardino Valley, the Inland Empire Utilities Agency also has plans to reuse large volumes of recycled water. Based on the review provided above, which includes, the SAWPA evaluation of future use of recycled water for alternative uses within the Upper Santa Ana River Basin, the combined impacts of the current recycled water use/sales proposals is not forecast to cause cumulative impacts on the region's water resources or water quality. Generally, there will be increased discharges to the river in the long run, which will benefit the entire system, as shown in Tables 4.4-15 and 4.4-16.

The identified impacts require modest mitigation to ensure that future site specific projects do not degrade water quality. However, based on the evaluations in this document and IEUA's Optimum Basin Management Program Program Environmental Impact Report and Facilities Management Plans Program Environmental Impact Report, no significant cumulative adverse water resource and water quality impacts will result from implementing these projects within the Upper Santa Ana Watershed.

4.4.6 Unavoidable Adverse Impact

For the proposed RIX Recycled Water Sales Program at this stage of review, there is no potential for program implementation to cause unavoidable significant adverse impacts to water resources and water quality. The proposed project is not forecast to cause significant water resource or water quality impacts along reaches 3, 4 and 5 of the Santa Ana River channel with implementation of mitigation measures listed above. Further, future site specific impacts are not forecast to be unavoidably significant with implementation of listed mitigation measures. Some unavoidable changes are forecast to result from program implementation, see also the discussion in the Biology section of this document, but sufficient treated effluent will continue to be discharged to the Santa Ana River channel downstream of the RIX discharge location to ensure that these impacts, after mitigation, are not significant.

FIGURE 4.4-2
Relationship of Storm Flows to Base Flows at Riverside Narrows



Source: Santa Ana River Watermaster Annual Report, 2000

4.5 AIR QUALITY

4.5.1 Introduction

Air Quality was identified as a topic for evaluation in this PEIR because construction and operation of the facilities proposed under the program have the potential to generate substantial air emissions. The emissions will be associated with operation of construction equipment, the disturbance of soil, and energy consumed by power equipment. This section of the PEIR quantifies emissions based on the facilities identified in Table 4.1-2, which basically are: pipelines, pump stations, and appurtenances.

4.5.2 Environmental Setting

The planning area encompasses the San Bernardino Valley portions of San Bernardino and Riverside counties and the coastal plain portion of Orange County, which are located within the South Coast Air Basin (SoCAB). The South Coast Air Quality Management District (SCAQMD) has jurisdiction over air quality issues within the SoCAB.

The project area is comprised of highly urbanized areas, natural open space, and agricultural areas that are primarily associated with the dairy industry. The applicable general plans (cities and counties) envision additional urban development with a reduction in the agricultural uses over time.

While the SoCAB has some of the most unhealthful air in the nation, air quality within the SoCAB has continued to show improvement up to the summer of 2002. At this time, the SoCAB is classified non-attainment for ozone (O_3), small particulate matter (PM_{10}), and carbon monoxide (CO).

4.5.2.1 Climate/Meteorology

Warm, dry summers, low precipitation, and mild winters characterize climate in the planning area. Average daily winter temperature is 51°F and average daily summer temperature is 75°F. During the year, temperatures range from a low near 20°F during the winter to a high of over 100°F during the summer. More than two-thirds of annual rainfall occurs from December through March with approximately 90 percent occurring between November and April. Little rain falls between May and November, due to the semipermanent Pacific high pressure system that prevents storms from entering the Master Plan area. In the planning area, mean annual precipitation ranges from 13 inches near Prado Dam to 25 inches at the base of the San Gabriel Mountains. In these mountains, average annual rainfall has reached as high as 40 inches with extremes ranging between 40 and 200 percent of normal. In nearly all months out of the year, evaporation exceeds precipitation. Relative humidity averages 45 percent year-round; 40 to 70 percent in winter, and 10 to 20 percent in summer.

Topography is a major factor influencing wind direction over the project area. Prevailing winds are generally light, and westerly or southwesterly. Night and early morning winds are usually north-easterly. Some afternoon sea breezes blow into the San Bernardino Valley from the Los Angeles area. Summer daytime wind speed averages 10 to 15 miles per hour (mph) whereas the winter daytime wind speed averages five to eight mph. There is little seasonal variability in this pattern.

Occasionally during autumn and winter, "Santa Ana" conditions develop from a high pressure zone to the east and bring dry, high velocity winds from the deserts to the east and northeast over Cajon Pass. These winds, gusting to over 80 mph, can reduce relative humidity to below 10 percent.

The SoCAB experiences a persistent temperature inversion (increasing temperature with increasing altitude) as a result of the Pacific high. This inversion limits the vertical dispersion of air contaminants, holding them relatively near the ground. As the sun warms the ground and the lower air layer, the temperature of the lower air layer approaches the temperature of the base of the inversion (upper) layer until the inversion layer finally breaks, allowing vertical mixing with the lower layer. This phenomenon is observed in mid-afternoon to late afternoon on hot summer days, when the smog appears to clear up suddenly. Winter inversions frequently break by mid-morning.

The SCAQMD maintains monitoring stations throughout the SoCAB and the Coachella Valley to monitor concentrations of criteria pollutants in the air. The nearest SCAQMD monitoring stations to the general planning area that measure all criteria pollutants are the East San Gabriel Valley V1 station and the Central San Bernardino V2 station. Monitored ambient air quality data from these stations for the latest three years available (1998-2000) are provided in Tables 4.5-1 and 4.5-2.

These stations are located generally upwind and downwind of the central portion of the planning area, the Chino Basin. The data on Tables 4.5-1 and 4.5-2 indicate that air quality is essentially the same for carbon monoxide and nitrogen dioxide both upwind while ozone and PM10 levels are generally higher downwind or easterly of the planning area.

4.5.2.2 Air Quality Regulations

Federal Regulations/Standards

Pursuant to the federal Clean Air Act (CAA) of 1970, the U.S. Environmental Protection Agency (EPA) established National Ambient Air Quality Standards (NAAQS). The NAAQS were established for several major pollutants, termed "criteria" pollutants because the choices of NAAQS are supported by specific medical evidence. The NAAQS are two-tiered: primary standards to protect public health; and secondary standards to prevent degradation to the environment (e.g., impairment of visibility, damage to vegetation and property, etc.).

The six criteria pollutants are ozone (O_3), carbon monoxide (CO), particulates less than ten microns (PM_{10}) in diameter, nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead (Pb). The primary standards for these pollutants are shown in Table 4.5-3; the health effects resultant from exposure to these pollutants are shown in Table 4.5-4. In July 1997, the EPA adopted a new NAAQS for particulates less than 2.5 microns ($PM_{2.5}$).

Data collected at permanent monitoring stations are used by the EPA to classify regions as "attainment" if the primary NAAQS have been achieved, or "non-attainment" if the NAAQS are not achieved. The SoCAB is currently classified as a non-attainment area for three criteria pollutants: O_3, PM_{10} and CO. Concentrations of NO_2, SO_2 and Pb are classified as "attainment." The SoCAB attainment status for $PM_{2.5}$ has not been determined.

Table 4.5-1
AIR POLLUTANT DATA SUMMARY FROM
EAST SAN GABRIEL VALLEY V1 MONITORING STATION
(1998-2000)

Pollutant	SCAQMD Station Data		
	1998	1999	2000
Ozone			
Highest 1 hour, ppm	0.15	0.14[c]	0.17
Days > 0.12 ppm[a]	19	2[c]	16
Days > 0.09 ppm[b]	43	24[c]	36
Carbon Monoxide			
Highest 1 hour, ppm	6	5	NM
Days > 35.0 ppm[a]	0	0	NM
Days > 20.0 ppm[b]	0	0	NM
Highest 8 hour, ppm	3.9	3.9	NM
Days > 9.0 ppm[a,b]	0	0	NM
Nitrogen Dioxide			
Highest 1 hour, ppm	0.14	0.16[c]	0.12
Days > 0.25 ppm[b]	0	0[c]	0
Annual Average	0.364	0.390[c]	0.364
Days > 0.053 ppm[a]	No	No[c]	No
Sulfur Dioxide			
Highest 24 hour, ppm	NM	NM	0.02[c]
Days > 0.05 ppm[b]	NM	NM	0[c]
Particulates (PM_{10})			
Highest 24 hour	87	103	108
Days > 150 µg/m^3 [a]	0	0	0
Days > 50 µg/m^3 [b]	16	35	31
AAM[a]	40.6	56.3	52.6
Year > 50 µg/m^3	No	Yes	Yes
AGM[b]	35.7	51.5	47.1
Year > 30 µg/m^3	Yes	Yes	Yes

Notes: ppm = parts per million
µg/m^3 = milligrams per cubic meter
NM = Not measured at this station
AAM = Annual Arithmetic Meter
AGM = Annual Geometric Mean

a Federal Standard
b State Standard
c Less than 12 full months of data. May not be representative.

Source: SCAQMD Annual Monitoring Reports, 1998-2000

Table 4.5-2
AIR POLLUTANT DATA SUMMARY FROM
CENTRAL SAN BERNARDINO V2 MONITORING STATION
(1998-2000)

Pollutant	SCAQMD Station Data		
	1998	1999	2000
Ozone			
Highest 1 hour, ppm	0.21	0.16	0.15
Days > 0.12 ppm[a]	39	14	27
Days > 0.09 ppm[b]	65	45	48
Carbon Monoxide			
Highest 1 hour, ppm	6	5	5[c]
Days > 35.0 ppm[a]	0	0	0[c]
Days > 20.0 ppm[b]	0	0	0[c]
Highest 8 hour, ppm	4.6	4.0	4.3[c]
Days > 9.0 ppm[a,b]	0	0	0[c]
Nitrogen Dioxide			
Highest 1 hour, ppm	0.11	0.14	0.10
Days > 0.25 ppm[b]	0	0	0
Annual Average	0.034	0.036	0.033
Days > 0.053 ppm[a]	No	No	No
Sulfur Dioxide			
Highest 24 hour, ppm	NM	NM	NM
Days > 0.05 ppm[b]	NM	NM	NM
Particulates (PM_{10})			
Highest 24 hour	114	134	108
Days > 150 $\mu g/m^3$ [a]	0	0	0
Days > 50 $\mu g/m^3$ [b]	22	33	32
AAM[a]	46.3	56.5	50.1
Year > 50 $\mu g/m^3$	No	Yes	Yes
AGM[b]	39.3	50.6	44.5
Year > 30 $\mu g/m^3$	Yes	Yes	Yes

Notes: ppm = parts per million
$\mu g/m^3$ = milligrams per cubic meter
NM = Not measured at this station
AAM = Annual Arithmetic Meter
AGM = Annual Geometric Mean

a Federal Standard
b State Standard
c Less than 12 full months of data. May not be representative.

Source: SCAQMD Annual Monitoring Reports, 1998-2000

A five-year deadline for NAAQS attainment was originally set by the CAA; however, the attainment date was subsequently revised by the CAA Amendments, which also required the states to identify non-attainment subareas within their borders and to develop an EPA approved State Implementation Plan (SIP), demonstrating attainment of all NAAQS by 1982. In a later EPA mandate, that attainment deadline was extended to 1987. The 1990 CAA Amendments specify new strategies for attaining NAAQS nationwide over the next 20 years, including mandatory 3 percent annual reductions of air pollutant emissions for both existing and new stationary sources, the scheduled introduction of low emitting cars and trucks into the nation's motor vehicle fleet, and the development of mass transit or higher occupancy vehicle alternatives to the single passenger automobile. The 1990 CAA Amendments designated the SoCAB as: "extreme" for ozone, requiring attainment with the federal ozone standard by 2010; "serious" for CO, requiring attainment of federal CO standards by 2000; and "serious" for PM_{10} requiring attainment with federal standards by 2001.

In response to the CAA requirements, the SCAQMD and Southern California Association of Governments (SCAG - which has been designated by the EPA as the Metropolitan Planning Organization responsible for ensuring compliance with the requirements of the CAA - prepare air quality management plans (AQMP) for the attainment of the ambient air quality standards. Air quality planning is described in a following section.

State Regulations/Standards

The State of California began to set California ambient air quality standards (CAAQS) in 1969 under the mandate of the Mulford-Carrell Act. The CAAQS are generally more stringent than the NAAQS. In addition to the six criteria pollutants covered by the NAAQS, there are CAAQS standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility reducing particles. These standards are listed in Table 4.5-3.

Originally, there were no attainment deadlines for the CAAQS. However, the California Clean Air Act (CCAA) of 1988 provided a time frame and a planning structure to promote their attainment. The CCAA required non-attainment areas in the State to prepare attainment plans, and proposed to classify each such areas on the basis of the submitted plan, as follows: moderate, if CAAQS attainment could not occur before December 31, 1994; serious, if CAAQS attainment could not occur before December 31, 1997; and severe, if CAAQS attainment could not be conclusively demonstrated at all. The attainment plans are required to achieve a minimum 5 percent annual reduction in the emissions of non-attainment pollutants, unless all feasible measures have been implemented. The SoCAB is classified as a "severe" non-attainment area for ozone, carbon monoxide, and nitrogen dioxide.

Regional Air Quality Planning Framework

The California Air Resources Board (CARB) coordinates and oversees both State and federal air pollution control programs in California. The CARB has divided the State into 15 air basins. Significantly authority for air quality control within them has been given to local Air Pollution Control Districts (APCD) or Air Quality Management District (AQMD), which regulate stationary source emissions and develop local non-attainment plans. CARB has designated all of Los Angeles County south of the San Gabriel Mountains, Orange County, and the non-desert portions of

Riverside and San Bernardino counties as the SoCAB under the jurisdiction of the SCAQMD. SCAQMD is responsible for regulatory stationary source emissions, and has been given the authority to regulate mobile emissions as an indirect source. The SCAQMD and SCAG jointly conduct air quality planning in the SoCAB. The CARB regulates motor vehicles and fuels.

Regional Air Quality Management Plan

Compliance with the provisions of the federal CAA and CCAA is the primary focus of the latest AQMP developed by SCAQMD and SCAG. The Plan is revised every three years, with the latest version adopted by the SCAQMD in November 1996 and titled the 1997 AQMP. The latest AQMP was adopted by the CARB in February 1997, and was included in the SIP and send to the EPA for its review and approval.

According to the 1997 AQMP, attainment for all federal health standards is to occur no later than year 2000 for carbon monoxide, the year 2006 for PM_{10} and the year 2010 for ozone. State standards would be attained no later than the year 2000 for carbon monoxide. State standards for ozone and PM_{10} would not be achieved until after the year 2010.

The 1997 AQMP includes short-term, intermediate, and long-term control measures, and market based incentive strategies to meet targets for emission reduction. The short-term measures identify specific control measures under existing technology. The control measures consist mainly of stationary source controls that will be the subject of the SCAQMD rule making. CARB adopted motor vehicle emissions standards and fuel specifications, and federally adopted programs to reduce emissions from sources under federal jurisdiction. Intermediate term measures are composed primarily of the extension, or more stringent application, of short-term control measures. Long-term measures depend on substantial technological advancements and breakthroughs that are expected to occur throughout the next two decades.

In response to legal challenges to the 1997 AQMP, and EPA's rejection of the ozone portion of the SIP, the ozone portion of the AQMP was amended in 1999 to add new stationary source control measures to further strengthen the plan. The 1999 amended ozone plan is currently being reviewed by federal authorities.

AQMP control measures focus on adoption of new regulations or enhancement of existing regulations for stationary sources, implementation/facilitation of advanced transportation technologies (i.e., telecommunications, zero emission and alternative fuel vehicles and infrastructure and both capital- and non-capital based transportation improvements). Capital-based improvements consist of high occupancy vehicle (HOV) lanes, transit improvements, traffic flow improvements, park and ride and intermodal facilities, and urban freeway, bicycle and pedestrian facilities. Non-capital based improvements consist of rideshare matching and Congestion Management Plan (CMP) based transportation demand management activities.

Table 4.5-3
AMBIENT AIR QUALITY STANDARDS

Pollutant	Average Time	State Concentration	Federal Primary	Federal Secondary
Ozone	1 Hour	0.09 ppm (180 µg/m^3)	0.12 ppm (235 µg/m^3)	Same as Primary Standard
Nitrogen Dioxide	Annual Average	---	0.053 ppm (100 µg/m^3)	
	1 Hour	0.24 ppm (470 µg/m^3)	---	Same as Primary Standard
Carbon Monoxide	8 Hour	9 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	
	1 Hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	
PM10	Annual Geometric Mean	30 µg/m^3	---	
	24 Hour	50 µg/m^3	150 µg/m^3	Same as Primary Standard
	Annual Arithmetic Mean	---	50 µg/m^3	
Sulfur Dioxide	Annual Average	---	80 µg/m^3 (0.03 ppm)	---
	24 Hour	0.04 ppm (105 µg/m^3)	365 µg/m^3 (0.14 ppm)	---
	3 Hour	---	---	1300 µg/m^3 (0.5 ppm)
	1 Hour	0.25 ppm (655 µg/m^3)	---	--
Lead	30-day Average	1.5 µg/m^3	---	---
	Calendar Quarter	---	1.5 µg/m^3	Same as Primary Standard
Sulfates	24 Hour	24 µg/m^3	---	---
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	---	---
Vinyl Chloride (chloroethene)	24 Hour	0.010 ppm (26 µg/m^3)	---	---
Visibility Reducing Particles	8 Hour (10 am to 6 pm, PST)	**	---	---

Note: ** In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70 percent. Measurement in accordance with CARB Method V.

Source: CARB, 2002

Table 4.5-4
HEALTH EFFECTS SUMMARY FOR AIR POLLUTANTS

Pollutants	Sources	Primary Effects
Ozone	Atmospheric reaction of organic gases with nitrogen oxides in sunlight.	Aggravation of respiratory and cardio-vascular diseases. Irrigation of eyes. Impairment of cardiopulmonary function. Plant leaf injury.
Nitrogen Dioxide	Motor vehicle exhaust. High temperature, stationary source combustion. Atmos-pheric reactions.	Aggravation of respiratory illness. Reduced visibility. Reduced plant growth. Formation of acid rain.
Carbon Monoxide	Incomplete combustion of fuels and other carbon-containing substances, such as motor vehicle exhaust. Natural events, such as decomposition of organic matter.	Reduced tolerance for exercise. Impair-ment of mental function. Impairment of fetal development. Death at high levels of exposure. Aggravation of some heart disease (angina).
PM_{10}	Stationary combustion of solid fuels. Construction activities. Industrial process-es. Atmospheric chemical reactions. Fugitive dust.	Reduced lung function. Aggravation of the effects of gaseous pollutants. Aggravation of respiratory and cardiorespiratory diseases. Increased cough and chest discomfort. Soiling. Reduced visibility.
Sulfur Dioxide	Combustion of sulfur-containing fossil fuels. Smelting of sulfur-bearing metal ores. Industrial processes.	Aggravation of respiratory diseases (asthma, emphysema). Reduced lung function. Irritation of eyes. Reduced visibility. Plant injury. Deterioration of metals, textiles, leather, finishes, coating, etc.
Lead	Contaminated soil.	Impairment of blood function and nerve construction. Behavioral and hearing problems in children.

Source: CARB, 2002

Air Toxics

Toxic air contaminants (TACs) are airborne substances that are capable of causing short-term or long-term adverse human health effects. TACs include both organic and inorganic chemical substances. TACs may be emitted from a variety of common sources, including gasoline stations, automobiles, dry cleaners, industrial operations, and painting operations. Research and teaching facilities where a variety of chemicals are used for various experiments may also be a source of TACs.

The 1990 federal CAA Amendments expanded the regulation of hazardous air pollutants (HAPs; the federal government terminology for TACs), establishing a list of 172 individual compounds and 17 compounds categories to be regulated as HAPs. The federal CAA required the EPA to establish a stringent, technology based emissions standard for stationary sources of emissions of these listed substances. The Act also required the EPA to list "major" and "area" source categories that the EPA finds sufficiently threatening to human health or the environment by November 1993, to establish emissions standards for at least 40 stationary source categories by November 1994, and to establish standards for all regulated sources by November 2002.

"Major sources" are defined as any stationary source that emits at least 10 tons per year (tpy) of any single HAP or 25 tons per year of any combination of HAPs. "Area sources" are stationary sources encompassing small diverse facilities that routinely release small amounts of HAPs. By November 1997, the EPA must list sufficient categories and subcategories of area sources to ensure that 90 percent of the emissions of the 30 HAPs presenting the greatest threat to the public health in the largest number of urban areas are subject to regulation.

In the state of California, the Air Toxics "Hot Spots" Information and Assessment Act of 1987 (AB 2588) requires specified facilities to submit to the local air pollution control agency, in this case, the SCAQMD, a comprehensive plan to inventory air toxics emissions for all substances listed pursuant to the Act. After the inventory preparation plan is approved, the facility must implement the plan and submit the resulting air toxics emission inventory to the District. After the District receives the completed emission inventories subject to the Act, it is then required to identify high priority facilities for which health risk assessments must be prepared to estimate the potential health risk associated with TAC emissions.

Assembly Bill 1807 (Tanner Bill) set up a statewide process to determine the need for methods to set standards for toxic air contaminants. The process includes identification of toxic air contaminants, determination of emissions and ambient levels of the identified compounds, preparation of regulatory needs documents, and establishment of minimum statewide emission control standards by the California Air Resources Board (CARB).

The CARB has identified several chemicals as TACs under the Tanner Bill, including asbestos, benzene, cadmium, carbon tetrachloride, chlorinated dioxins and dibenzofurans (15 species), chromium (VI), ethylene dibromide, ethylene oxide and methylene chloride as toxic air contaminants. The CARB has not developed statewide ambient air quality standards for any of these toxic chemicals.

Table 10-2 of the CEQA Handbook identifies air toxics and representative uses/sources that are subject to federal and state regulations. The uses/sources identified in the table that emit air toxics do not include water treatment or production facilities as potential air toxics sources.

The SCAQMD regulates levels of air toxics through a permitting process. Both new and existing industries routinely use materials classified as air toxics. For new and modified sources, the SCAQMD has adopted Rule 1401, with which the project proponent must comply before the project can be constructed and put into operation. A permit, when issued, will allow the facility to operate and will specify the conditions, if any, that might limit its operation.

Rule 1401 pertains to new source review of toxic air contaminants. Rule 140w specifies the following requirements for maximum individual cancer risk (MICR) and cancer burden:

- A maximum individual excess cancer risk greater than one in one million ($1x10^{-6}$), if the unit is constructed without T-BACT;
- A maximum individual excess cancer risk greater than ten in one million ($1x10^{-5}$), if the unit is constructed with T-BACT; or
- Greater than 0.5 excess cancers in the population subject to a risk greater than one in one million.

For noncarcinogenic compounds, Rule 1401 requires that the nonchronic acute and chronic hazard index (HI) not exceed 1.0. In addition to the air toxics, the SCAQMD controls the emissions of reactive organic gases (ROGs), and odors through regulations and the permitting process.

SCAQMD Rules and Regulations

Regulation II

Identifies the information required of applicants seeking a Permit to Construct for air pollution sources and requires submission of information before an application can be considered. Specific rules that maybe applicable to the management plans include: (1) Rule 201 - Permit to Construct, (2) Rule 204 - Permit Conditions, (3) Rule 212 - Standard for Approving Permits, and (4) Rule 217 - Provisions for Sampling and Testing Facilities.

Regulation II also contains a "List of Criteria Identifying Information Required of Applicants Seeking a Permit to Construct." Include in this list are a concentration impact analysis, a health risk assessment, a Best Available Control Technology (BACT) evaluation, and source test data. The type of information and level of detail required will vary depending on the scope of the project, predicted emissions, and potential health effects.

Regulation IV

Operation of existing equipment is governed by Regulation IV. All visible emissions are regulated by rules in Regulation IV. Odors are regulated by Rule 402, "Public Nuisance."

Regulation IX

This regulation specifies standards of performance for new stationary sources (NSPS). Subpart GG of the regulation provides the NSPS for Stationary Gas Turbines.

Regulation X

Regulation X addresses the National Emission Standards for Hazardous Air Pollutants (NESHAPS). Fugitive HAP emissions from equipment leaks may be subject to this regulation.

Regulation XI

This regulation addresses source-specific standards. Specific rules that may be applicable to Master Plan facilities under this regulations include: (1) Rule 1110.2 - Emissions from Stationary Internal Combustion Engines, and (2) Rule 1146.1 - Emission of Oxides of Nitrogen from Small Industrial, Institutional and Commercial Boilers, Steam Generators and Process Heaters.

Regulation XIII

This regulation addresses new source review. The regulation sets forth preconstruction review requirements to ensure that operation of new or modified facilities does not interfere with progress toward attainment of the national ambient air quality standards, and that future economic growth within the SCAQMD is not unnecessarily restricted.

A key impact of Regulation XIII is the required application of BACT and use of emission offsets. BACT must be employed for any permit which results in a net emission increase of any non-attainment air contaminant, any halogenated hydrocarbon or ammonia. Air contaminants of concern include carbon monoxide, sulfur dioxide, nitrogen oxides, particulate matter, lead compounds, and ROGs. BACT is determined by SCAQMD based either on published guidelines or on a case-by-case basis.

The SCAQMD, which has jurisdiction over air quality issues in the SoCAB, has determined that compliance with the terms and conditions of its applicable permits and regulations is adequate mitigation for potential project-related impacts to air quality. No further mitigation is required.

4.5.3 Project Impacts

This section assesses potentially significant environmental impacts to air quality resulting from the three proposed management plans. Section 4.5.3.1 sets forth the threshold criteria used to determine the significance of air quality impacts under CEQA. Section 4.5.3.2 assesses potential project impacts to air quality from construction and operational emission sources developed under the RIX Recycled Water Sales Program, based on data available at this time. These sections include comparisons to significance criteria outlined in Section 4.5.3.1.

4.5.3.1 Significance Criteria/Thresholds of Significance

Thresholds for Construction Emissions

Specific criteria for determining whether the potential air quality impacts of a project are significant are set forth in the SCAQMD's CEQA Air Quality Handbook. The criteria include emission thresholds, compliance with State and federal air quality standards, and conformity with the existing SIP or consistency with the current AQMP.

The following CEQA significance thresholds for construction emissions have been established by the SCAQMD:

- 24.75 tons per quarter or 550 pounds per day of CO
- 2.5 tons per quarter or 75 pounds per day of ROC
- 2.5 tons per quarter or 100 pounds per day of NO_X
- 6.75 tons per quarter or 150 pounds per day of SO_X
- 6.75 tons per quarter or 150 pounds per day of PM_{10}

Thresholds for Operational Emissions

The daily operational emissions "significance" thresholds are as follows:

Regional Emissions Thresholds

- 550 pounds per day of CO
- 55 pounds per day of ROC
- 55 pounds per day of NO_X
- 150 pounds per day of SO_X
- 150 pounds per day of PM_{10}

Projects in the SoCAB with operation-related emissions that exceed any of the emission thresholds may be considered significant, but the thresholds are not mandatory on the local agency.

Location-Specific Emission Standards

- California State 1-hour CO standard of 20.0 ppm
- California State 8-hour CO standard of 9.0 ppm

The significance of localized project impacts depends on whether ambient CO levels in the vicinity of the project are above or below State and federal CO standards. If ambient levels are below the standards, a project is considered to have significant impacts if project emissions result in an exceedance of one or more of these standards. If ambient levels already exceed a State or federal standard, project emissions are considered significant if they increase one hour CO concentrations by 1.0 ppm or more, or eight hour CO concentrations by 0.45 ppm or more.

Facilities with emissions of TACs are considered significant if a health risk assessment shows an increased risk of greater than 10 in one million.

The potential air quality impacts of the proposed project were assessed using guidelines and data developed by the SCAQMD CEQA Air Quality Handbook.

4.5.3.2 Impacts Analysis

The following discussion is based on the questions posed in the Air Quality section of the CEQA guidelines. The impacts of the program are examined for the construction and operational phases of implementation, and conclusions are drawn concerning the significance of those impacts. The facilities identified at this time are evaluated.

a. Will the program violate any air quality standard or contribute substantially to an existing or projected air quality violation?

Construction Phase (Short-term Emissions)

Implementation of the RIX Recycled Water Sales Program would result in the construction of projects in the immediate period (0-6 months from plan approval). Additional sub-projects would be programmed in the Near Term (within 10 years) and Long Term (10-40 years). The projects are summarized in the Project Description and on Table 4.2-2. Generally, for each market (agency or private consumer), they are:

- Excavation and laying of pipelines for an estimated initial total of 53,196 feet (10.23 miles),
- Construction of one pump station on one acre of land, and
- Construction of other appurtenances (such as extraction wells) on 1,000 square feet of land.

Short-term construction phase impacts would include fugitive dust and other particulate matter, as well as exhaust emissions generated by earth moving activities and operation of construction during site preparation (clearing and grading) and construction. Construction phase emissions were calculated for the type of project as described in the following sections. The following was assumed:

- Excavation and laying of pipelines could be expected to disturb a maximum of 1.26 acres of soil per day (see Figure 4.5-1).
- The transport of pipeline segments and sand during pipeline development can be estimated to require a maximum of approximately 56 truckloads per day.
- The development of extraction wells with a maximum bore diameter of 24 inches and depth of 600 feet will have a maximum disturbance area of 0.35 acres each and require 4 trucks per well to remove spoils. Development of an anticipated five extraction wells can be assumed to take place within a single quarter-year.
- In the development scenario of a pump station with a maximum power output of 8,400 horsepower it is assumed that a maximum of one acre will be graded and a worst-case

circumstance that demolition of existing structures will need to occur. Construction can be assumed to take place in a single quarter-year.

- During foundation construction of the pump station delivery of an average of 13 truckloads of concrete and materials per day could be expected (for approximately 3 days). An average of 10 truckloads of equipment and other materials may be delivered per day during the remaining construction activities.

Pipelines

One of the substantial sources of pollutants from future pipeline construction would be fugitive dust (particulate matter measured as PM-10) generated during trench excavation, pipe installation, and trench backfilling. Pipeline construction disturbance area estimate for pipeline diameters ranges between 12 inches to 96 inches are shown in Figure 4.5-1. From this figure, soil disturbance from pipeline installation is estimated at a maximum of approximately 1.26 acres per day. Please note that the total disturbance width shown here varies from the "20-30 foot easement" shown in Table 4.2-2. The differences may be accounted for in that the widths might change dependent upon "staging areas" needed, i.e., where equipment is temporarily parked or "safety zones" during construction and not just actual probable soil disturbance width. The SCAQMD CEQA Air Quality Handbook provides an average PM_{10} emission factor that does not take into consideration use of any dust control measures. These PM_{10} emissions would be reduced by approximately 50 percent through conformance with fugitive dust control measures listed in SCAQMD Rule 403 (see mitigation measures to be implemented as part of this program).

Short-term emissions from pipeline construction would also result from heavy equipment operations and the transport of pipeline segments and sand by heavy-duty diesel trucks. Daily criteria pollutant emissions estimates from construction equipment assume a 10-hour work-day and a 6-day workweek (with 78 workdays per quarter). As many as 20 construction workers could be expected to commute to the construction site. The average construction worker commute trip is assumed to be 13.6 miles (SCAQMD CEQA Air Quality Handbook default for San Bernardino County). Asphalt paving operations as part of pipeline installation will produce emissions of reactive organic compounds (ROC) from asphalt offgassing. Combined emissions for future pipeline installation are presented in Table 4.5-5 below.

Table 4.5-5
TOTAL SHORT-TERM CONSTRUCTION EMISSIONS
ASSOCIATED WITH PIPELINE INSTALLATION

Pollutant Source	Pollutant Emissions (lbs/day)				
	CO	ROC	NO_X	SO_X	PM_{10}
Fugitive Dust	NG	NG	NG	NG	28.86
Onsite Heavy Equipment	39.82	3.74	42.44	3.59	3.80
Mobile Equipment	11.61	1.36	11.44	0.47	0.59
Stationary Equipment	1.06	0.34	4.82	0.34	0.17
Commuting Traffic	8.92	0.63	0.64	0.07	0.13
Asphalt Offgassing	NG	1.26	NG	NG	NG
Total (lbs/day)	61.41	7.33	59.34	4.47	35.55
Totals (tons/qtr)	2.39	0.29	2.31	0.17	1.31
SCAQMD Criteria: (lbs/day) (tons/qtr)	 550 24.75	 75 2.5	 100 2.5	 150 6.75	 150 6.75

Note: NG = Criteria pollutants that have estimated negligible values

Source: Albert A. Webb Associates

Thus, short-term emissions from pipeline construction may be considered less than significant if the emissions generated are at or below the SCAQMD criteria, as shown above.

Extraction Wells

During well drilling and development, as many as 20 construction workers may be commuting to the construction site. Approximately 2 pieces of stationary equipment (welders) could be in operation. An area of approximately 0.35 acres will be disturbed around each well site. Well drilling and development is expected to be completed in a single quarter-year. Combined maximum daily emissions and total quarterly emission rates are presented in Table 4.5-6 below.

Table 4.5-6
TOTAL SHORT-TERM CONSTRUCTION EMISSIONS
ASSOCIATED WITH EXTRACTION WELL DEVELOPMENT

Pollutant Source	Pollutant Emissions (lbs/day)				
	CO	ROC	NO_x	SO_x	PM_{10}
Fugitive Dust	NG	NG	NG	NG	23.10
Onsite Heavy Equipment	49.77	5.93	53.05	4.49	4.75
Mobile Equipment	1.04	0.12	1.02	0.04	0.05
Stationary Equipment	1.06	0.34	4.82	0.34	0.17
Commuting Traffic	8.92	0.65	0.64	0.07	0.13
Total (lbs/day)	60.79	7.04	59.53	4.94	28.20
Totals (tons/qtr)	2.37	0.27	2.32	0.19	1.10
SCAQMD Criteria: (lbs/day) (tons/qtr)	 550 24.75	 75 2.5	 100 2.5	 150 6.75	 150 6.75

Note: NG = Criteria pollutants that have estimated negligible values

Source: Albert A. Webb Associates

Thus, short-term emissions from extraction well development may be considered less than significant if the emissions generated are at or below the criteria listed above.

Pump Stations

Short-term emissions for construction of future pump stations can be evaluated using three construction phases to estimate emissions resulting from (1) site grading and demolition, (2) foundation construction, and (3) the typical construction period when the remainder of the facility construction takes place. Stationary construction equipment used may include welders, cutting torches, portable generators, and concrete pumps. Approximately 16 construction workers could be expected to commute to each construction site. The number of workers should remain the same during all three construction phases. A maximum of 0.075 acres could be paved with asphalt for access roadways and parking at a future proposed pump station. Combined emissions for each phase of construction, maximum daily emissions, and total quarterly emission rates are presented in Table 4.5-7 as follows. Quarterly emissions totals of all criteria pollutants reflect 2 days of site preparation activity, 3 days of foundation construction activity, and 73 days of typical construction activity (with 6 workdays each week; 78 workdays per quarter). The quarterly emissions totals of ROCs include 3 days of architectural coatings at 30.65 pounds per day. ROC emissions for the remaining typical construction period are 4.63 pounds per day.

TABLE 4.5-7
TOTAL SHORT-TERM CONSTRUCTION EMISSIONS BY PHASE
ASSOCIATED WITH PUMP STATIONS

Construction Phase	Pollutant Emissions (lbs/day)				
	CO	**ROC**	**NO_x**	**SO_x**	**PM_{10}**
Grading and Demolition					
Fugitive Dust	NG	NG	NG	NG	6.60
Onsite Heavy Equipment	18.39	4.11	51.18	5.09	4.01
Commuting Traffic	7.13	0.50	0.51	0.06	0.11
Foundation	**CO**	**ROC**	**NO_x**	**SO_x**	**PM_{10}**
Construction					
Onsite Heavy Equipment	11.36	2.74	29.54	1.96	2.30
Commuting Traffic	7.13	0.50	0.51	0.06	0.11
Stationary Equipment	2.13	0.67	9.63	0.67	0.34
Construction Period					
Onsite Heavy Equipment	6.13	1.58	16.36	0.86	1.21
Mobile Equipment	2.07	0.24	2.04	0.08	0.10
Stationary Equipment	1.07	0.34	4.2	0.34	0.17
Commuting Traffic	7.13	0.50	0.51	0.06	0.11
Asphalt Offgassing	NG	0.20	NG	NG	NG
Architectural Coating	NG	26.03	NG	NG	NG
Total (lbs/day)	25.52	28.89	51.69	5.15	10.72
Totals (tons/qtr)	0.66	0.15	0.98	0.06	0.07
SCAQMD Criteria:					
(lbs/day)	550	75	100	150	150
(tons/qtr)	24.75	2.5	2.5	6.75	6.75

Note: NG = Criteria pollutants that have estimated negligible values

Source: Albert A. Webb Associates

Short-term emissions from pump station construction may be considered less than significant if the emissions generated are at or below the criteria listed above.

Operational Phase (Long-Term Emissions)

Operation of the facilities developed during implementation of the RIX Recycled Water Sales Program would result in long-term emissions. The sources of these emissions would be truck traffic, employee commuting, on-site internal combustion (as from periodic test runs of back-up generators), and increased electrical demand at the new facilities.

The following are some generalizations of theoretical water conveyance and storage projects, relative to long-term emissions, which could be expected in the future upon implementation of the program:

- The average work-related trip length can be assumed to be 13.6 miles (SCAQMD CEQA Handbook default for San Bernardino County) with trip speeds estimated at 35 miles per hour.

- Electricity usage for pump stations and wells is based on 750 watt-hours per horsepower-hour of energy and assumes an average usage rate at 62 percent of maximum capacity.

- One 15 minute test of a pump station back-up generator will be conducted per day.

The estimated emissions of each of the criteria pollutants as a result of motor vehicle trips for an estimated 10 employees needed for new facilities is shown in Table 4.5-8 below. It is assumed that the 10 employees have 2 commuting round trips per day (totaling 20 commuting roundtrips) and 20 roundtrips per day is needed for facility maintenance and operations. Each roundtrip is assumed to be 13.6 miles.

Table 4.5-8
ESTIMATED LONG-TERM MOBILE EMISSIONS (lbs/day)

Pollutant Source	NO_x	CO	ROC	SO_x	PM_{10}
Employee Vehicle Trips	0.41	6.45	0.35	0.06	0.13

Source: Albert A. Webb Associates

In calculating emission rates for electrical consumption, it is assumed that each 8,400 horsepower pump station will average 62 percent of capacity and that 750 watt-hours per horsepower will be used. It is also anticipated that a maximum of 5 extraction wells with 400 horsepower motors running 24 hours per day at a consumption rate of 300 kilowatts per hour may be needed to fulfill that anticipated 18,000 acre-feet per year of extraction. Table A9-11-B of the SCAQMD CEQA Air Quality Handbook lists the emission factors for each criteria pollutant from the consumption of electricity. Table 4.5-9 below presents the anticipated emissions of criteria pollutants from electrical consumption from facilities developed under the program.

Table 4.5-9
ESTIMATED LONG-TERM EMISSIONS FROM ELECTRICAL CONSUMPTION

Pollutant Source	NO_x	CO	ROC	SO_x	PM_{10}
Pump Station	14.06	18.75	0.94	11.25	3.75
Extraction Wells (5 total)	5.4	7.2	0.36	4.32	1.44
Total	19.46	25.95	1.30	15.57	5.19

Source: Albert A. Webb Associates

Pump stations can be assumed to have back-up generators, which would supply the vital power needs of the station in the event of a power failure (or rolling blackouts). These back-up generators are not anticipated to supply enough power to pump water, but would supply power to the control panels, instrumentation and lighting to keep the station in a safe standby condition. These back-up generators could range between approximately 300 horsepower to 600 horsepower each and could be test-run once a week for 15 minutes. Maximum annual runtime for each generator is less than 200 hours. It is assumed additionally that one generator will be tested per day. The anticipated emissions estimated for the largest back-up generator are shown in Table 4.5-10. The unit used for the following is a 600 horsepower one, run 0.25 hours a day. The emission factors for all of the criteria pollutants except SO_X are from the SCAQMD BACT requirements effective January 1, 2000. The emission factor for SO_X is estimated using emissions data from a 2000 kv standby diesel generator. The emissions factors used are in grams per horsepower hour. The daily emission totals below reflect conversion of grams to pound (454 grams per pound).

Table 4.5-10
ESTIMATED LONG-TERM EMISSIONS FROM BACK-UP GENERATOR TESTS

Pollutant Emissions (lbs/day)				
CO	**ROC**	**NO_X**	**SO_X**	**PM_{10}**
2.81	0.33	2.28	0.24	0.13

Emission Factors Used:
CO 8.5 gms/hp hour
ROC 1.0 gm/hp hour
NO_X 6.9 gms/hp hour
SO_X 0.73 gpms/hp hour
PM_{10} 0.4 gm/hp hour

Source: Albert A. Webb Associates

To summarize, an estimate of the daily long-term emissions that might be generated from implementation of the RIX Recycled Water Sales Program is shown in Table 4.5-11 as follows. The estimate is derived from combining both mobile and stationary emissions.

Table 4.5-11
COMPOSITE LONG-TERM EMISSIONS (lbs/day)

Pollutant Source	CO	ROC	NO_X	SO_X	PM_{10}
Mobile Emissions	6.45	0.35	0.41	0.06	0.13
Electrical Consumption	25.95	1.30	19.46	15.57	5.19
Emergency Generator Tests	2.81	0.33	2.28	0.24	0.13
Total	35.21	1.98	22.15	15.87	5.45
SCAQMD Criteria	550	55	55	150	150

Source: Albert A. Webb Associates

If long-term emissions of air pollutants related to all of the above activities exceed the SCAQMD criteria, then the program impacts would be considered potentially significant. However, from the above, the program impacts are not at this time seen to be significant, as only a limited number of permanent facilities will be operating.

b. Will the program expose sensitive receptors to substantial pollutant concentrations?

"Sensitive receptors" are considered to include schools, daycare centers, hospitals, convalescent homes, or other facilities serving individuals who are especially sensitive to air pollution. Thus, the clean air needs of children and those persons with impaired lung function or are chronically or acutely ill (such as hospital patients, senior citizens, and others with impaired lung function) require special attention in evaluating air quality impacts.

As construction and operational impacts to air quality for criteria pollutants are not seen to be significant, there should be no impact to sensitive receptors. However, to evaluate the potential impacts, specific facility sites need to be evaluated as to the presence of sensitive receptors in the immediate project site vicinity, ranging from a one-quarter to one-mile radius. Additionally, travel routes for truck trips and employee commuting need to be identified. Then, any particular air pollutants (i.e., other than the criteria pollutants and especially toxic air pollutants) and their potential emission rates need to be determined for specific projects.

Construction Phase

As stated above, no sensitive receptors should be affected. Near term projects implemented under the RIX Recycled Water Sales Program may impact future sensitive receptors that may locate near project sites. However, these impacts will be short-term, temporary and thus will not be significant after the implementation of the construction activity air quality mitigation measures proposed in this section.

Operation Phase

The SCAQMD has designated a large number of compounds as toxic air contaminants (TACs). Although there are no ambient air quality standards for these compounds, their toxicity subjects them to federal and state regulations, which require qualification and may require control for specific industries or processes. Assembly Bill 2588, the California Air Toxics "Hot Spots" Information Assessment Act of 1987 requires an Air Toxics Emissions Inventory for potential sources of TACs.

Table 10-2 of the SCAQMD CEQA Handbook identifies the type of facilities that are representative of users that could generate toxic contaminants. Water treatment and supply facilities are not listed. Water facilities do utilize chlorine, which is identified as a contaminant of concern for acute exposure. State and local rules and regulations regulate the use and storage of chlorine. Compliance with these rules and regulation are deemed by regulatory agencies to be adequate to mitigate the potential risk of exposure to acceptable levels.

One component of the proposed program is to connect IEUA's Regional Wastewater Treatment Plant #3 (RP-3) to a new pipeline bringing recycled water from the RIX facility. An Air Toxics Emissions Inventory was prepared for the IEUA's RP-2 plant in 1992 to test for over 20 volatile and

hazardous compounds in the plant's liquid phase. This information is reported in the Final Program EIR for Regional Plant Number 5 (IEUA, 1999). No pollutants were found to be above the method detection limits according to this testing. This information is consistent with the results from other treatment plants in the SCAB and is assumed to be representative for planned new and modified wastewater treatment facilities for the IEUA. Therefore, liquid treatment trains are not considered to present a source of toxic emissions.

Air toxics emissions were also calculated for the RP-2 boiler in 1992 and used in the RP-5 impact analysis (IEUA, 1999). IEUA also conducted air toxic emissions calculations for a cogeneration unit at RP-1 which was used in the RP-5 EIR. The evaluation of the RP-2 boiler identified two potential toxic air contaminants, acetaldehyde (less than 0.01 lbs/day) and formaldehyde (0.22 lbs/day). Evaluation of the RP-1 cogeneration unit identified potential emissions of benzene (0.07 lbs/day), toluene (0.04 lbs/day), and xylenes (less than 0.01 lbs/day). Any boilers or cogeneration units to be installed must meet the provisions of SCAQMD Rule 1401, which requires preparation of risk assessments before permits can be issued.

A risk assessment evaluates potential toxic emissions for the proposed uses and also evaluates the nature and location of sensitive receptors, resulting in theoretical probabilities of various health risks as a result of exposure to the potential emissions. Criteria for issuance of permits require that emissions are to be determined to result in risks below identified thresholds prior to approval. Considering the limited mass and nature of air toxics as typified by existing IEUA operations, it is expected that the future risk assessment evaluations prepared for specific facilities or modifications thereto, as they are designed and submitted to the SCAQMD for permit processing, can be successfully completed and that either no special requirements for air toxics will be required as part of the SCAQMD permits, or that permit conditions will be imposed by the SCAQMD to reduce the impacts to insignificance. On this basis, the potential impact of any modifications necessary for RP-3 to process or pass through RIX recycled water is deemed insignificant.

c. Will the program create objectionable odors affecting a substantial number of people?

Construction Phase

Construction phase emissions consist primarily of construction equipment and motor vehicle exhaust, and particulate emissions from earth moving activities. These are not ordinarily sources of objectionable odors off of the construction site. Therefore, no significant construction phase odor impacts are anticipated.

Operation Phase

Several uses of RIX recycled water could present the potential for generation of objectionable odors. Specific treatment technologies, enclosed process units, composting controls, and odor control features, including biofilters, incorporated into new facilities or existing facilities are intended to control odors to a point that they typically cannot be detected off-site. Odor dispersion modeling, for example, will need to be conducted for any planned biofilter systems at proposed composting facilities in order to demonstrate that there would be no significant odor impacts from the operation of the facility.

The potential for significant odors might be limited to periods of upset conditions that require the temporary storage of partially treated wastewater in emergency storage basin(s). Since RIX recycled water is to be distributed as fully treated, meeting all Title 22 requirements, it should not cause a problem. However, it might be mixed with partially treated water by a consuming agency. The infrequent, temporary nature of upset conditions should limit potential for significant odor impacts. No mitigation is necessary at this time.

4.5.4 Mitigation Measures

4.5.4.1 Construction Impacts

Although no emissions are anticipated to be above their respective significance thresholds, there are some general mitigation measures to reduce emissions from construction equipment. These measures will be implemented to minimize adverse effects on adjacent properties.

4.5-1 Limit construction equipment use to a mix of equipment that is substantially the same as that used for the estimation of pollutant emissions.

4.5-2 All equipment shall be properly tuned and maintained in accordance with manufacturer's specifications.

4.5-3 General contractors shall maintain and operate construction equipment so as to minimize exhaust emissions.

4.5-4 During construction, trucks and vehicles in loading and unloading queues would be kept with their engines off, when not in use, to reduce vehicle emissions.

4.5-5 Construction activities should be phased and scheduled to avoid emissions peaks and discontinued during second-stage smog alerts.

Fugitive dust control is required by SCAQMD Rule 403 to prevent local nuisance impacts. The following mitigation measures will be implemented to reduce fugitive dust emissions.

4.5-6 Water active grading sites at least twice daily and when dust is observed migrating from the site.

4.5-7 Suspend all grading and excavation operations when wind speeds exceed 25 mph.

4.5-8 Apply non-toxic chemical soil stabilizers according to manufacturers specifications to inactive construction areas (previously graded areas inactive for 10 days or more).

4.5-9 Replace ground cover or pave disturbed areas immediately after construction is completed in the affected area.

4.5-10 Sweep streets once per day and when soil material is observed on traveled roadways.

4.5.4.2 Operation Impacts

No emissions are expected to exceed the thresholds of significance. Therefore, other than compliance with SCAQMD rules, regulations and permit conditions, no further mitigation can be

identified. Subsequent analyses of any specialized facilities may indicate significant impacts that would be assessed and mitigated in subsequent CEQA environmental documents as necessary.

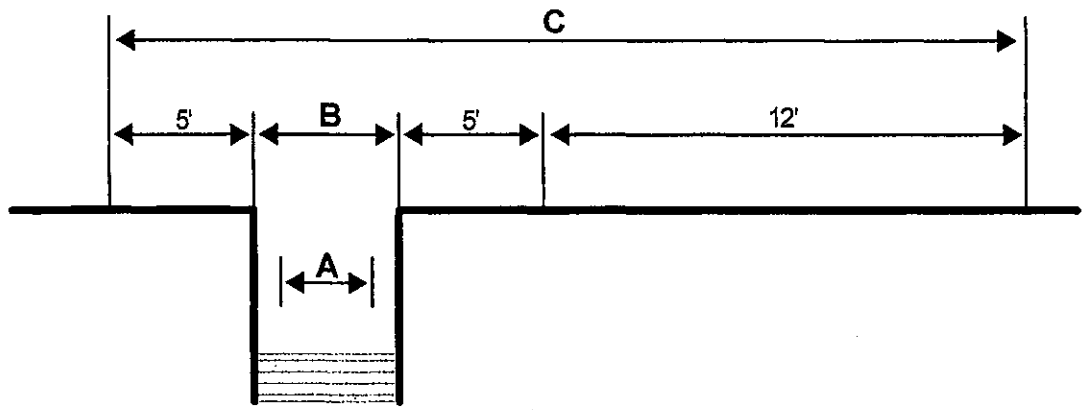
4.5.5 Cumulative Impact

Implementation of the RIX Recycled Water Sales Program will contribute some air pollutants to the SoCAB from construction and operation of the facilities to be developed over the next twenty years. These facilities will be essential infrastructure systems designed to provide for beneficial reuses of recycled water. These uses will enhance water supply for the intensity of land uses identified in applicable regional and local general plans and also assist in the management of biosolids and groundwater resources. The regional air planning agencies, SCAG and SCAQMD, assume in their air planning documents (the RCPG and AQMP) that if growth occurs that is consistent with applicable, adopted general plans, then ambient air quality standards can be met. Because this program does not propose amendments to existing general plan land uses and because it could, in effect, reduce air pollution emissions associated with existing waste/wastewater management procedures in the program area, it is concluded to be in conformity with the adopted regional air basin planning documents. Therefore, implementation of the program is not forecast to cause or contribute to significant air quality impacts.

4.5.6 Unavoidable Significant Impacts

No unavoidable significant adverse impacts to air quality from either construction or operation of facilities have been identified at this time to be associated with the RIX Recycled Water Sales Program have been identified.

FIGURE 4.5-1
Pipeline Disturbance Area



Pipeline Element	Diameter	Trench Width	Total Disturbance Width	Maximum Daily Rate of Progress [1]	Total Daily Disturbance Area
	A	B	C		
Pipelines under asphalt or dirt cover	12"-36"	5.5'	27.5'	2,000'/day	1.26 acres
Pipelines under asphalt or dirt cover	36"-42"	6.5'	28.5'	1,500'/day	0.98 acres
Pipelines under asphalt	48"	7.5'	29.5'	1,000'/day	0.68 acres
Pipelines under dirt cover	48"	7.5'	29.5'	1,500'/day	1.02 acres
Pipelines under dirt cover	60"	8.5'	30.5'	1,000'/day	0.70 acres
Pipelines under dirt cover	72"	10.0'	32.0'	1,000'/day	0.73 acres
Pipelines under dirt cover	96"	11.5'	33.5'	600'/day	0.46 acres

Notes: [1] Estimated daily rate of progress is length of pipeline completed per day. Variables affecting progress include road conditions (level of traffic and number of intersections), topography, terrain, groundwater levels, and soil/geological conditions.

Source: Albert A. Webb Associates, 2001

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4.6 TRANSPORTATION / CIRCULATION

4.6.1 Introduction

Potential impacts to the transportation and circulation system have been included as a topic of evaluation in this PEIR, based on the general developmental conditions anticipated by the RIX Water Sales Program. The NOP and scoping processes did not identify specific transportation concerns relating to the impacts that might result from the installation of pipelines, extraction wells and treatment facilities. The Western Riverside Council of Governments did request a demonstration of consistency of the program with regional plans, including the Regional Transportation Plan and the Congestion Management Plan.

4.6.2 Environmental Setting

4.6.2.1 Air Transport System

The Inland Empire region is served by a number of airport facilities. The air transport system is comprised of a commercial air carrier facility, general aviation airports and private airfields. The main airport facilities are briefly described as follows:

Ontario International Airport serves the growing international air transportation needs of the Inland Empire area. It functions as a major satellite airport to Los Angeles International Airport, providing both passenger and air cargo service.

The Chino Airport is located 4 miles southeast of downtown Chino, at the southeast corner of Euclid Avenue and Merrill Avenue. The facility provides general aviation services for approximately 950 aircraft based there.

Rialto Municipal Airport, located west of Cedar Avenue between Baseline Road and Highland Avenue (SR-30) is also a general aviation airport. It is also designated by the Federal Aviation Administration (FAA) as a reliever airport for Ontario International Airport, relieving the larger facility of some of the general aviation activities that would otherwise locate there.

Cable Airport, located in the northwest portion of the City of Upland, serves the general aviation needs of the Upland community and adjacent cities. It is a privately owned, public use airport, serving customers with light personal and business airplanes.

The City of Riverside Municipal Airport is located in the northwestern portion of the City, east of the Santa Ana River Regional Park, and also south of Central Avenue and North of Arlington Avenue. It is also near the Union Pacific Railroad along Van Buren Boulevard. It is a 441-acre facility with three hundred aircraft based there, from helicopters to business jet aircraft. General aviation aircraft operations account for most of the operations, with air taxi and military operations accounting for approximately one percent.

The Corona Municipal Airport is located in the Prado Basin in northwestern Corona, less than one mile southeast of the Santa Ana River channel proper. It is also north of the BNSF and Metrolink railroad lines.

4.6.2.2 Non-Motorized Transport System

Non-motorized transport encompasses bicycle, equestrian and pedestrian circulation. Within the various potentially affected jurisdictions, bicycle trails are noted as an energy efficient alternative to the automobile to help link the commercial, residential and open space uses within communities. Each jurisdiction has identified numerous existing and planned trails within their General Plans.

The main trail potentially affected by the proposed program is the Santa Ana River Trail. This is to become a link between Orange, Riverside and San Bernardino counties along a 110-mile length in the Santa Ana River corridor. Visitors will be able to hike, bicycle or ride (proximity to Metrolink commuter train route) from the Pacific Ocean, at Bolsa Chica State Ecological Reserve, to the newly forming San Timoteo Canyon State Park in the upper Santa Ana River watershed. Orange County has already constructed a portion of the bike path up to Green River Golf Course. A tentative alignment through the Prado Basin has been developed with the U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, State Parks, and county and local jurisdictions. The segment from Mission Boulevard to Market Street in Riverside is now open. Several loop trails are under consideration. These would allow “side-trips” from the main trail segment. At this time a Golden Loop in Santa Ana, a Prado Basin Loop Trail, La Sierra Trail, and Riverwash Loop (15 miles up to the San Bernardino National Forest) are envisioned (www.sawpa.org).

4.6.2.3 Rail System

Extensive rail service is provided in the program area, serving both passenger and freight services. The Burlington Northern Santa Fe (BNSF) and the Southern Pacific main lines run in an east-west direction orth and south of Interstate 10 (I-10), respectively. The BNSF line carries both freight and passenger traffic, including Metrolink and Amtrak services. The Southern Pacific main line runs south of, and parallel to, the I-10 Freeway through the cities of Chino, Fontana, Ontario, Pomona, Rialto and San Bernardino. These two main line railroads maintain major facilities in the program area, including a major classification yard in west Colton and rail-truck trainloads and warehousing facilities in Fontana and Pomona. These railroads connect southern California with other U.S. regions, Mexico and Canada via connecting railroad lines.

The southwestern portion of the program area has the BNSF railroad extending east-west through Corona and north of the Riverside Freeway (SR-91). This railroad provides daily freight service to the City of Riverside. A branch of this railroad travels through the University area and connects with a main line in Highgrove. The Union Pacific Railroad runs east-west in the City of Riverside in the vicinity of Van Buren Boulevard.

4.6.2.4 Road System

The program area contains a number of regional roadways that provide access to Los Angeles, Orange, Riverside and San Bernardino County areas. The primary regional roadway network is comprised of two interstate freeways, the San Bernardino freeway (I-10), which passes on an east-

west alignment through the northern portion of the program area, and the Ontario freeway (I-15), which is oriented north-south through the middle of the program area. In addition, there are many State Routes (SR) running through the program area. The Pomona Freeway (SR-60) passes through the mid-portion of the program area in an east-west direction and provides access to Riverside County via Los Angeles and San Bernardino Counties. The Corona Expressway (SR-71) connects Riverside County with Orange County through a section of San Bernardino County and the cities of Chino Hills and Pomona. Euclid Avenue (SR-83) provides north-south access through the cities of Chino, Ontario and Upland. The Riverside Freeway (SR-91) follows the Santa Ana River through the Anaheim Hills to link the City of Riverside to Orange County.

The following is a more thorough description of the main regional roadways in the program area, in the upper Santa Ana River watershed (upstream of Prado Dam). Refer to Figure 4.6-1.

San Bernardino Freeway (I-10) is an eight-lane Interstate freeway that currently traverses in an east-west direction through San Bernardino westward to los Angeles and eastward to Palm Springs. The projected year 2010 average daily traffic (ADT) volumes on I-10 range from 173,000 vehicles per day to 232,000 vehicles per day through the program area.

Ontario Freeway (I-15) is a six to eight-lane Interstate freeway in the middle portion of the program area. It connects Riverside County to San Bernardino County. The projected year 2010 volumes on the I-15 range from 105,000 vehicles per day to 175,000 vehicles per day through the program area.

Pomona Freeway (SR-60) is a six-lane facility that goes through the program area in an east-west direction, providing access to Riverside County via Los Angeles and San Bernardino counties. The project year 2010 ADT volumes on the SR-60 range from 85,000 vehicles per day (east of Pedley Road) to 201,000 vehicles per day (west of its intersection with the I-15).

Corona Expressway (SR-71) is a six-lane divided freeway located in the western portion of the program area (in the upper Santa Ana River watershed). The projected 2010 ADT volumes on SR-71 range from 13,400 vehicles per day near Pine Avenue in south Chino to 32,300 per day at the confluence of SR-60.

Riverside Freeway (SR-91) is the most heavily traveled route in Riverside County, with an ADT of 150,000 (in 1990). Widening projects, development of carpool lanes, and interchange improvements have taken place since then, including toll roads.

Euclid Avenue (SR-83) is a roadway which traverses the program area in a north-south direction from the southern portion of the City of Chino through the City of Ontario and up into the northern portion of the City of Upland. In the City of Chino, Euclid Avenue is designated as an expressway with eight travel lanes under the proposed Master Plan of Arterials. The City of Ontario identifies this roadway as a divided arterial accommodating four to sic lanes of traffic with a median. The City of Upland categorizes the roadway as a major arterial and includes a wide landscaped median with six lanes south of Foothill Boulevard and four traffic lanes north of Foothill Boulevard. The projected ADT volume on Euclid Avenue ranges from 12,500 vehicles per day in the City of Chino to 34,500 vehicles per day north of I-10 in the City of Upland by the year 2010.

There are local roads that could be affected by the program for the construction of the recycled water pipeline from the RIX facility westward to the RP-3 facility of IEUA, depending on the route selected. They are all considered to be arterials, which are larger streets with multiple lanes in each direction with direct access to adjacent properties. They are described as follows:

Agua Mansa Road is a two-lane east-west arterial in the City of Colton, on the border with the City of Rialto. The estimated traffic count for buildout conditions, on this road east of Riverside is 12,275 ADT and west of Riverside Ave. 4,952 ADT (Rialto General Plan Update 1991).

Riverside Avenue is a north-south arterial of four lanes. The sections potentially affected by the proposed pipeline are located in Colton and Rialto. The main portion of this avenue, north of the I-10, had an ADT of 16,000 to 18,000. It was considered to have a capacity of 30,000 (Rialto General Plan Update 1991). The estimated traffic count at buildout for that portion in Rialto south of the I-10 was 29,703 ADT, and for that portion in Rialto north of I-10 was 43,675 ADT.

Jurupa Avenue is an east-west arterial of two to four lanes. Those sections potentially affected are located in Rialto and Fontana. The ADT ranged from 790 in Rialto to 1,200 in Bloomington (1987 Rialto data). The estimated ADT at buildout for the Rialto portion is 1,790.

Slover Avenue is classified as a major highway, with two to four lanes. It extended east-west in Rialto and Fontana, paralleling and south of the I-10. The ADT ranged from 1,900 to 5,533 in the Rialto section (1987 Rialto data). The capacity was identified as 12,000 vehicles per day.

The forecasting of traffic volumes is necessary for presenting a global picture of traffic flow, evaluating traffic trends, and planning and designing highways. A more localized method to determine traffic flow is based on a level of service (LOS) approach. Traffic flow is measured by the number of vehicles that can pass over a given section of road in a given time period, particularly through constrictions, such as intersections with stop signs or traffic signals. The LOS on a roadway varies between LOS "A," unrestricted traffic flow, to forced flow conditions with high approach delays. The definitions of LOS for uninterrupted flow (flow unrestrained by the existence of traffic control devices) are:

- LOS "A," representing free flow where individual users are virtually unaffected by the presence of others in the traffic stream.

- LOS "B," in the range of stable flow, but where the presence of other users in the traffic stream begins to be noticeable. Here the freedom to select desired speeds is relatively unaffected but there is a slight decline in the freedom to maneuver.

- LOS "C," in the range of stable flow, but where the operation of individual users becomes significantly affected by intersections with others in the traffic stream.

- LOS "D," representing high-density but stable flow where speed and freedom to maneuver are severely restricted and the driver experiences a generally poor level of comfort and convenience.

- LOS "E," representing operating conditions at or near the capacity level where all speeds are reduced to a low, but relatively uniform value. Small increases in flow will cause breakdowns in traffic movement.

- LOS "F," which defines forced or breakdown flow. This condition exists wherever the amount of traffic approaching a point exceeds the amount that can traverse the point. Queues form behind such locations.

For San Bernardino County areas, the Congestion Management Plan (SANBAG, 1992) identified road segments and intersections that were found to be at LOS "F". In terms of intersections, Cherry Avenue at Slover Avenue (in the City of Fontana) was listed. This intersection is to the west of the proposed pipeline alignment along Slover Avenue. The segments of Slover and Jurupa near Beech Avenue (RP-3 area) were rated as LOS "A-B", as well as segments to the east. Riverside Avenue was rated LOS "A" between Slover and Jurupa. It was rated LOS "D" in some sections north of the I-10.

4.6.3 Environmental Impacts

4.6.3.1 Significance Criteria/Thresholds of Significance

The following criteria will be used as the thresholds of significance in this evaluation of traffic and circulation for the recycled water sales program, based on CEQA guidelines.

1. Will the project cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?

2. Will the project exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?

3. Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

4. Substantially increase hazards due to a design feature (i.e., sharp curves or dangerous intersections) or incompatible uses (i.e., farm equipment)?

5. Will the project result in inadequate emergency access?

6. Will the project result in inadequate parking capacity?

7. Will the project conflict with adopted policies, plans, or programs supporting alternative transportation (i.e., bus turnouts, bicycle racks)?

Additionally, the San Bernardino County Congestion Management Plan (SANBAG, 1992) specified thresholds for project effects on LOS levels for road segments and intersections as: (1) dropping below an adopted LOS standard, or if the current LOS is "F" and a project increases the LOS by 10 percent or more, then a deficiency is seen to exist, which must be remedied by physical improvements or management strategies. Generally, the adopted LOS standards throughout San Bernardino County are "C" or "D", although LOS "E" at peak hour may be acceptable under certain circumstances.

4.6.3.2 Impacts Analysis

a. Will the project cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?

As described in the Air Quality impacts section of this chapter, Section 4.5, the program will generate some construction traffic and operational traffic. It was estimated that 16 to 20 construction workers would be needed for pipeline installation, extraction well development, and pump station construction. This would generate 20 commuting roundtrips per day. Daily vehicle trips for diesel trucks are anticipated to be 5 to 10 during construction for wells and pump stations and 5 to 6 truckloads per day for pipeline emplacement. It was estimated that less than 10 truck trips per day would be needed during operations. A conservative estimation of 10 employees having 2 commuting roundtrips per day, totaling 20 commuting roundtrips, was also projected for facility maintenance and operations.

Generally, the program area is extensively developed with residential, commercial and industrial uses that already contain routes with substantial traffic. The existing circulation system experiences certain levels of use, based on existing levels of development and the role which certain roads (I-10, I-15, SR-60 and SR-91) play in regional and interstate travel and commerce. The General Plans of the counties and local jurisdictions involved all identify a circulation system designed to meet the build-out traffic generation. The General Plan EIRs have concluded that local circulation systems, with planned improvements, will be adequate to meet the forecast traffic volumes without any significant adverse circulation system impacts.

Each jurisdiction has a capital improvement program in place to address these improvements, such that when an individual construction project occurs in the future, any existing deficiencies in an affected route may have already been corrected. The project, then, may not be required to provide any mitigation because of the small volume of traffic associated with both the construction and operation stages of the proposed project activities. Future initial studies prepared in accordance with the PEIR requirements contained in Section 15168 of the State CEQA Guidelines can document the status of road improvements, which may eliminate the need for mitigation or define the need for additional mitigation, dependent upon the timeframe of the project. With implementation of project-specific road improvements in accordance with local agency or county General Plan requirements, no significant circulation system impacts are forecast to occur.

Regarding the proposed pipeline from the RIX facility to RP-3, the potentially affected roads (Agua Mansa, Riverside Avenue, Jurupa Avenue and Slover Avenue) can handle traffic volumes or capacities much greater than the traffic to be generated for construction. Jurupa Avenue would be considered the most sensitive, or the least traveled of these routes. Traffic would temporarily increase up to 4 percent of anticipated levels of traffic or road capacity. For Agua Mansa, Riverside and Slover, the traffic increases would be less than one percent. Thus, no adverse traffic impact is anticipated for traffic volumes. Impacts along the local streets would also include a temporary disruption of traffic flow, for trenching activities. A traffic plan would specify some redirection in order to bypass or manage traffic through construction areas and to restore normal traffic flows upon completion.

b. Will the project exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?

The construction and operational activities described more thoroughly in the Air Quality section of this chapter (Section 4.5) will generate a small amount of traffic that should not adversely affect present levels of service. Locations or facilities such as pumps stations and recharge basins could also result in localized construction interference with traffic. Project-specific traffic plans will be developed to minimize impacts and restore normal circulation once construction is completed.

In terms of the proposed pipeline route, the worst intersection (at LOS "F") identified in the immediate area is Slover Avenue and Cherry Avenue, which is located to the west and not on the proposed pipeline alignment. Other segments and intersections were all rated at LOS "A" or "B". A traffic plan will be implemented to minimize impacts to local roads and highways during these construction activities.

c. Will the project result in a change in rail, waterborne or air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

The proposed program has no potential to adversely impact waterborne traffic, since such a transportation system does not occur in the program area. The program is not anticipated to conflict with rail or air service to existing facilities.

d. Will the project substantially increase hazards due to a design feature (e.g. sharp curves or dangerous intersections) or incompatible uses (e.g. farm equipment)?

During short-term construction projects to install pipelines and construct facilities, the program has a potential to create construction traffic hazards for pedestrians or bicyclists, as well as for vehicles. However, these impacts are temporary. Mitigation is proposed to reduce potential hazards to a non-significant level of impact. No incompatible uses should be created by the program.

e. Will the project result in inadequate emergency access?

The program may create short-term detours on roadways related to construction activities. To limit any impacts on emergency access, all affected public safety providers will be notified prior to the construction of proposed facilities and pipelines in order to determine the best means for accomplishing this. Temporary closure of a public street might be one measure. For operations, no conflicts should arise, as agencies developing the facilities must include them in their emergency operations plans, in consultation with local and regional public safety providers.

f. Will the project result in inadequate parking capacity?

The program is one that will not generate a significant amount of traffic, or require substantial parking. Construction activities will require temporary parking capacity. Also, the implementation of the program will result in certain permanent facilities that will require a minimal parking capacity for operations and maintenance activities. Each agency has its own guidelines (either through its master facilities plans or other guidance) on the number and placement of parking spaces for each type of facility, i.e., recharge basins and pump stations. Additionally, these guidelines must conform to requirements of the jurisdictions (municipal or county for the water agency's service area) in which the facilities are placed. Thus, no mitigation is necessary because provision of adequate onsite parking is already inherent to the development of facilities.

g. Will the project conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?

Implementation of the program is not seen to create conflicts with adopted policies supporting alternative transportation. The agencies developing facilities under the program have existing transportation programs (for those with more than 100 employees), which encourage and facilitate the use of alternative transportation modes. No mitigation is required.

4.6.4 Mitigation Measures

Implementation of the RIX recycled water sales program will result in several site-specific projects, which will require additional site-specific traffic surveys and mitigation measures before they can be initiated. General mitigation measures to reduce any potentially adverse impacts on circulation to a level of insignificance can be included in this program-level document, however. These can be applied to any site-specific project. They are provided as follows.

4.6.4.1 To Reduce Construction Traffic Impacts

4.6-1 For each facilities development project that will increase trip generation by more than 50 vehicles during peak hour, the implementing agency shall prepare a traffic study that evaluates the impacts of this traffic on the local circulation system and identify project-specific or fair-share mitigation to maintain peak hour level of service at LOS "E" or better.

4.6-2 The implementing agency shall require the construction contractor to provide adequate traffic management resources during construction (signing, protective devices, flag persons, etc.) to maintain the safe flow of traffic, particularly emergency access, on local streets at all times.

4.6-3 During construction, the implementing agency shall require traffic hazards for vehicles, bicycles, and pedestrians to be adequately identified and such traffic controlled to minimize hazards.

4.6-4 The implementing agency shall require the construction contractor to ensure that no open trenches or traffic safety hazards be left in roadways during period of time when construction personnel are not present (nighttime, weekends, etc.), without appropriate signing and protection to minimize hazards.

4.6-5 The implementing agency shall require all roads to be repaired adequately after construction activities to ensure that traffic can move in the same manner as before construction without damage to vehicles.

4.6.4.2 To Reduce Operational Traffic Impacts

4.6-6 The implementing agency shall emphasize transportation demand management or non-motorized transportation alternatives for specific project-related employees, to reduce demand for roadway use. If projects are not already identified in the agency's transportation management plans, they shall be included.

4.6-7 Roadway improvements to eliminate or reduce any circulation system impacts or traffic hazards, as associated with access to a permanent facility, shall be mitigated in accordance with standard agency requirements or prudent circulation system planning requirements. Strategies than can be considered for application include the following:

- ***signalization, signing and striping improvements,***
- ***additional through or turn lanes as dictated by volume,***
- ***additional storage area for vehicle queuing (i.e., right-and left-turn bays),***
- ***increasing curb radii to accommodate higher turning radius trucks,***
- ***pavement/roadbed improvements,***
- ***widening to provide sufficient land widths for trucks, and***
- ***improvements to enhance sight distances.***

4.6-8 The implementing agency shall conduct a detailed operational analysis for selected final site locations and, as necessary, develop conceptual design plans to accommodate specific facility traffic. The conceptual design plans should be oriented toward facilitating the movement of large trucks at facility driveways and nearby intersections.

4.6-9 The implementing agency shall conduct addition analyses for each facility on the availability of rights-of-way, adjacent land uses and locations of driveways, existing improvement plans, roadway cross-sections and unique characteristics or needs for each project.

4.6-10 Any facilities developed under the program that are near airports will be evaluated for maintenance of access to airports and also reduction/elimination of any hazards to airport operations. Special mitigation to ensure access and prevent hazards will be incorporated into the project design.

4.6.5 Cumulative Impact

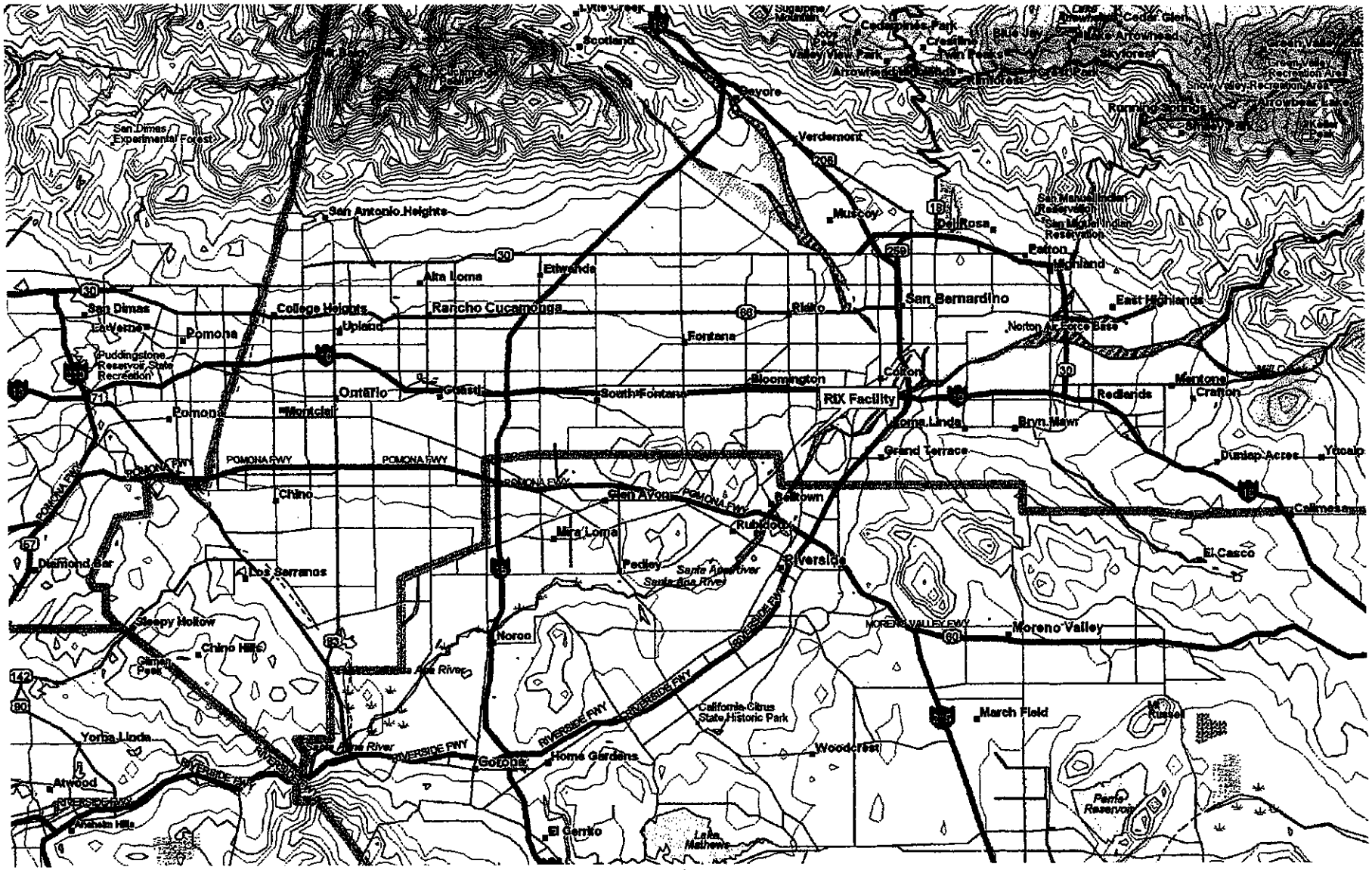
Implementation of projects under the recycled water sales program will not cause traffic generation that will be substantially different from that which is forecast to occur within the existing general plans for the affected jurisdictions or individual agency service areas. The minimal amount of new

construction or operations traffic, i.e., less than 50 trips per day, should not contribute to cumulative traffic growth.

4.6.6 Unavoidable Adverse Impact

The construction and operational traffic and circulation system impacts discussed in this subsection are not considered to be significant adverse impacts. Minor impacts, particularly those related to facility construction activities, are unavoidable and will be mitigated on a project-specific basis.

FIGURE 4.6-1
Regional Road Network



Source: Delorme XMap

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4.7 BIOLOGICAL RESOURCES

4.7.1 Introduction

This section characterizes the biological resources in the immediate vicinity of the RIX facility discharge point to the Santa Ana River, as well as downstream resources. It also addresses those resources that might be affected by construction activities related to the reuse of RIX-produced recycled water by other agencies. As specifics are unknown for the future projects, this is a more general assessment. Impacts directly or indirectly associated with the impacts of removal of water from the river discharge are analyzed, as well as potential impacts of physical construction of other facilities.

The NOP comment letters from resources agencies raised numerous concerns and issues, summarized as follows:

- Request for complete assessment of the flora and fauna within and adjacent to the project area, with particular emphasis upon identifying endangered, threatened, and locally unique species and sensitive habitats. (California Department of Fish and Game [CDFG])

- Project impacts should be analyzed relative to their effects on off-site habitats, including nearby public lands, open space, adjacent natural habitats and riparian ecosystems. (CDFG)

- A cumulative effects analysis should be developed, that includes anticipated future projects and assesses impacts on plant communities and wildlife habitats. (CDFG)

- A range of alternatives should be analyzed to ensure that alternatives to the proposed project are fully considered and evaluated. Analyses should include mitigation measures for wildlife habitat and plant community impacts, where identified. (CDFG)

- Particular emphasis for analysis should be on (1) direct impacts of diverting a substantial amount of water from the Santa Ana River and (2) impacts from the construction of infrastructure to carry to the diverted water. (CDFG)

- Specific impacts to sensitive species and riparian vegetation need to be identified, along with avoidance measures, alternative measures and mitigation. Species of concern are: the San Bernardino kangaroo rat, western yellow-billed cuckoo, Southwestern willow flycatcher, least Bell's vireo, yellow-breasted chat, Santa Ana sucker, arroyo chub, slender-horned spineflower, Delhi Sands flower-loving fly and Santa Ana River woollystar. (CDFG; U.S. Fish and Wildlife Service [USFWS])

- Specific impacts of the project on the hydrology of any and all riparian, wetlands, or alluvial scrub communities within the sphere of influence of the project. (USFWS)

- Request specific mitigation or compensation plans and impact minimization or avoidance measures to fully offset project-related impacts, including proposals for mitigating the cumulative impacts of direct and indirect habitat loss, degradation, or modification. (USFWS)

4.7.2 Environmental Setting

4.7.2.1 Santa Ana River System

Riparian Community

The RIX facility currently discharges into the Santa Ana River channel at a point approximately 1.4 miles upstream of the Riverside Avenue Bridge (Cities of Rialto and Riverside). Appendix 8.3 in this main document contains 17 aerial photos of the Santa Ana River channel extending from La Cadena in the City of Colton to Prado Dam. These are current photos (taken in spring, 2002) provided by the Santa Ana Watershed Project Authority (SAWPA). These photos show the river channel and adjacent land uses, but are the essential tool used to estimate the density of riparian vegetation within the river channel. The RIX facility and surroundings are shown on photos #16-17. The series continues downstream, from #15 down to #1, with Prado Dam being the end point. As shown on these photos, the adjoining and downstream river habitat is characterized by a meandering stream, with an extended river bottom area containing riparian vegetation and open sand. However, this section is affected by channelization activities and woody vegetation removal for flood control. Additionally, the river is constrained here by a 1,000-foot-wide flood control channel. The immediate vicinity of the RIX plant represents the upstream end of the perennially flowing portion of the River. Effluent discharges from the RIX facility and the Rialto wastewater treatment plant (refer to introductory Figure 3.1-1) provide the constant flow, which is also supplemented by rising groundwater, additional wastewater treatment plant discharges and surface runoff downstream to Prado Basin.

MBC Applied Environmental Sciences (MBC) conducted a riparian vegetation assessment downstream of the RIX facility in July 2000 (refer to Technical Appendix B). This survey consisted of a reconnaissance of a 3-mile stretch between the RIX facility outfall and the Highway 60 overpass. Four study transects were used, as well as observations. The results of this survey are summarized below. However, a more comprehensive survey was subsequently conducted in August 2002 based on an aerial survey and analysis of aerial photographs. This survey yielded area coverages of vegetation types, such that a quantitative baseline condition could be established. A summary of these findings is also presented below.

Riparian communities generally can be divided into three zones:

- An active zone closest to the stream that is most subject to disturbance from winter rain-caused flood damage. Willow and cottonwood trees characterize this zone.

- A border zone with a reliable water supply. The border zone is less subject to disruption, so larger trees with a well-developed understory and considerable plant diversity are present.

- An outer zone, or higher terraces, that are only occasionally subject to flooding but where trees such as sycamore take advantage of higher water tables found adjacent to streams.

Arundo donax, an invasive grass species, can be found in any of these zones, and based on the aerial survey, it occupies substantial areas of the channel downstream of the 60 Freeway.

Vegetation of the Santa Ana River in the immediate vicinity of the RIX exhibits all three of these typical riparian zones. In the immediate downstream reaches where the river is constrained by high levees and urban development, the outer zone is devoid of vegetation. Vegetation in the river is composed primarily of mixed willow woodland. Wetland vegetation is less abundant than willow woodland due to the natural and human disturbances. Extreme variations in precipitation from year to year subject riparian vegetation in the Santa Ana River to cycles of drought, flooding, scouring, and deposition. Severe flooding resulting from major storms in 1938, 1962 and 1969 tore out vast stands of woodland vegetation in the river. Vegetation removal and channel straightening occurred almost annually until the year 2000 (when the Santa Ana sucker became a listed threatened species).

As part of the MBC vegetation survey, 90 species of plants were identified, the most conspicuous of these being mule fat, Fremont cottonwood, willows and arundo (giant reed). Little of the willow woodland consisted of pure stands of native species, with the giant reed and tree tobacco occurring with the willows and cottonwood in the riverbed. Higher on the riverbanks, castor bean and Eucalyptus occurred with willows, cottonwoods, and tree tobacco. Mule fat occurred along the edges of the willow stands on the banks and drier locations in the riverbed. Low wetland vegetation, such as broad-leaved cattail, watercress and greater duckweed, were found adjacent to or in the water throughout the survey area. Other native and non-native annual species, such as black mustard, white sweetclover, water speedwell and 10 species of low lying grasses were found in these same areas. Refer to Techncial Appendix B for the complete listing of plants.

The type and extent of existing riparian habitat (plant communities) in the Santa Ana River channel is obviously a key element in evaluating any proposal to divert RIX recycled water flows from the river. Utilizing a digitized version of the aerial photos Wildermuth Environmental, Inc. calculated the estimated total amount of riparian habitat acreage within the Santa Ana River channel and the Prado Basin. Please refer to Appendix 8.3 which contains copies of the 17 photos used to calculate the acreage. Based on these calculations the total acreage of riparian vegetation from the RIX facility to the Riverside Narrows is 1,150 acres. Below the Narrows an estimated 6,425 acres of riparian vegetation was calculated. The estimated total area of riparian habitat calculated for the areas up- and downstream of the Narrows is 7,575 acres. All areas within the river channel supporting riparian vegetation at any density were included in this calculation. Disturbed areas within the channel, such as that shown in photos #6 and 7 of Appendix 8.3, were not included in the overall calculations. All areas with native vegetation were included in the estimate. The digitized estimate was validated during an aerial overflight of the whole channel on August 16, 2002. Based on the methodology used in compiling this estimate, we believe that the existing riparian habitat acreage estimate for the Santa Ana River channel should be accurate to within ±5% of the actual total acreage.

The Rialto and RIX treated effluent discharges appear to be the only source perennial flows between the RIX discharge point and the Riverside Narrows. Downstream of the Narrows the City of Riverside, City of Corona, and Western Municipal and Inland Empire Utilities Agency treated effluent discharges combine to support the 6,425 acres of riparian habitat. Overall discharges supplement the natural flows in the Santa Ana River which vary greatly each year, depending upon the amount of precipitation that falls during the winter precipitation season. Most importantly, the treated effluent discharges support the riparian habitat during the late-summer and fall period when natural flows are not available.

Tom Dodson & Associates' (TDA) ecologist, Ms. Lisa Kegarice, reviewed large scale aerial photos (the same as those provided in Appendix 8.3) with the goal of characterizing the density of plant cover for use in estimating the water consumption of the existing riparian habitat within the Santa Ana River channel between the RIX discharge location and the Riverside Narrows. Ms. Kegarice verified the plant communities and their densities during the aerial overflight of the project area on August 16, using the large scale maps. Videotapes of the habitat were also taken as a reference point for future estimates of density of plant cover. Sufficient random plots within the river channel between the RIX discharge point and the Riverside Narrows were carefully evaluated on the aerial photos by Ms. Kegarice to validate the estimates presented below. The following acreage estimates were developed for the 1,150 acres of riparian habitat located between the RIX Plant and Riverside Narrows.

Table 4.7-1
RIPARIAN HABITAT ASSESSMENT OF THE SANTA ANA RIVER BETWEEN THE RIX FACILITY AND RIVERSIDE NARROWS

Habitat Description/Coverage	Percent of Total Acreage	Estimated Total Acreage
Water/hydrophytes/wetland	8	~92
Riparian woodland (1-10% coverage)	20	~230
Riparian woodland (11-40% coverage)	3.5	~41
Invasive species (Arundo/Salt Cedar, 11-40% coverage)	3.5	~40
Riparian woodland (41-70% coverage)	10.8	~124
Invasive species (Arundo/Salt Cedar, 41-70% coverage)	12	~138
Riparian woodland (71-100% coverage)	16.2	~186
Invasive species (Arundo/Salt Cedar, 71-100% coverage)	26	~299
Totals	100	1,150

This summary illustrates the remarkable extent to which *Arundo donax* has invaded the Santa Ana River channel upstream of the Riverside Narrows.

Faunal Resources

Vertebrates and insects were also recorded during the MBC riparian vegetation survey (refer to lists in Technical Appendix B). Birds were the most abundant of the wildlife species. These included: red-winged blackbird, great blue heron, red-tailed hawk, great egret, killdeer, rock dove, American crow, black phoebe, violet-green swallow and mourning dove. Mammals observed were the

California ground squirrel, desert cottontail and jackrabbit. Amphibians and reptiles included the bullfrog, western fence lizard, and side-blotched lizard. Insects were highly abundant throughout the survey area, including: true bugs, dragonflies, damselflies, grasshoppers, lacewings, butterflies, true flies, beetles, ants, wasps, and bees. All insects observed, excepting ants and antlions, were found in association with river water or river vegetation.

In terms of fisheries, sampling by Chadwick Ecological Consultants, Inc. (CEC) and others indicate that there are only two native fish species in the Santa Ana River section from the RIX discharge point downstream to the MWD pipeline crossing. These are the Santa Ana sucker (*Catostomus santaanae*) and the state-listed arroyo chub (*Gila orcutti*), which are federal and state-protected species. Historically (i.e., prior to construction of the RIX facility) Santa Ana suckers were rare to absent upstream of the MWD crossing, but abundant at this location (C&A, 1992). Recent quantitative data in this reach is lacking, since use of electrofishing equipment in the Santa Ana River has been severely restricted by the U.S. Fish and Wildlife Service since 1998. Electrofishing data by CEC in 1998 (CEC unpublished data), by USGS in 1999, 2000 and 2001 (Saiki, 2000; USGS unpublished data) indicate that this reach has become a stronghold for the Santa Ana sucker. The arroyo chub was the most abundant species at Riverside Avenue downstream of the RIX facility and the second most abundant species at the MWD crossing (USGS unpublished data, 2001). Refer to Technical Appendix C, which contains presentation handouts of CEC population studies of the Santa Ana sucker.

Besides these two native species, several introduced species are present in the reach, as shown in Table 4.7-2. Near the RIX facility (Riverside Avenue), the most current electrofishing data indicated that tilapia, mosquitofish, and fathead minnow were the only other species present (CEC and USGS unpublished data). Near the MWD crossing, the number of introduced species is much higher, probably reflecting historically more consistent flows and habitat quality in this reach. Six additional species have been documented at this site, including green sunfish, largemouth bass, yellow and black bullhead, common carp, and sailfin molly (CEC and USGS unpublished data). These data suggest that conditions at the MWD crossing continues to be more conducive to the establishment of introduced species than the section upstream to the RIX facility.

Table 4.7-2
FISH SPECIES COLLECTED IN THE SANTA ANA RIVER FROM RIX FACILITY OUTFALL DOWNSTREAM TO MWD PIPELINE CROSSING

Scientific Group and Name	Common Name
Cyprinidae (carps and minnows) *Cyprinus carpio* *Gila orcuttis* *Pimephales promelas*	Carps and Minnows Common carp Arroyo chub Fathead minnow
Catostomidae (suckers) *Catostomus santaanae*	Suckers Santa Ana sucker
Ictaluridae (bullhead catfishes) *Ameriurus melas* *meiurus natalis*	Bullhead Catfishes Black bullhead Yellow bullhead
Poeciliidae (livebearers) *Gambusia affinis* *Poecilia latipinna*	Livebearers Western mosquitofish Sailfin molly
Centrarchidae (sunfishes) *Lepomis cyanellus* *Micropterus salmoides*	Sunfishes Green sunfish Largemouth bass
Cichlidae (cichlids) *Tilapia* spp.	Cichlids Mozambique and/or redbelly tilapia

Source: Chadwick Environmental Consultants, Inc. data; USGS data.

4.7.2.2 Other Areas

Facilities related to the implementation of the project (pipelines, pump stations, and recharge basins) could affect upland or riparian habitat at locations other than the Santa Ana River. The project's area of potential impact is a widespread area that is highly urbanized, but also contains many sensitive plant communities and wildlife habitat. The information which follows is summarized from profiles contained in the Draft Western Riverside County Multispecies Habitat Conservation Plan (Dudek and Associates, October 2000) and the San Bernardino County General Plan Biological Resources Report (San Bernardino County, March 1989). The key biological resources in Riverside, San Bernardino, and Orange counties are described briefly as follows.

- **Alluvial Scrub –** Alluvial scrub is found on coarse-particled riverwash soils near flood channels or in areas that are frequently flooded and also upon deeper and more fine-textured Soboba soils at high elevations on flood plain terraces. It is intermediate between chaparral and coastal sage scrub and shares many of the same species. It is dominated by scale-broom, which is regarded as a specific indicator of Riversidian alluvial scrub. It is typically composed of white sage, redberry, flat-top buckwheat, our lord's candle, California croton, cholla, tarragon, yerba santa, mule fat and mountain-mahogany. There are two sensitive plant species endemic to this habitat type: the slender-horned spineflower and the Santa Ana River woolly-star.

- **Chaparral –** Chaparral is the most widespread of vegetation types in southern California. There are several different chaparral subtypes occurring in the region, extending from the Pacific coast to the mountain foothills (0-6,000 foot elevation). Three subtypes are predominantly in the project area: southern mixed chaparral, chamise chaparral, and scrub oak chaparral. Southern mixed chaparral is composed of broad-leaved evergreen sclerophyllous shrubs that grow to 8 to 12 feet tall and form dense stands. The plants of this association are typically deep-rooted shrub species that include chamise, toyon and lemonadeberry. This habitat occurs on dry, rocky and often steep north-facing slopes with little soil. Chamise chaparral is dominated by chamise. This habitat occurs on shallower, drier soils at somewhat lower elevations than mixed chaparral. Scrub oak chaparral is a dense evergreen association that is dominated by scrub oak, but also can have eastwood manzanita, toyon, mountain mahogany, poison oak and narrow leaf bedstraw. Chaparral is not a necessary habitat to identified sensitive species, but can support foraging by such species as the San Bernardino kangaroo rat, Los Angeles pocket mouse, and San Diego horned lizard.

- **Coastal Sage Scrub –** Coastal sage scrub is composed of low-growing, aromatic drought-deciduous shrubs. It is found on xeric sites, particularly steep, south-facing slopes with thin and/or rocky soils. California sagebrush, California buckwheat, California encelia and several species of sage are common. The subtype found generally in the Santa Ana watershed is that of the Riversidean alluvial sage scrub, previously discussed as alluvial scrub. Diegan coastal sage scrub is found south of the Santa Ana River and east of the Santa Ana Mountains, and southwest of Temecula and Santa Rosa areas. Coastal sage scrub supports many protected plant and animal species. It is considered the obligate habitat of the California gnatcatcher. Others are slender-horned spineflower, Santa Ana River woolly star, Nevin's barberry, Stephens and San Bernardino kangaroo rats, and the Los Angeles pocket mouse.

- **Deciduous Woodland –** California walnut woodland is a specialized woodland habitat restricted to the Chino Hills and Etiwanda area within the Valley region. It occurs among rocky outcrops in canyon areas, often mixing with canyon live oak, Engelmann oak, sugar bush and squaw bush. It is considered a sensitive habitat due to its small acreage and limited distribution. Generally, southern California oak woodlands may include live oak, Engelmann oak, canyon live oak, coast live oak, and scrub oak. The Engelmann oaks predominate in drier areas, and this tree occurs only in San Diego Riverside, Orange and Los Angeles counties in the United States. Coast live oak is found on moister slopes, with many shade-tolerant understory species. Riparian forest and woodland areas consist of one or more deciduous tree species with an assorted understory of shrubs and herbs. Southern cottonwood/willow riparian forest is dominated by cottonwood and willow trees, with understory species of mugwort, stinging nettle and wild cucumber. The largest area occurs along the Santa Ana River drainage from Lake Evans to beyond the Prado Basin. This riparian complex supports numerous sensitive species, particularly the birds least Bell's vireo and southwestern willow flycatcher. Along seasonally flooded banks with drier riparian zones, southern sycamore/ alder woodland can be found.

- **Wetlands –** Emergent marshes, open water and vernal pools are the three types of wetland areas found in the region that are of importance, due to their limited extent, wildlife values and support of rare plant and animal species. Freshwater marshes are dominated by perennial monocots of cattails, spike rushes, bulrush, flatsedges, smartweed, watercress, and

yerba mansa. Open water contains rooted aquatic plants such as pennywort, water smartweed, pondweeds and water-parsley and floating plants such as duckweed, water buttercup, and mosquito fern. Vernal pools have many protected plants, including California Orcutt grass, little mousetail, thread-leaved brodiaea, Coulter's goldfields, spreading and low navarretia, and the invertebrate, the Riverside fairy shrimp.

A final habitat type of significance is one that is dependent upon underlying soil and sediment rather than on a plant community. Delhi sand soils have evolved on former sand dune complexes. These sand dune complexes, and some adjacent sandy soils (such as the Tujunga soil series) can support the Delhi sands giant flower-loving fly, which is listed as a federal endangered species and described in more detail in the following section. These soils types can be found in Jurupa Hills, Rubidoux, and west and south of Highway 60 (Western Riverside County Soils Survey). The fly is considered to be endemic to that portion identified as the "Colton Dunes."

4.7.2.3 Sensitive Species

The Natural Diversity Database (NDDB) was reviewed for records of sensitive plant or animal species and plant communities occurring in the project area encompassing the upper Santa Ana River mainstem (San Bernardino downstream to Prado Dam). Results are included in Appendix 8.4. Fifty-seven plants, animals and plant community types were listed. For this area, the following USGS 7.5' topographic quadrangle maps were used: San Bernardino South, Fontana, Riverside West, Corona North, Corona South and Prado Dam. For other areas, the records for many additional quadrants in San Bernardino, Riverside and Orange Counties might be applicable. There will be a need to review these as project-specific locations are identified that fall outside the above USGS maps. However, it is expected that the list will be similar to the one included in this document.

In order to focus on sensitive species at this time, the nine species identified as being of concern to the resources agencies are addressed as follows. Most of these species are associated with the riparian areas in the potentially affected reaches of the Santa Ana River system. The following species descriptions are taken from accounts prepared in conjunction with the Western Riverside County Multiple Species Habitat Conservation Plan (http://ecoregion.ucr.edu/dudek) and other sources.

Slender-horned Spineflower (*Dodecahema leptoleras*) – Protected as an endangered species at both the state and federal levels, this spring-blooming annual is typically associated with sandy soil in mature alluvial scrub. Studies suggest that the ideal habitat is a terrace or bench that receives overbank deposits every 50 to 100 years. Only eight areas are known to support the slender-horned spineflower, including two in San Bernardino County associated with the Santa Ana River and Cajon Creek. The plant is only readily detectable in the spring between April and June when it is in bloom. Population size varies significantly from year to year, depending upon rainfall. Seed dispersal may occur by floodwater, wind, or animals. Flood control, mining, urbanization, and off-road vehicle use are recognized as threats to this species.

Santa Ana River Woollystar (*Eriastrum densifolium* ssp. *sanctorum*) – Also listed as endangered under both the state and federal endangered species acts, the woollystar is found in open washes and alluvial fan sage scrub on open slopes above main watercourses

where flooding and scouring occur at a frequency that maintains a conditions of open shrubland. The species occurs along the Santa Ana River and Cajon and Lytle Creeks, and the Santa Ana River downstream into the Santa Ana Canyon. Plants bloom from June to August, with sticky seeds primarily lodging within five feet of the parent plant. Longer seed dispersal is presumed to depend upon flood events. The average life span of this perennial is five years. Floodplain modification for flood control and development, mining, off-road vehicles, and competition from non-native species are identified as threats to the species.

Santa Ana Sucker (*Catostomus santaanae*) – This fish species is listed as a federal threatened species and as a California species of special concern. The Santa Ana sucker is known from the Santa Ana River, the headwaters of the San Gabriel River, and the Los Angeles River. The sucker is also found in the Santa Clara River, where it was probably introduced. The Santa Ana River population is associated with the main river channel and several tributaries, with a noted concentration found from the Rialto Drain to Sunnyslope Creek. This section of the river has a greater extent of gravel, cobble and rock bottom that is the preferred substrate for this species than reaches further downstream. Based upon the distribution of larval and juvenile fishes found for recent seasons, this portion of the river supports spawning. Spawning peaks between late May and early June, but can occur from March until early July. Larvae and young appear to prefer the stream margins, with water depths of six inches or less, moving into deeper water, preferably with cobble and/or gravel substrate, as they mature. Adults are associated with deep holes or pools of 18-50 inches deep that form at bridge abutments, large clumps of Arundo or willows, or similar obstacles that favor pool formation. Electrofishing data also indicated that suckers are found in runs, where they are probably feeding. Cobble and/or gravel substrate with clear water are conducive to the growth of diatoms and algae, which are important for feeding. Reproductive characteristics of this species (large number of eggs, short generation time, prolonged spawning period) are adapted for recolonization following drastic population declines after periods of severe drought or large flood events. The primary threats to the species have been identified as watershed changes that affect stream flow and water quality (turbidity, dissolved oxygen, pathogens and toxins), dams and similar barriers that restrict migration, and exotic fish species (introduced predator or competitor species). Recent studies of the Santa Ana River population suggest that lack of breeding habitat and predation may be the limiting factors locally, but that water quality is not a factor in this river system.

Least Bell's Vireo (*Vireo bellii pusillus*) – This migratory songbird is listed as endangered at both the state and federal levels. Spending the winter in southern Baja, the distribution during the breeding season covers much of southern California. The largest population is associated with the Santa Margarita River in San Diego County, with the Prado Basin population in the Santa Ana River system being the second largest (increase from 19 pairs in 1985 to 270 pairs in 1998). Birds typically arrive from the wintering grounds in late March and depart by the end of August. Preferred nesting and foraging area are in riverine riparian habitat with a layered canopy and well-developed understory vegetation. Vireos will also forage in adjoining non-riparian habitat, and will nest there on occasion. Breeding territories are thought to average from one to three acres in area. It was previously thought that birds returned to the same location from year to year, however, recent data suggest that more study of this is needed. Dispersal of young similarly requires further study-unpublished data cites by the USFWS suggest that up to 20 percent of the young disperse outside of the drainage system in which they were raised. The regional population in Prado Basin is increasing, but remains

endangered due to threats associated with the loss of riparian habitat and parasitism by brown-headed cowbirds. Critical habitat has been designated for this species, with designated habitat extending along the Santa Ana River from Prado Basin upstream to Tequesquite Landfill in the City of Riverside (approximately 6 miles downstream of the RIX facility).

Southwestern Willow Flycatcher (*Empidonax traicii extimus*) – This species is protected at both the state and federal levels. The local distribution is restricted generally to the Prado Basin, with three to five breeding territories recorded in this area. The species is associated with riparian woodlands along streams and rivers. Preferred nesting locations have surface water nearby. This is a migratory species that winters in Mexico, with wintering grounds extending further south to Central America, and perhaps, northern South America. Birds arrive in southern California at the end of April and depart by early September. Migrating flycatchers of other subspecies are known in the region. Protection is extended only to breeding individuals. Approximately 25 percent of adults return to their territory from the previous year; at least 20 percent of juveniles return to a location within one or two miles of their natal territory. Territory size ranges from about one-half acre to one acre, with a larger surrounding home range. The primary threats to this species are loss of riparian habitat and brood parasitism by brown-headed cowbirds. Critical habitat for the southwestern willow flycatcher corresponds to that for the least Bell's vireo, incorporating Prado Basin and the Santa Ana River upstream to the Tequesquite Landfill, including areas with surface water and adjacent riparian vegetation within 100 meters of the water. Due to the extremely specialized habitat requirements exhibited by this species, the USFWS considers all know populations or locations to be critical to the survival of the species.

Western Yellow-billed Cuckoo (*Coccyzus americanus occidentalis*) – This bird is a California endangered species, a federal species of management concern (in Region 1), and a candidate for listing as a federally endangered species. This migrant is an inhabitant of extensive riparian forests. Breeding sites are restricted to river bottoms and similar habitat where humidity is high and where dense understory abuts slow-moving watercourses, backwaters or seeps. Only a handful of small populations remain in California, including one associated with Prado Basin and adjacent Riverside County reach of the Santa Ana River. This Prado population is estimated at five pairs. The major continuing threat is considered to be habitat destruction.

Arroyo Chub (*Gila orcutti*) – This is a California species of special concern. This fish prefers slow-moving, backwater streams with sand or mud beds. The species is common at three localities within its native range, namely the upper Santa Margarita River, Trabuco Creek, and Malibu Creek. Limited numbers of the chub have also been found in Pacoima Creek, the Sepulveda Flood Control Basin, the Los Angeles River drainage, upper San Gabriel River drainage, and middle Santa Ana River tributaries between Riverside and the Orange County line. The arroyo chub was found to be fairly common at MWD crossing upstream to the RIX facility and in Sunnyslope during the last electrofishing sampling (USGS data) and in Temescal Creek (C&A, 1992). The species is threatened by the introduction of non-native species and watershed changes such as stream channelization, sand and gravel mining, and flood control activities that alter its low-gradient stream habitat.

Yellow-breasted Chat (*Icteria virens longicauda*) – This is a California species of special concern and a federal species of management concern (in Region 1). This bird nests in dense riparian habitat within stream, swampy ground and the borders of small ponds. The yellow-breasted chat is an uncommon summer resident and migrant in coastal California, usually arriving in April and departing by late September. Important populations include a large concentration in Prado Basin and contiguous reaches of the Santa Ana River. As with the other riparian birds, loss of habitat and cowbird parasitism are considered to be the primary factors in the species' decline.

San Bernardino Kangaroo Rat (*Dipodomys Merriam parvus*) – This subspecies of the most widespread kangaroo rat species in the state occurred historically in a range extending from the San Bernardino Valley south to Menifee Valley. Only a few known populations remain, including those in locations along the Santa Ana River, Cajon Creek, Lytle Creek and City Creek. It prefers soils of sandy loam on alluvial fans and floodplains with open to moderately shrubby vegetation. Intermediate sage scrub patches on less-frequently flooded terraces within the floodplain are suspected to provide the best habitat for this species. Cycles of flooding and dry periods resulting in dynamic fluctuations of habitat are probably crucial for this species. Listed as a federal endangered species in 1998, it is estimated that 98% of the species potential habitat has been lost due to flood control improvements, agriculture, and urban development.

Delhi Sands Flower-loving Fly (*Rhaphiomidas terminatus abdominalis*) – This species is a federally-listed endangered species. It is linked to fine, sandy soils often with wholly or partly consolidated dunes referred to as the Delhi Series in San Bernardino and Riverside counties. The fly in endemic to the Colton Dunes, which once covered more than 40 square miles. All known extant populations now occur within an 8 to 11 mile radius straddling Interstate 10 in the vicinity of Colton and Rialto in San Bernardino county and in the vicinity of Mira Loma, Jurupa and Aqua Mansa in Riverside county. The Delhi series soils extend east-west along Highway 60 in Riverside County. The fly is found in relatively intact, open, sparse native habitats with less than 50 percent vegetative cover, associated with desert sand-verbenas. The adult fly has a long proboscis for extracting nectar from flowers, such as from California buckwheat. It is unknown what the larval stages feed on. Adults can only be found on the surface during late summer. Larvae are present in soils year-round. The larval stage may last 2 years. Reproduction occurs in August and September, when adults emerge from pupae and take flight. Eggs are deposited in the sand. The major threat to the species is habitat loss. All known remaining populations are found in small isolated habitat patches surrounded by incompatible land uses. Other threats are considered to be urban development, agricultural uses, sand mining, invasion by exotic species and off-road vehicles.

4.7.3 Environmental Impacts

Impacts to biological resources are considered to be significant according to CEQA Guidelines (§15064 and Appendix G) if the direct, indirect or cumulative effects of the proposed project:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS?

- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the CDFG or USFWS?

- Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption or other means?

- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

a. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Fame or U.S. Fish and Wildlife Service?

The riparian vegetation assessment conducted by MBC Applied Environmental Sciences in 2000 (refer to Technical Appendix B) included some discussion of least Bell's vireo. None of these birds or other sensitive species was present during the field survey. Potential least Bell's vireo habitat was evaluated. While none of the study area contained appropriate vegetation for this species according to MBC (i.e. a dense understory of herbaceous and shrubby plants within or next to willow woodland), conditions exist to support the vireo from the RIX facility downstream to Prado Dam. The vireo is known to occur within this riparian corridor along the Santa Ana River, particularly within the Prado Basin behind the Dam. For purpose of this analysis, it is assumed that the vireo will inhabit the reach downstream of RIX to the Riverside Narrows.

From the information available so far for the proposed project, the diversion of water from the Santa Ana River does not present potential for significant impacts to the sensitive species spineflower, the woollystar, or the San Bernardino Kangaroo rat. These species are all associated with the broader Santa Ana River wash and tributaries, particularly upstream of the I-10/I-215 Interchange. Critical habitat, foraging and breeding characteristics of these species are independent of the typical stream flows and riparian vegetation. The two native fish species, however, will potentially be affected and are discussed further below.

Santa Ana Sucker

The biology of the Santa Ana sucker (*Catostomus santaanae*) is not that well known at this time, particularly in terms of specific habitat requirements, population cycles, and breeding. It is generally agreed that the preferred substrate of the Santa Ana Sucker is gravel and cobble and that these are necessary for successful spawning. The streams where the species is found are subject to periodic and major flooding events, which result in drastic reductions in all fish populations, as well as other aquatic species. The sucker is adapted to take advantage of these events, with high

reproductive rates, short generation times, and a prolonged spawning period. In other words, suckers can repopulate an area quickly after catastrophic flooding events. Suckers become mature during their second summer and spawn between mid-March through May. Females can produce 4,400 to 16,000 eggs at a time. Detritus, algae and diatoms make up 98 percent of the diet in younger fish, with aquatic insects becoming more significant as they reach one year.

The species has declined in its range, which is four river systems in the Los Angeles area, due to changes in the overall hydrologic system, particularly in the reduction of natural variability (flooding events) and physical alterations in channels. Dams and reservoirs, as well as effluent flows, have made the environment more stable such that introduced fish can survive. Green sunfish and largemouth bass, for example, are found in southern California reservoirs. These are predators of the sucker. Physical alterations have blocked sucker movements from tributaries to main channels. Cattle are also a major threat to the species, by reducing water quality and degrading riparian areas. Refer to the species account included in Technical Appendix D, taken from the Western Riverside County MSHCP, for more detailed information on the above.

Regarding specific impacts of the proposed action (reduction of flows into the river from the RIX facility), the lowest flows shown to support the sucker are 10 to 20 cfs, based on data from Haines Creek in lower Big Tujunga Wash, which supports a reproducing Santa Ana Sucker population and has low flows in this range (Swift, 2001; Technical Appendix E). However, physical attributes of the Santa Ana River and Haines Creek are substantially different, such that 10 to 20 cfs should not, at this time, be considered an appropriate minimum flow for this section of the Santa Ana River. A flow analysis was done for this PEIR, contained in Appendix 8.2, SAR Average Monthly Flows. This analysis was discussed in Hydrology/Water Quality section 4.4 of this document, but is presented more fully here in the context of biological resources. The data show river flows for the years 1990-1995, or pre-RIX operations, and from 1996-2002, for three key USGS gauging stations. “E” Street at San Bernardino, Station No. 11059300, is the upstream reference point; MWD Crossing (at the Riverside Narrows), Station No. 11066460, is downstream of the Rialto drain (containing Rialto WRP flows as well as runoff) and RIX; and Below Prado Dam, Station No. 11074000, is further downstream. Prior to RIX, the MWD gauge was downstream of San Bernardino WRP and Colton WRP discharge points. The effluent flows are also given for RIX, Rialto, Colton, SBWRP and Riverside facilities. Comparisons show the percentages of effluent to total river flows at the two downstream gauging stations. Generally, prior to RIX, the combination of San Bernardino WRP and Colton WRP effluent flows would be equivalent to RIX, which now is comprised of flows from both of these facilities and additional water from groundwater extraction. The section of the river from RIX downstream to MWD Crossing is the focus of the analysis, as an important area for the Santa Ana sucker, but information is also shown downstream to below Prado Dam in order to show the relative flows from the different facilities.

Key data from Appendix 8.2 are shown as follows in Table 4.7-3. Annual data indicate that RIX average monthly flows ranged from 54.87 to 79.83 cfs (1996-2001), whereas flows from Colton and SBWRP combined ranged from 37.33 to 48.42 cfs (1990-1995). Generally, the increases from 1996-2001 reflect human population growth in the region, with increasing water consumption and subsequent wastewater discharge. RIX flows comprised anywhere from 5.4 to 85.5 percent of the total flows measured at MWD Crossing and from 2.62 to 34.5 percent of the total flows measured at below Prado Dam. In comparison, Colton and SBWRP combined were 2.53 to 31.8 percent at MWD Crossing and 1.93 to 37.7 percent at below Prado Dam.

It is apparent that flows from these facilities comprise the majority of total flows at MWD Crossing, but less so below Prado Dam. The change from SBWRP and Colton facilities to RIX has generally increased the amount of water in the river reaching MWD Crossing and reduced the percentage variation somewhat. Pre-RIX and post-RIX contributions, in terms of percentage of total flows, are similar below Prado Dam.

The Rialto facility could be considered a stable input, ranging from 8 to 11 cfs from 1990 to the present, affecting the downstream MWD Crossing at typically less than 5 percent of the total river flow for these years. The Riverside facility has similarly contributed 40 to 50 cfs to the river for these years, affecting the Prado Dam flows at approximately an overall 20 percent. Also, there is a contribution of rising groundwater that enters Riverside Narrows and which can be seen at MWD crossing gauge.

Thus, the flow reductions to occur from the proposed action, i.e., up to a 30-35 cfs reduction, could be assessed in light of recent trends (1990-2001) as bringing flows back to pre-RIX conditions at MWD Crossing and having little effect below Prado Dam. Flows were present prior to RIX facility operations, but poor water quality limited the use of this reach of the river by suckers (Risk Sciences et al., 1992). The flow of 10 to 20 cfs would still be met for supporting sucker populations, although it must be qualified again that this has not been determined to be a "minimum" flow requirement in the Santa Ana River system. As far as impacts on the sucker, there were substantial populations in the river pre-RIX. The limiting factor appears to have been water quality, not water flows, for these populations. Although the RIX flows have been considered a general benefit to the sucker, there is no evidence that reduced flows would be detrimental. Refer to Technical Appendix C, which contains presentation handouts of population studies of the sucker, both pre-RIX and post-RIX, as conducted by CEC, Inc.

Table 4.7-3
SUMMARY OF SANTA ANA RIVER AVERAGE MONTHLY FLOWS

Time Period and Facility	Range of Effluent Flows in cfs	Range of Flows as % of Total Flows at MWD Crossing (USGS Sta. No. 11066460)	Range of Flows as % of Total Flows at Below Prado Dam (USGS Sta. No. 11074000)
RIX Ops			
Annual RIX			
2001	57.64 - 76.98	26.3 - 87.2	10.4 - 34.5
2000	59.36 - 79.83	27.8 - 86.9	9.97 - 33.9
1999	62.43 - 73.42	49.9 - 83.1	19 -36.2
1998	60.9 - 76.64	5.4 - 64.96	2.62 - 26.8
1997	55.89 - 71.33	10.6 - 85.5	8.4 - 31.1
1996 (partial yr.)	54.87 - 64.95	28.3 - 77.2	13.6 - 36
RIX Ops			
Wet Season RIX (Nov-Apr)			
2001	61.67 - 76.98	26.3 - 63.3	10.4 - 27.2
2000	61.16 - 79.83	27.8 - 79	9.97 - 31.8
1999	62.36 - 65.93	49.9 - 78.3	19 - 31.4
1998	62.61 - 75.82	5.4 - 60.8	2.62 - 25.2
1997	57.2 - 63.99	10.6 - 57.2	8.4 - 25.6
1996	55.72 - 57.89	28.3 - 56	13.6 - 15.2

Time Period and Facility	Range of Effluent Flows in cfs	Range of Flows as % of Total Flows at MWD Crossing (USGS Sta. No. 11066460)	Range of Flows as % of Total Flows at Below Prado Dam (USGS Sta. No. 11074000)
RIX Ops			
Dry Season RIX (May-Oct)			
2001	57.64 - 66.23	75.3 - 87.2	24.4 - 34.5
2000	59.36 - 74.61	72.3 - 86.9	26.6 - 33.9
1999	64.75 - 73.42	58.3 - 83.1	23 - 36.2
1998	60.9 - 76.64	13.6 - 64.96	8.37 - 26
1997	55.35 - 71.33	10.6 - 79.9	17.7 - 31.1
1996	54.3 - 64.95	53.4 - 77.2	17.97 - 36
RIX Ops			
SAS Spawning Season RIX (Mar-May)			
2001	57.64 - 68.83	54.6 - 75.3	15.6 - 24.4
2000	61.16 - 61.3	37.3 - 72.3	18.4 - 28.96
1999	62.36 - 71.04	49.9 - 72.6	23 - 23.8
1998	69.24 - 76.64	13.6 - 28.1	8.37 - 13.1
1997	55.35 - 57.2	56.8 - 66.6	19.1 - 23.8
1996	55.39 - 55.72	56 - 71.1	15.2 - 17.97
Pre-RIX Ops			
Annual SB + Colton			
1995	42.2 - 46.38	2.53 - 102.8	2.3 - 32
1994	38.28 - 44.91	6.1 - 111.37	7.8 - 37.7
1993	39.63 - 44.58	2.4 - 112.4	1.26 - 37
1992	40.28 - 44.19	11.6 - 106.7	1.93 - 32.1
1991	37.33 - 45.07	10.2 - 105.1	9.4 - 36.6
1990	42.7 - 48.42	34.9 - 92	13.3 - 37.5
Pre-RIX Ops			
Wet Season SB + Colton (Nov-Apr)			
1995	43.33 - 45.65	2.53 - 72.8	2.8 - 23.8
1994	38.28 - 44.35	6.1 - 49.7	22.3 - 37.7
1993	39.63 - 44.58	2.4 - 112.4	1.26 - 20.9
1992	40.8 - 43.2	11.6 - 80.6	5.4 - 20.5
1991	37.33 - 45.07	10.2 - 70.3	9.4 - 36.6
1990	42.7 - 48.12	34.9 - 76.4	13.3 - 24.7
Pre-RIX Ops			
Dry Season SB + Colton (May-Oct)			
1995	42.2 - 46.38	18.9 - 102.8	9.55 - 31.8
1994	39.07 - 44.91	72.8 - 111.37	22.3 - 37.7
1993	40.7 - 44.21	16.5 - 113.1	10.2 - 37
1992	40.28 - 44.19	69.8 - 106.7	1.93 - 34
1991	37.53 - 41.24	64.4 - 105.1	9.4 - 32.9
1990	43.7 - 47.47	58.6 - 92	23.9 - 37.5

Time Period and Facility	Range of Effluent Flows in cfs	Range of Flows as % of Total Flows at MWD Crossing (USGS Sta. No. 11066460)	Range of Flows as % of Total Flows at Below Prado Dam (USGS Sta. No. 11074000)
Pre-RIX Ops			
SAS Spawning Season SB + Colton (Mar-May)			
1995	42.2 - 45.65	15.4 - 30.3	2.3 - 9.5
1994	39.07 - 40.21	6.1 - 72.8	11.4 - 22.3
1993	41.04 - 42.33	7.5 - 16.5	4.85 - 10.2
1992	40.8 - 41.8	17.4 - 69.8	1.93 - 9.5
1991	40.8 - 44.18	10.2 - 49.65	9.4 - 36.6
1990	47.13 - 47.97	51 - 58.6	18.4 - 23.9

Table 4.7-3 also summarizes flow data in terms of wet and dry season differences and the spawning period of the Santa Ana sucker. Generally, the effluent discharges should comprise less of the total flows in the river during the wet season (November through April) over the dry season (May-October). RIX average monthly flows in cfs were similar for both (55.72-79.83 cfs for wet season and 54.3-76.64 for dry season) from 1996-2001. As percentages of the total flows, there was slight difference of 5 to 9 percent. RIX flows were 5.7 to 79 percent of the wet season flows and 10.6 to 87.2 percent of the dry season at MWD Crossing, and 2.62 to 31.8 percent of the wet season flows and 8.37 to 36.2 percent of the dry season flows at below Prado Dam. Comparatively similar, pre-RIX average monthly flows from SBWRP and Colton combined averaged 37.33 to 48.12 cfs in the wet season and 37.53 to 46.38 cfs in the dry season for 1990-1995.

The percentages of effluent flows to total river flows varied widely, however, in both seasons at both stations-by over 100 percent (2-113%) at MWD Crossing and by almost 40 percent (1-37%) at below Prado Dam. There were several unusual storm events in these years that would account for this. Thus, any reductions in RIX flows would not be expected to have substantially different effects seasonally, if the premise is that reductions would have more adverse impact on the river during the dry season.

For the Santa Ana sucker spawning period (March-May), RIX average monthly flows ranged from 55.35 to 76.64 cfs in 1996-2001. These flows were 13.6 to 75.3 percent of the total river flows at MWD Crossing and 8.37 to 28.96 percent at below Prado Dam. Prior to RIX operations, SBWRP and Colton combined average monthly flows were 39.07 to 47.97 cfs for 1990-1995. These were 6.1 to 72.8 percent of total river flows at MWD Crossing and 13.1 to 28.96 percent at below Prado Dam. RIX flows have comprised more of the flows in the river as compared to pre-RIX conditions during the critical Santa Ana sucker spawning period, but not by more than 5 to 7 percent. It is suggested by these data that reductions in flows for these three months should not result in less than a 40 cfs discharge to the river (not less than pre-RIX conditions), which would be a 15 to 45 cfs reduction from current discharges as based on recent trends (as opposed to the 30-35 cfs reduction proposed).

The substrate of the Santa Ana River downstream of the RIX facility to the MWD crossing is dominated by gravel and cobble, which comprise 60 to 100 percent of the substrate (Swift, 2001; Technical Appendix E). This is a fairly recent phenomenon, following initiation of the RIX discharge. The dominant substrate in this section of the Santa Ana River during the Use Attainability Analysis

study was shifting sand (C&A, 1992). Downstream of the MWD crossing, substrate is comprised almost entirely of shifting sand. Studies have shown that suckers are found in both area, but the preferred substrate of the sucker, especially for spawning, is agreed upon as gravel and cobble (Saiki, 2000; Swift, 2001; SMEA, 1999).

Reductions in flow could, then, affect available habitat for the sucker. However, changes would be dependent upon channel morphology, which is in flux since the cessation of channel maintenance activities. There will probably be a decrease in wetted area and a decrease in depth, but without better definition of the habitat requirements of the sucker (especially adults), impacts would be difficult to assess. Besides substrate preference, water depth and water velocity preferences for various life stages need to be addressed. Reductions in flow could actually increase critical habitat for the sucker, at least for some life stages (Albert A. Webb Associates, 2001; see Technical Appendix F). Additionally, reduced flows may be beneficial to the sucker by limiting usable habitat for introduced species with an affinity for deeper pool habitat (i.e., bullhead species, largemouth bass and sunfish species).

Pre-RIX conditions supported viable habitat, although the effluent discharges were less and quite variable in their percentages of total river flows and water quality problems were also present. The overall habitat availability is dynamic in this river system and can change substantially between years and even within a single year. The Santa Ana River is subject to very high winter flows, which scour out new pools and fill in others on an annual basis. Due to this flow regime, "riffle" (or run) locations can change, as well as gravel/cobble and sand areas. Seasonal effects of herbaceous plant growth along channel margins and their role in seasonal island development also play a role in habitat availability. All are likely important to the sucker-run habitat needed for feeding and spawning; pool habitat for cover; and gravel/cobble bottom for spawning. Therefore, a general diversity of habitat needs to be maintained, but would be difficult to achieve, with the flooding and scouring cycles of the river and ongoing maintenance activities for flood management.

Thus, any attempts to preserve and/or create sucker habitat through manipulation of RIX effluent flows can only function minimally or in the short-term. It is recommended to focus on the spawning period, March through May, with annual examinations of flows and habitat conditions for spawning before March, downstream of RIX to MWD Crossing. Special needs for maintenance of optimum spawning conditions or areas through the month of May might then be identified. Then, further analysis and flow adjustments would be considered. Until better data are obtained, however, this PEIR includes a mitigation measure of not reducing effluent flow to less than 40 cfs, as discussed previously in this section.

Water quality issues for the sucker are not clear-cut. Water quality management activities and subsequent improvements have occurred since the early 1990s, specifically reducing unionized ammonia and chlorine which adversely affected all fish populations in the river system (SWRCB, 1995; Risk Sciences et al., 1992). Contaminants such as organochlorine pesticides/PCBs and heavy metals found in sucker populations in the Santa Ana River were not in higher concentrations than those in other freshwater fishes in the United States (Saiki, 2000). Turbidity is considered a factor, as Santa Ana suckers are typically found in clear waters. Temperature can be important, but is associated with dissolved oxygen levels. Warm water that is well-oxygenated, with moderate-to-high turbidity and moderate mineral content was found to support the substantial sucker populations at MWD Crossing (Saiki, 2000).

Water quality of RIX-produced effluent was previously analyzed in the hydrology and water quality section of this document. There was some discussion of support of fisheries. The only issues might be temperature and dissolved oxygen levels at river monitoring stations, which show some changes (increases in temperature and decreases in dissolved oxygen). However, there are not enough data (samples taken and sampling locations) and there are other incoming flows, such that direct associations with RIX effluent cannot always be made. The Santa Ana sucker is found in varying temperature regimes, with "preferred" temperatures for spawning not known (Swift, 2001). Sampling for suckers at MWD Crossing showed a range of 11.3 to 30.8°C and a mean of 20.5°C and dissolved oxygen levels of 5.8 to 9.4 mg/l with a mean of 7.7 mg/l. In terms of mitigation for water quality, then, none is recommended. As stated in the Conservation Program (SMEA, 1999), "water quality improvement is not considered a viable recovery strategy at the present time because it does not appear that controllable water quality factors are limiting the Santa Ana sucker populations."

A number of interested parties, including the U.S. Fish and Wildlife Service (USFWS), the California Department of Fish and Game (CDFG), the County of Orange, Orange County Water District (OCWD), the San Bernardino County Flood Control District (SBCFCD), the Riverside County Flood Control District (RCFCD), the City of Riverside, and the City of San Bernardino Municipal Water Department (SBMWD), have been negotiating the terms of a Conservation Agreement intended to permit certain covered activities. The Conservation Agreement implements conservation measures, including research activities.

As a participant in the conservation program outlined in the Conservation Agreement, the SBMWD has agreed to participate financially and to provide in-kind contributions of staff time toward research activities sponsored by the program. The program is administered through the Santa Ana Watershed Project Authority (SAWPA).

As part of the research activities to date, SBMWD has retained the services of a biologist who has conducted the first part of a two-part study. Brant Allen's report, *Evaluation of Santa Ana Sucker Habitat and Water Quality Changes in the Santa Ana River as a Result of Temporary Shutdowns at the Rapid Infiltration and Extraction Plan (RIX),* was prepared in November 2002 in accordance with a scope of work negotiated between the SBMWD and the USFWS.

The first half of the study was structured to analyze whether there are any habitat or water quality consequences affecting the Sucker as the result of temporary shutdowns, with an emphasis on hot weather conditions. The conclusions of the above report include that non-native species have more of an impact on the Cucker than effluent flow change or water quality. The second half of the study will analyze whether there are measurable effects because of temporary shutdowns during the Sucker spawning season. The temporary shutdowns result when the facility must discontinue discharging either the maintenance activities or because of potential violations of its National Pollutant Discharge Elimination System (NPDES) permit.

At the time that this PEIR is prepared, the status of the Conservation Agreement is in flux. It appears that the conservation program will be implemented through license conditions imposed by the Army Corps of Engineers (COE), at least as to those participants who have a Corps permit. The COE will serve as the sponsoring agency for the purposes of a Section 7 consultation. SBMWD does not have, nor does it need, a Corps permit. Therefore, there is no nexus for a consultation with the USFWS at this time.

However, SBMWD has committed to participation in the conservation program voluntarily and the following measures are identified in the Conservation Agreement at this time:

- Study design and implementation to determine the effects on the species associated with operational shutdowns of various durations. Information to be gathered will include: number of dead suckers, number of stranded suckers, changes in water quality in isolated pools, and behavior and condition of suckers particularly in isolated pools.

- Development of an adaptive management strategy to minimize the take of suckers during periods of shutdown if any of the conditions mentioned above are observed.

Therefore, to further the development of the SAS conservation program while implementing the proposed RIX water sales program, the Water Department will implement mitigation identified in the following section of this document. In addition, SBMWD will continue participation in the committees, consultations, and activities pursuant to the conservation program for the Santa Ana Sucker.

Arroyo Chub

The arroyo chub is a state species of special concern. It has been found to be the most abundant species at Riverside Avenue downstream of the RIX facility and the second most abundant species at the MWD Crossing (USGS unpublished data, 2001). This fish species has different habitat requirements than the sucker, namely its preference slow moving or backwater sections of streams that are warmer and that have sand or mud substrates. They are particularly tolerant of wide flow, temperature and dissolved oxygen fluctuations. Arroyo chub spawn continuously from February through August, but mostly in June and July. They require pools or quiet edge waters at temperatures of 14 to 22°C for spawning. Their reduction has been considered to be mostly a result of fragmentation of the populations, loss of low gradient streams and the introduction of predator fish species (MSHCP, 2000; refer to species account in Technical Appendix D).

Maintenance of diversity of water quality parameters and stream habitats in the upper Santa Ana River is necessary to the recovery of both the sucker and arroyo chub populations. Mitigation is identified in the next section for implementation to ensure that the RIX water sales program does not conflict with the above goal.

b. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service? Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption or other means? Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

As discussed previously, the major riparian habitat, protected wetlands, and wildlife corridor/nursery potentially affected by the program at this time is the Santa Ana River mainstem, from the RIX facility downstream to approximately the MWD gauging station. Other potentially affected natural

communities or riparian/wetlands areas are identified in the Natural Diversity Database records reviewed for this program and included in Appendix 8.4.

The role of RIX discharges in supporting the riparian habitat in the Santa Ana River channel downstream of the RIX facility needs to be defined before an impact analysis can be completed. To define this role, the following assumptions have been used:

1. Annual natural flows in the Santa Ana River will vary each year. These flows typically occur during the winter period when demand for water by riparian plants is at a low. Due to these conditions, the annual flow contribution to sustaining the Santa Ana River riparian habitat will be disregarded.

2. This analysis will focus solely upon the role that RIX discharges play in sustaining the riparian habitat between the RIX discharge location and the Riverside Narrows, i.e., the MWD crossing. Downstream of the Narrows, City of Riverside, City of Corona and Inland Empire Utilities Agency (IEUA) discharges are deemed sufficient to support the riparian habitat. For example, City of Riverside discharges are equivalent to about 26 MGD (40 cubic feet per second, cfs), or about 79 acre-feet per day. Annual discharges are approximately 28,835 acre-feet. City of Corona discharges are estimated to be 10 MGD or 11,202 acre-feet annually. IEUA discharges are presently about 40,000 acre feet annually, and recent evaluation of the 50 year planning horizon by IEUA identifies a future minimum flow of about 17,000 acre-feet per year if that agency's most optimistic use of recycled water is fulfilled. Thus, the approximate 6,425 acres of riparian habitat downstream of the Riverside Narrows will be supplied with sufficient flows, particularly summer flows, from these treatment facilities.

3. In determining water consumption by riparian habitat along the Santa Ana River from RIX to the Riverside Narrows, this document relies upon a detailed study of Mojave River (USGS 1996) which identified "Estimated average annual water use for specified areal densities of healthy riparian vegetation along the Mojave River." These values are shown in Table 4.7-4. Because temperatures are lower, particularly during part of the summer due to the marine cloud cover, and humidity is generally higher in the Santa Ana River Basin than the Mojave River Basin, the values shown in Table 4.7-4 have been adjusted downward by 5%. Also, the water consumption requirements for Arundo has been equated to that of Salt Cedar for the water consumption estimate presented below.

Table 4.7-4
ESTIMATED AVERAGE ANNUAL WATER USE FOR SPECIFIED AREAL DENSITIES OF HEALTHY RIPARIAN VEGETATION ALONG THE MOJAVE RIVER
(Water Use in Acre-Feet/Acre)

Plant Species	1-10% Areal Density	11-40% Areal Density	41-70% Areal Density	71-100% Areal Density
Cottonwoods, willows and baccharis	0.4	1.7	3.7	4.1
Saltcedar	0.3	1.2	2.5	2.8
Mesquite	0.1	0.6	1.3	1.4
Hydrophytes, including evaporation from open water	---	---	---	5.6 and 6.7*

* Alto subarea is 5.6 and Centro and Baja subareas and Afton area are 6.7
Source: USGS, 1996. Water Resources Investigation Report 96-4241

Riparian habitat depends on an adequate supply of water to sustain its unique characteristics. Under present conditions, RIX discharges between ~55 and ~76 cfs during an average month. Using the acreage values previously identified for the riparian habitat that occurs between the RIX discharge point and the Riverside Narrows in the environmental setting discussion in this section (Table 4.7-1), and the estimated average annual water use for specified areal densities of healthy riparian vegetation adjusted as outlined above (Table 4.7-4), TDA identified the following water consumption requirements for the 1,150 acres of riparian habitat located in the River channel between these two points:

Riparian, 1-10% coverage	92 acre-feet per year (afy)
Riparian, 11-40% coverage	68.43 afy
Riparian, 41-70% coverage	459.54 afy
Riparian, 71-100% coverage	763.83 afy
Open Water/Hydrophytes	515.2 afy
Invasive Species, 11-40% coverage	48.3 afy
Invasive Species, 41-70% coverage	345 afy
Invasive Species, 71-100% coverage	837.2 afy

Total estimated annual water consumption: 3,129.5 afy

As indicated above, for this evaluation no contribution to flows in the critical period analysis River channel are attributed to natural flows, which will vary annually based on the amount of precipitation within the Santa Ana River Basin. This is a very conservative assumption, but it allows an unbiased determination of the impact to riparian habitat between the RIX discharge point and the Riverside Narrows. If 30-35 cfs of flows are diverted from RIX discharges to the sales program, this would leave 20 to 41 cfs of average monthly flow continuing to be discharged. One cubic foot per second flow generates about 1.983 acre-feet of water per day. Thus, 20 cfs flows equates to about 39.66

acre-feet of flow per day (afd) and 41 cfs equates to 81.3 afd. Comparable annual average flows produced by 20 to 41 cfs discharges would range between 14,476 afy to 29,675 afy.

These residual discharge volumes represent four to almost ten times the volume of water required to sustain the existing riparian habitat between the RIX discharge location and the Riverside Narrows. This has three important related consequences. First, the residual flows (20 to 41 cfs) are large enough to ensure that RIX discharged will continue to flow all the way to and through the Narrows. Second, the flows are sufficient to ensure that RIX flows will continue to supply a portion, unquantifiable at this point, of the flows downstream of the Narrows. Third, seasonal flows will be sufficient to meet the spring and summer demands of the riparian habitat, and probably sufficient to allow the riparian habitat to expand in the future. Assuming that 50 percent of the demand for water occurs from June through August of a given year, based on other Santa Ana River studies, as shown in Table 4.7-5 (1,565 acre-feet based on 3,130 ÷ 2 = 1,565) and a total of 3,649 acre-feet occurs (assumes 20 cfs per day or 39.66 acre-feet per day over 92 days from June 1-August 31 of a given year), more than ample water will be flowing from RIX downstream to the Riverside Narrows to meet existing and expanded demand by the riparian habitat.

Table 4.7-5
MONTHLY DISTRIBUTION OF
WATER USE FOR RIPARIAN VEGETATION
ALONG THE SANTA ANA RIVER*

Month	Monthly Fraction of Annual Use**
January	2%
February	2%
March	5%
April	7%
May	10%
June	13%
July	17%
August	15%
September	12%
October	9%
November	5%
December	3%
TOTAL	100%

Notes: * Personal communication with Mark Wildermuth indicates that Santa Ana Watershed evapo-transpiration (ET) rates are 83% of those of the Mojave River ET rates.

** Troxel, Use of Water by Nataive Vegetation Bulletin 50.

Source: Wildermuth Environmental, Inc.

Based on the data presented above, RIX residual flows after water sales will be more than sufficient, without any mitigation, to ensure the existing riparian habitat, between the RIX discharge

point and the Riverside Narrows, can continue to survive and even expand. Since the project does not propose any major facilities or any known discharges within the Santa Ana River channel, the net effect of implementing the proposed RIX Recycled Water Sales Program on riparian habitat is forecast to be nonsignificant, without mitigation.

c. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

At this time, the program is not in conflict with any known local policies or ordinances, such that impacts and mitigation needs can be assessed. Specific future facilities that will be developed in various communities will be subject to further environmental review, at which time local ordinances will be examined. In general local ordinances protect the same biological resources identified by the county, state and federal government, so the measures identified in this document should be sufficient to protect sensitive biological resources. Other potentially affected resources, however, could be the following: trees in rights-of-way where pipelines might be constructed, orchards or groves, hillsides, parklands and open space areas designated for protection of local biological resources.

d. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

The Multispecies Habitat Conservation Plans of both Riverside (Western Riverside) and San Bernardino Counties are in the process of being completed, i.e., neither have been finalized or adopted. Adopted habitat conservation plans (primarily for coastal sage scrub habitats) may affect future facility development in Orange County and will be given full consideration as specific facilities are identified.

The San Bernardino County General Plan Natural Resources Section (Adopted July, 1989) identifies special habitat areas in the project area as oak woodlands in the Yucaipa and Chino Hills, riparian woodlands through the Valley, and alluvial fan scrub. Specific areas to be preserved are the walnut woodlands in the Tonner Canyon area of Chino Hills and in the Western Valley Foothills, other oak woodlands, and all riparian areas and perennial springs countywide. Additionally, the General Plan references those areas identified under other agency programs: CDFG's Areas of Special Biological Importance, BLM's Areas of Critical Environmental Concern, USFWS/BLM's Wilderness Areas and Wilderness Study Areas, and USFWS's Designated Critical Habitats. For all state or federally listed threatened, rare or endangered species occurring in San Bernardino County, the General Plan requires a mandatory finding of significant effect pursuant to State CEQA Guidelines with the preparation of an Environmental Impact Report for any project that might adversely affect these species. Biological reports are required, with mitigation measures designed to eliminate or reduce impacts to any identified resources. Mitigation monitoring is also required.

The Riverside County General Plan (1992) addresses wildlife and vegetation as separate resources issues. Wildlife protection is based on the determination and mapping of areas known to contain important or unique wildlife habitats, including habitats of listed rare, endangered, threatened or otherwise protected species. Mitigation of any identified project-related impacts on habitats is required. Vegetation protection is based on determination and mapping of areas containing unique or unusual vegetation or plant communities, with emphasis on formally designated rare, endangered and sensitive plants or plant communities. Some were specifically identified in this

Plan: freshwater marshes, oak woodlands, alpine meadows and palm oases. Certain soils types, such as clay soils, were also mentioned as supporting sensitive plants (example, alkali vernal pools). Mitigation of any identified project-related impacts on areas with such plants or plant communities is required, through the setting aside of areas as open space as the preferred mitigation measure.

The potential program-related impacts of facilities development will need to be assessed on a project-specific basis, since the relationship of the project to identified special habitats or protected plant or animal species is highly dependent upon physical location. In order to ensure conformance with the General Plans of both counties, mitigation identified below will apply to each facility developed under the RIX Water Sales Program.

When the Multispecies Habitat Conservation Plans for Riverside and San Bernardino County are adopted, any facilities subsequently developed will follow their directives for biological resources assessment, mitigation and monitoring. It is assumed these will be more specific than, and incorporated into, the General Plans.

e. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

Based on the data presented above, both the flows in the Santa Ana River channel and the riparian corridor along the channel will be maintained without any adverse modifications. Therefore, no potential to interfere with the movement of any fish or wildlife species or adverse impacts to migratory wildlife corridors or wildlife nursery sites is forecast to occur from implementing the proposed project. No mitigation is required.

4.7.4 Mitigation Measures

Although project impacts are generally forecast to be less than significant, there are some general mitigation measures to control future adverse impacts when specific projects are identified and implemented. These measures will be implemented to minimize adverse effects on potentially significant species or habitat located within the future project's area of potential impact.

4.7-1 SBMWD will develop thresholds for corrective actions and management activities to minimize the take of suckers, building upon the adaptive management strategy for periodic operational shutdowns of the RIX facility. Particular attention will be paid to the spawning areas and period (March-May) of those populations downstream to MWD crossing. Flow reductions will not result in discharges less than 40 cfs or less than those produced prior to RIX operations during the spawning period. This value is considered conservative and will hold until additional data on overall stream hydrology and ecology are defined.

4.7-2 SBMWD will participate in any ongoing river studies of the arroyo chub and derive any management activities for the Santa Ana sucker in context of potential improvements for chub populations.

4.7-3 The Biological Resources Overlays contained in the General Plans of Riverside County or San Bernardino County will be examined for identified special habitats for each facility to be developed under the program. For projects within such habitats, a biological survey will be conducted when any resources may be impacted by a proposed project, with a subsequent report prepared by a qualified biologist. The report will include identification

of site-specific resources, mitigation measures to eliminate or reduce impacts to any sensitive species or communities (Note: Riverside County prefers non-disturbance, whereas San Bernardino County will allow disturbance if enhancement of populations/habitats is also a mitigation measure), and a mitigation monitoring program.

4.7.5 Cumulative Impact

Implementation of the RIX Recycled Water Sales Program is not forecast to cause any direct significant adverse impacts on sensitive species or riparian or other habitat. The only other agency currently proposing to utilize large quantities of recycled water, i.e., divert existing effluent discharges to the Santa Ana River system, is the IEUA and their minimal flows have been identified above as 17,000 acre-feet over the next 50 years. Although other agencies may ultimately decide to use their effluent discharge for recycled water purposes, no other specific or approved plans exist for diversion of existing discharges. Sufficient discharges have been identified within the Upper Santa Ana River Basin to meet the demand for the riparian habitat acreage identified in the above evaluation. For example, even at the highest rate of water consumption for riparian habitat, about five acre feet per year, the 6,425 acres between the Riverside Narrows and Prado Basin would only consume 32,125 afy, which would be less than the combined City of Riverside and IEUA discharges. Therefore, based on the data available at this point in time, implementation of the proposed project is not forecast to cause or contribute to cumulative significant biological resource impacts.

4.7.6 Unavoidable Significant Impacts

No unavoidable significant adverse impacts to biological resources from either construction or operation of facilities have been identified at this time to be associated with the RIX Recycled Water Sales Program.

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4.8 ENERGY AND MINERAL RESOURCES

4.8.1 Introduction

This subchapter focuses on the potential natural resource and energy impacts from implementing the RIX Facility Recycled Water Sales Program.

4.8.2 Environmental Setting

Aggregate resources of suitable quality for mining may exist within the Santa Ana River channel within the area of potential impact, but there are tremendous constraints for development of such resources, such as habitat that supports endangered species, wetland values, and flood hazards. There is no mining of mineral resources downstream of the RIX facility or within the project area to the west. Most mining activity is confined to the upper valley portions of the Santa Ana River floodplain, Lytle Creek floodplain, and the floodplains of the creeks that are discharged from the San Gabriel Mountains, west of Lytle Creek to the San Bernardino/Los Angeles County boundary. None of the RIX infrastructure is presently proposed to be installed or operated within these areas.

Electricity is provided within the project's area of potential impact by Southern California Edison (SCE) or local city utilities, such as the cities of Colton and Riverside. The existing consumption of electrical energy within the area of potential impact has not been quantified. Electricity generation and availability is presently managed at the state level and over the past several years the availability of energy has fluctuated due to apparent periodic shortages and increased energy production activities. Electricity supplies are currently adequate to meet peak day demands and additional electrical generating capacity is being brought on line to meet future demand.

Southern California Gas (The Gas Company) supplies natural gas to the area of potential impact through a fixed transmission and distribution system of underground mains. Several major gas mains pass through the region. The amount of natural gas consumed by users within the area of potential impact has not been quantified.

4.8.3 Project Impacts: Energy and Mineral Resources

The implementation of the RIX Recycled Water Sales Program would include installing new infrastructure systems, the majority of which will be passive energy consumers. The mineral resource of focus in this evaluation are the mineral resources that may occur within the project's area of potential impact and that may be impacted directly from installing this infrastructure. The energy resource issue is related to energy consumption resulting from implementing the Program.

4.8.3.1 Thresholds of Significance

A project would normally be considered to have a significant effect on mineral resources or energy resources if the project prevents access to the mineral resources or creates a demand for energy that exceeds the commercial capacity to provide energy resources. These criteria will be utilized in evaluating significance of the proposed project's impacts on these resources.

4.8.3.2 Energy Resources

The proposed project will not consume any natural gas; therefore, no adverse impacts to this energy system can be caused by the proposed project.

The only project component with a potential to consume electricity is the booster pumps that may be required to lift water from the RIX facility to future purchasers. Booster pumps are commonly used throughout the region to lift water to required elevations for gravity delivery. Such pumps are typically operated during the night and early morning hours when electricity demand is lowest and the cheapest electricity rates apply. By using electric power during the low-demand periods, the proposed project has no potential to cause or contribute to significant peak demand for electricity. Mitigation is required below to ensure that the proposed project minimizes demand for electricity and eliminates any potential for significant effect on the existing generating and distribution capacity of the system.

4.8.3.3 Mineral Resources

The project's area of potential impact has little to no known mineral resources located within its boundaries. Implementation of the proposed project infrastructure is not forecast to limit access to any known mineral resources, nor is it forecast to adversely impact any existing mineral production facilities. The availability of recycled water may reduce overall demand for potable water where existing aggregate processing operations can receive recycled water to support processing operations. The proposed project is not forecast to cause significant loss of availability of such resources. No mitigation is required.

4.8.4 Mitigation Measure

The only identified potential for significant impact to energy and mineral resources is a potential to cause significant demand for electricity during peak demand periods. The following mitigation measure will be implemented to reduce this impact to a level of nonsignificance.

4.8-1 All pumping of recycled water shall occur during off-peak hours, unless a project specific evaluation of electricity demand demonstrates that it will not cause or contribute to cumulative significant impacts on the electricity generation or distribution systems.

4.8.5 Cumulative Impact

Cumulative mineral resources impacts can only occur when such resources are not avoided or are removed from current or future exploitation. Based on the above analysis, such resources can be avoided or otherwise not removed from existing or future production. Therefore, no cumulative significant mineral resource impacts are forecast to occur if the proposed project is implemented. Additional electricity demand in support of the proposed project is forecast to be minor, but if it is added to cumulative peak demand, it could contribute to significant short-term effects on the overall generation and distribution system. By restricting electricity consumption to off-peak hours, the potential for the proposed project to contribute to significant cumulative peak demand for electricity is eliminated.

4.8.6 Unavoidable Adverse Impact

The mineral and energy resources evaluation presented above indicates that, with implementation of the above mitigation measure, the proposed project will not cause any significant unavoidable adverse impacts. Therefore, no significant unavoidable adverse mineral or energy resource impacts are forecast to occur if the proposed project is implemented.

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4.9 HAZARDS AND RISK OF UPSET

4.9.1 Introduction

The analysis in this section focuses on potential hazards and risks associated with implementing the Water Sales Program ranging from administration of the program to construction activities. This section also addresses the transport and handling of hazardous materials as part of the proposed construction activities. The local agency general plans have been reviewed for policies regarding management of hazardous materials and wastes and contaminated areas.

4.9.2 Environmental Setting

4.9.2.1 Existing Policies and Regulations

The principal agency for managing contamination from illegal or accidental releases of hazardous materials and wastes in the State of California is the Department of Toxic Substances Control (DTSC). In addition to enforcing state regulations (California Code of Regulations (CCR) Titles 17, 19, and 22), the DTSC was granted authorization from the federal EPA in 1992 to be the agency responsible for regulating the generation, transport, and disposal of hazardous waste under the authority of the Resource Conservation and Recovery Act (RCRA) in California. Other agencies that may periodically coordinate with DTSC or with the enforcement of regulations that address site activities include: San Bernardino County Fire Department-Hazardous Materials Division, San Bernardino County Department of Environmental Health, the Riverside County Fire Department, County of Riverside Environmental Health Department-Hazardous Materials Management Division, local City fire departments, the Regional Water Quality Control Board (RWQCB, Santa Ana), the State Water Resources Control Board, the SCAQMD, the Department of Transportation, and the California Highway Patrol.

4.9.2.2 Risk Associated with the Use of Hazardous Materials

Hazard vs. Risk

Worker and public health are potentially at risk whenever hazardous materials are present or will be used. It is important to differentiate between the "hazard" of these materials and the acceptability of the "risk" they pose to human health and the environment. A hazard is any situation that has the potential to cause damage to human health and the environment. The risk to human health and the environment is determined by the probability of exposure to the hazardous substance and the severity of harm such exposure would pose. The likelihood and means of exposure, in addition to the inherent toxicity of a substance, determine the degree of risk to human health. When the risk of an activity is judged acceptable by society in relation to perceived benefits, the activity is judged to be safe.

Means of Exposure

Exposure to hazardous materials could occur in the following manner: (1) improper handling or use of hazardous materials during the course of business, particularly by untrained personnel; (2) failure of storage containment systems; (3) environmentally unsound treatment/disposal methods; (4)

transportation accidents; (5) fire, explosion or other emergencies; or (6) permitted release of hazardous materials by regulatory agencies. The following factors influence the health effects of exposure to hazardous materials: the dose to which the person is exposed, the frequency of exposure, the duration of exposure, the exposure pathway (route by which a chemical enters a person's body), and the individual's unique biological susceptibility.

The means of exposure as outlined above would determine the way in which toxic materials are absorbed into the body and, therefore, the bodily organs or systems affected. The major ways in which toxic materials may enter and be absorbed by the body are through the mouth (ingestion), the skin (penetration), or the lungs (inhalation). How a hazardous substance gets into the body and what damage it causes depends on the form or physical properties of the substance (i.e., liquid, solid, gas, dust, fibers, fumes or mist). A chemical may be toxic by one route and not another.

Health effects from exposure to toxic materials may be acute or chronic. Acute effects, usually resulting from a single exposure to a toxic material, may include significant immediate damage to organs and systems in the body, and possibly death. Chronic effects, usually resulting from long term exposure to a toxic or hazardous substance, may also include systemic and organ damage, as well as birth defects, genetic damage and cancer.

Hazardous Material Handling

The administration of the RIX Recycled Water Sales Program itself does involve the use and /or transport of hazardous substances. Hazardous materials could be utilized during short-term construction activities such as during the installation of pipelines. Table 4.9-1 lists federal, state and local regulatory agencies that oversee hazardous substances handling and management, and the statutes and regulations that these agencies administer. The following discussion contains a summary review of regulatory controls pertaining to hazardous materials.

4.9.2.3 Federal

Federal agencies that regulate hazardous and toxic materials include the EPA, the Occupational Safety and Health Administration (OSHA), the Nuclear Regulatory Commission (NRC), the U.S. Department of Transportation (DOT), and the National Institutes of Health (NIH). The following federal laws and guidelines govern hazardous materials. Hazardous materials handling and management associated with the proposed project must comply with applicable regulations as follows:

- Federal Water Pollution Control Act
- Clean Air Act
- Occupational Safety and Health Act
- Federal Insecticide, Fungicide, and Rodenticide Act
- Comprehensive Environmental Response, Compensation, and Liability Act
- Guidelines for Carcinogens and Biohazards

Table 4.9-1
SUMMARY OF HAZARDOUS MATERIALS REGULATORY AUTHORITY

Regulatory Agency	Jurisdiction	Authority
FEDERAL AGENCIES		
Dept. of Transportation	Federal	Hazardous Materials Transportation Act - Code of Federal Regulations (CFR) 49
Environmental Protection Agency	Federal	Federal Water Pollution Control Act Clean Air Act Resource Conservation & Recovery Act (RCRA) Comprehensive Environmental Response, Compensation & Liability Act Superfund Amendments & Reauthorization Act (SARA) Federal Insecticide, Fungicide & Rodenticide Act
Occupational Safety and Health Administration	Federal	Occupational Safety and Health Act & CFR 29
STATE AGENCIES		
Dept. of Toxic Substances Control	State	California Code of Regulations (CCR) Titles 17, 19, & 22
Dept. of Industrial Relations (CAL-OSHA)	State	California Occupational Safety & Health Act, CCR Title 8
State Water Resources Control Board & Regional Water Quality Control Board	State	Porter-Cologne Water Quality Control Act Underground Storage Tank Law
Health & Welfare Agency	State	Safe Drinking Water & Toxic Enforcement Act
Air Resources Board & Air Pollution Control District	State	Air Resources Act AB 1807 Air Toxics "Hot Spots" Information and Assessment Act
Office of Emergency Services	State	Hazardous Materials Release Response Plans/Inventory Law Acutely Hazardous Materials Law
Dept. of Fish and Game	State	Fish and Game Code
Dept. of Food and Agriculture	State	Food and Agriculture Code
State Fire Marshal	State	Uniform Fire Code, CCR Title 19
COUNTY AGENCIES		
Riverside County Fire Department San Bernardino County Fire Department, Hazardous Materials Division Riverside County Environmental Health Department, Hazardous Materials Management Division San Bernardino County Department of Environmental Health	County	Uniform Fire Code Hazardous Waste Control Statutes, H&S 25100 et. seq. Hazardous Materials Release Response Plans/Inventory Statutes, H&S 25500 et. seq. Acutely Hazardous Materials Regulations, CCR Titles 19, 22, & 23 Riverside County Code, Title 8, Health and Safety San Bernardino County Code
REGIONAL AGENCIES		
South Coast Air Quality Management District	South Coast Air Basin	Air Toxics "Hot Spots" Information and Assessment Act

Source: Urban Logic Consultants 1/98 and Local General Plans

- Superfund Amendments and Reauthorization Act Title III
- Resource Conservation and Recovery Act
- Safe Drinking Water Act
- Toxic Substances Control Act

Until August 1992, the principal agency at the federal level regulating the generation, transport and disposal of hazardous waste was the EPA under the authority of the RCRA. However, effective August 1, 1992, the California Environmental Protection Agency (Cal-EPA) and the DTSC, were authorized to implement the State's hazardous waste management program in lieu of the EPA.

4.9.2.4 State

The Cal-EPA and the State Water Resources Control Board generally govern the use of hazardous materials and the management of hazardous waste. The California Highway Patrol (CHP) and the California Department of Transportation (Caltrans) enforce hazardous substance transportation regulations. Chemical suppliers must comply with all applicable packaging, labeling and shipping regulations.

Applicable state and local laws include the following:

- Public Safety/Fire Regulations/Building Codes
- Hazardous Waste Control Law
- Hazardous Substances Information and Training Act
- Hazardous Materials Release Response Plans and Inventory Act
- Porter-Cologne Water Quality Control Act
- Tanner Toxics Act

DTSC has primary regulatory responsibility for the management of hazardous materials/substances and the generation, transport and disposal of hazardous waste under the authority of the Hazardous Waste Control Law (HWCL). DTSC can delegate enforcement to local jurisdictions that enter into agreements with the State agency. State regulations applicable to hazardous materials are indexed agreements in Title 26 of the CCR.

4.9.2.5 Regional

The SCAQMD works with the CARB and is responsible for developing and implementing rules and regulations to control the emission of air toxics on a local level. The SCAQMD establishes permitting requirements, inspects emission sources, and enforces measures through educational programs and/or fines. The Santa Ana Regional Water Quality Control Board controls the discharge of toxic materials in wastewater and from disposal facilities through the issuance of waste discharge requirements and NPDES permits under authority from the State Water Resources Control Board and the federal EPA.

4.9.2.6 Local

The jurisdictions that may be affected by the Water Sales Program include the cities of Colton, Corona, Fontana, Norco, Riverside and San Bernardino as well as unincorporated portions of Riverside and San Bernardino Counties. The local agency General Plans set forth policies and actions that are meant to achieve goals relative to hazards and the risk of upset. A highlight of the policies include the development of long-range planning programs to protect resources and the public, reducing the risk to the public from known contamination sites and the facilitation of coordinated, effective response to hazardous materials emergencies to minimize health and environmental risks.

The following agencies are responsible for enforcing the State regulations governing hazardous waste generators, hazardous waste storage, and transport, including inspections and enforcement: separate fire departments of the cities of Colton, Corona, Fontana, Norco, Riverside and San Bernardino; the Riverside County Fire Department; the San Bernardino County Fire Department; the Riverside County Environmental Health Department, Hazardous Materials Management Division and the San Bernardino County Department of Environmental Health. These agencies regulate the use, storage, and disposal of hazardous materials in their respective areas by issuing permits, monitoring regulatory compliance, investigating complaints, and other enforcement activities. In addition to providing fire protection and emergency services, the departments regulate the use and storage of hazardous materials for the service area and provides emergency response in the event of accidental release of hazardous materials. Each department also administers the local Fire Code which incorporates articles of the Uniform Fire Code (UFC). The UFC is a model code setting construction standards for buildings and associated fixtures, in order to prevent or mitigate hazards resulting from fire or explosion. The Riverside and San Bernardino County Health Departments review technical aspects of hazardous waste site cleanups, and oversees remediation of certain contaminated sites resulting from leaking underground storage tanks.

4.9.2.7 Hazardous Materials Transportation

Federal

The DOT has the regulatory responsibility for the safe transportation of hazardous materials between states and to foreign countries. DOT regulations govern all means of hazardous materials transportation (except for those packages shipped by mail, which are covered by the U.S. Postal Service regulations), including transportation by rail. DOT regulations are contained in the Code of Federal Regulations Title 49.

Under RCRA, the EPA sets standards for transporters of hazardous waste. In turn, the federal government authorized the State of California to carry out EPA regulations concerning transportation of hazardous wastes originating in, or passing through, the State.

State

The State of California has adopted regulations for the intrastate movement of hazardous materials. State regulations are indexed in the CCR Title 26.

The CHP has primary responsibility for enforcing federal and State regulations related to the transport of hazardous materials over streets and highways, including hazardous materials labeling and packaging regulations. The CHP also responds to hazardous materials transportation emergencies. The goal of these regulations is to prevent leakage and spills of material in transit and to provide detailed information to clean-up crews in the event of an accident. Vehicle and equipment inspection, shipment preparation, container identification, and shipping documentation are all part of the responsibility of the CHP, which conducts regular inspections of licensed transporters to assure regulatory compliance.

Common carriers which transport hazardous materials on roadways are licensed by the CHP under conditions specified in CCR Title 26, Division 14.1 Transportation of Hazardous Material, Section 32000.5, License to Transport Hazardous Materials. This section requires licensing of every motor (common) carrier who transports, for a fee, in excess of 500 pounds of hazardous materials at one time, and every carrier, if not for hire, who carries more than 1,000 pounds of hazardous materials of the type requiring placards. If the supplier or distributor carries fewer than 1,000 pounds of material, a license is not required.

4.9.2.8 Hazardous Materials Worker Safety Requirements

Federal

The Federal Occupational Safety and Health Administration (Fed/OSHA) is the agency responsible for ensuring worker safety. Fed/OSHA sets federal standards for implementation of training in the work place, exposure limits, and safety procedures in the handling of hazardous materials (as well as other hazards). Fed/OSHA also establishes criteria by which each state can implement its own health and safety program.

State

The California Department of Industrial Relations, Division of Occupational Safety and Health Administration (Cal/OSHA), assumes primary responsibility for developing and enforcing work place safety regulations within the State. Cal/OSHA standards are often more stringent than federal regulations.

Cal/OSHA regulations concerning the management of hazardous materials include requirements for safety training, availability of safety equipment, hazardous materials exposure warnings, and emergency action and fire prevention plan preparation. Cal/OSHA enforces the hazard communication program regulations, which include provisions for identifying and labeling hazardous materials, providing employees with Material Safety Data Sheets (MSDSs), describing the hazards of chemicals, and documenting employee training programs.

Both federal and state laws include special provisions for hazard communication to employees in research laboratories, including training in chemical work practices. The training, must include safe methods for handling hazardous materials, an explanation of MSDSs, use of emergency response equipment, and building emergency response plans and procedures.

4.9.3 Project Impacts

Implementation of the Water Sales Program has the potential to increase hazards and risk of upset from its construction activities and limited utilization of hazardous materials. Anytime construction activities are carried out, a potential exists for accidental releases of hazardous or toxic materials, particularly petroleum products.

A variety of land uses, including residential, commercial and industrial, are adjacent to the existing RIX facility and along the nine mile proposed pipeline route to the RP-3 site. The use and generation of hazardous materials is commonplace in industrial activities as well as certain commercial activities. There are a number of businesses in the affected jurisdictions that handle hazardous materials such as chemical industries, service stations, auto body shops, and paint stores. The implementation of the Water Sales Program will not alter the on-going operations of these uses.

4.9.3.1 Significance Criteria

In accordance with *CEQA Guidelines,* the effects of a project are evaluated to determine if they will result in a significant adverse impact on the environment. The criteria or standards, used to determine the significance of impacts may vary depending on the nature of the project. Impacts resulting from the implementation of the Water Sales Program will be considered significant if they cause any of the following:

- Handling, production, disposal or treatment of hazardous materials that puts public health and safety at risk, including exposure of sensitive receptors to substantial pollutant concentrations or creation of unsafe conditions for workers or the general public.

- New hazards or additional human exposure to hazards will be created that cannot be managed so as not to pose a threat to the environment or people.

- Project-related activities increase the risk of upset (accidents) in a manner that exposes the Program Area population to greater health risks.

- Project-related activities increase the risk of a safety hazard for people and/or aircraft operations.

4.9.3.2 Discussion of Hazard and Risk of Upset Impacts

a. Will the project use, store, transport or dispose of hazardous or toxic materials (including, but not limited to, oil, pesticides, chemicals or radiation)?

Inherent to the use of hazardous materials is the risk of an accidental release. Because of this risk, Federal, State and local agencies have established regulations to minimize the likelihood of such occurrences. During construction or maintenance activities in support of the Water Sales Program, fuels, oils, solvents, and other petroleum materials classified as "hazardous" will be used to support these operations.

There are two approaches to managing hazards: (1) minimize the potential release of hazardous or toxic substances into the environment; and (2) if released, have the resources and techniques on hand to respond to an accidental release, including controlling a release, managing any adverse exposure from a release; cleaning up (remediating) a release; and properly disposing of the material contaminated by the release.

Mitigation measures designed to reduce, control or remediate potential accidental releases must be implemented to prevent the creation of new contaminated areas that may require remediation and to minimize exposure of humans to public health risks from accidental releases. Such measures are presented in the following section. These measures are provided to reduce the potential for such accidents to occur (use of best management practices to minimize potential for accidental releases as part of construction activities); to immediately collect and store or remove the primary source of contamination, including soils; and to remediate any residual contamination to levels that do not exceed regulatory thresholds for use, generally unrestricted use, in the future. By implementing these measures potentially significant adverse environmental impacts from accidental releases associated with construction of the Water Sales Program can be reduced to a non-significant level of impact.

b. Does the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste?

None of the short-term construction activities or the long-term operations activities attributable to the proposed project will generate substantial quantities of hazardous emissions or require the handling of acutely hazardous materials, substances or wastes. As described above, inherent to the use of hazardous materials is the risk of an accidental release of hazardous emissions. During construction or maintenance activities in support of the Water Sales Program, fuels, oils, solvents, and other petroleum materials classified as "hazardous" will be used to support these operations.

Mitigation measures designed to reduce, or control potential accidental releases must be implemented to minimize exposure of humans to public health risks from accidental releases. Such measures are presented in the following section. These measures are provided to reduce the potential for such accidents to occur (use of best management practices to minimize potential for accidental releases). By implementing these measures potentially significant adverse environmental impacts from accidental releases associated with implementing the Water Sales Program can be reduced to a non-significant level of impact.

c. Will the project expose people to a potential health/safety hazard?

The Counties of Riverside and San Bernardino have established Hazardous Materials Management System to administer federal and state mandated programs. By continuing to operate the Hazardous Materials Management System through their respective Health Departments, potentially significant adverse environmental impacts from contaminated properties can be reduced to a non-significant level of impact. Compliance with these programs provide adequate mitigation to reduce potential impacts to potential contaminated sites to a non-significant level.

d. Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

Major evacuation routes are located within the program area along major interstates, freeways and major north-south and east-west roads. The proposed project activities will not result in a change to the emergency evacuation plans or emergency response plans over the long-term. In the short-term, construction activities related to construction of pipelines and other infrastructure system improvements located within existing road rights-of-way have a potential to interfere with such plans. Mitigation is identified below to ensure that roads under construction remain passable or that alternative routes are available both during daily construction and at the end of the day after construction is completed. These measures ensure that the proposed project will not significantly interfere with the existing emergency response plans or the emergency evacuation plans maintained by the local jurisdictions.

e. Will the project expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

The proposed project is not located in or near a wildland fire area. No potential exists to increase fire hazards in wildland areas or in the Program Area. Therefore, the proposed project is not forecast to adversely impact fire hazards within the Program Area. No mitigation is required.

4.9.4 Mitigation Measures

The following mitigation measures are recommended as conditions of project implementation. These measures will be implemented to minimize the potential for hazard effects from implementing the proposed project.

4.9-1 All contaminated material encountered during construction, particularly excavation, shall be delivered to a licensed treatment, disposal or recycling facility that has the appropriate systems to manage the contaminated material without significant impact on the environment.

4.9-2 Before determining that an area contaminated as a result of an accidental release is fully remediated, specific thresholds of acceptable clean-up shall be established and sufficient samples shall be taken within the contaminated area to verify that these clean-up thresholds have been met.

4.9-3 During construction activities within existing road rights-of-way or other easements where continuous access is required, a road operation management plan shall be prepared and implemented. At a minimum this plan shall define how to minimize the amount of time spent on construction activities; how to minimize disruption of vehicle and alternative modes of traffic at all times, but particularly during periods of high traffic volumes; adequate signage and other controls, including flagpersons, to ensure that traffic can flow adequately during construction; the identification of alternative routes that can meet the traffic flow requirements of a specific area, including communication (signs, webpages, etc.) with drivers and neighborhoods where construction activities will occur; and at the end of each construction day roadways shall be prepared for continued utilization without any significant roadway hazards remaining.

4.9-4 To the extent feasible, installation of pipelines or other construction activities in support of the Water Sales Program shall not be located on major evacuation or emergency response routes within any affected communities. Where construction on such routes is

necessary, local emergency response providers shall be contacted and emergency access and evacuation requirements shall be maintained at a level sufficient to meet their needs.

4.9.5 Cumulative Impact

Hazards, risk of upset and human health impacts within the Program Area are not forecast to be cumulatively significant and adverse. Each accidental release is required to be managed in a fashion that will not leave any significant residual contamination that can contribute to increased public health risk. Potential contamination and effects on emergency routes can be controlled through implementation of the mitigation measures outlined above. Therefore, the proposed project has no identified potential to significantly increase the cumulative risk of such impacts beyond current levels. The proposed project will not contribute to any new cumulative adverse impacts with implementation of the identified mitigation.

4.9.6 Unavoidable Adverse Impact

The hazards, risk of upset and human health evaluation presented above indicates that the proposed project has a potential to cause adverse health risk impacts from implementing the Water Sales Program activities. Therefore, no significant unavoidable adverse hazard, risk of upset or human health impacts are forecast to occur if the proposed project and identified mitigation is implemented.

4.10 NOISE

4.10.1 Introduction

This section of the PEIR focuses on the assessment of potential noise impacts on the environment resulting from the implementation of the RIX Recycled Water Sales Program ranging from administration of the program to construction activities. Implementation of the proposed projects could result in increased noise levels over both the short- and long term. Short-term noise increases will be caused by construction activities and the long-term noise increases could be associated with facilities and activities operated in support of the proposed project. This subchapter relies primarily upon data contained in the county and city general plans for the project area. These planning documents include the general plans for the following agencies: cities of Colton, Corona, Fontana, Norco, Riverside, and San Bernardino; and the counties of Riverside and San Bernardino.

4.10.2 Environmental Setting

4.10.2.1 Noise Terminology

Noise is often defined as unwanted sound. Sound is easily measured with instruments, but the human variability in subjective and physical responses to sound complicates the understanding of its impact on people. People judge the relative magnitude of sound by subjective terms such as "loudness" or "noisiness."

Physically, sound-pressure magnitude is measured and quantified in terms of a logarithmic scale in decibels (dB). Research on human hearing sensitivity has shown that a 3 dB increase in the sound is barely noticeable and a 10 dB increase would be perceived as twice as loud. The human hearing system, however, is not equally sensitive to sound at all frequencies. Therefore, a frequency-dependent adjustment called "A-weighting" has been devised so that sound may be measured similar to the way the human hearing system responds. The A-weighted sound level is often abbreviated "dBA" or "dB(A)." Figure 4.10-1 provides typical A-weighted sound levels of various noise sources and the responses people usually have to such sound levels.

A number of noise rating scales using A-weighted decibels are used in California for land use compatibility assessment and are described as follows:

- The Equivalent Noise Level (L_{eq}) scale represents the energy average noise level over a sample period of time. It represents the average decibel sound level that would contain the same amount of energy as a fluctuating sound level over the sample time period.

- The Day-Night Noise Level (L_{dn}) scale represents a time weighted 24-hour average noise level based on the A-weighted decibel scale. Time weighted refers to the fact that noise which occurs during certain sensitive time periods (such a the night) is penalized for occurring at these times. For the L_{dn} scale, the nighttime period (10 p.m. and 7 a.m.) noises are penalized by 10 dBA.

- The Community Noise Equivalent Level (CNEL) scale is similar to the L_{dn} scale except that it includes an additional 5 dBA penalty for the evening time period (7 p.m. to 10 p.m.). Both noise rating scales are used by the local jurisdictions and the State in evaluating transportation noise, including airports and roadways.

4.10.2.2 Noise Standards and Criteria

Noise rating scales, noise standards, community noise assessment criteria and noise mitigation measures are discussed below to provide a brief overview of how noise is evaluated and to explain the noise standards used in the Noise Elements of the land use jurisdiction General Plans within the Project Area. This information is needed in order to understand the existing background noise conditions in the project area.

The CNEL scale is used as the criterion for assessing the compatibility of residential land uses with community noise sources by utilizing an interior and exterior noise standard. Typical noise standards within the local jurisdiction's general plans in the Project Area encourage interior noise standards of 45 dBA CNEL and an exterior standard of 60-65 dBA CNEL. The local jurisdictions evaluate land use planning decisions relative to chronic noise exposure. An annual average noise level in excess of 60-65 dB CNEL is considered an excessive exterior exposure for most residential or other noise sensitive uses, unless mitigation is implemented to achieve this level where feasible. CNEL can be expressed as a daily average or as an annual average exposure to smooth out any day to day variations in noise generation.

Although CNEL is considered when using an annual average noise exposure such as along roadways or adjacent to airports, it is also calculated over a 24-hour period. Levels above 60-65 dB CNEL are considered intrusive for outdoor recreation, relaxation or normal conversation. Such intrusion could be considered an environmentally adverse impact even if no long-term noise incompatibility is created by the noise source. Environmental studies often use a change in the noise level by some given increment as a criterion for potential impact significance. A change of 3 dBA in noise from a semi-continuous source, such as a roadway, is often defined as a perceptible, but non-significant increase. Changes of 5 dBA are commonly designated as "clearly noticeable" and may be considered a significant change in the background noise level.

Sources of noise can be divided into transportation sources and non-transportation sources. The existing noise environment within the project's area of potential impact is dominated primarily by transportation-related noise sources. These noise sources include traffic noise from nearby roadways, from adjacent railroad lines and the several airports within the project area, including Corona Municipal Airport, Riverside Municipal Airport, Chino Airport San Bernardino International Airport and Ontario International Airport. Secondary non-transportation noise sources include industrial activity, mining, music, amplified sound and activities on private property.

4.10.2.3 Existing Noise Environment

Each city and county within the project's area of potential impact has adopted a general plan, which by law must incorporate a Noise Element to define acceptable noise levels for specific types of land uses. A summary of existing noise (as depicted in each city's general plan), typical noise thresholds, and future noise levels is provided in the following text. These summaries will be

compared relative to a single community's noise element in order to reduce the volume of text and supporting material that is needed to establish background noise levels throughout the project area.

Figure 4.10-2 provides a summary of the California Land Use/Noise Guidelines for exposure of specific land uses to community noise exposure. Within the communities affected by the proposed project the following noise environment was characterized in the local general plan noise elements.

City of Colton: The City of Colton has adopted a land use matrix and interior and exterior noise standards that reflect the noise guidelines contained in Figure 4.10-2. The noise environment in Colton is dominated by motor vehicle transportation noise sources, including Interstates 10 and 215 and major east-west and north-south arterials. The City of Colton is bisected by railroad tracks and marshalling yards. Numerous rail operations occur along these lines which are adjacent to, or run through, residential neighborhoods. The rail lines create noise impacts that exceed 65 dBA CNEL adjacent to the track, according to its General Plan. Colton does not have an airport; however, it does experience overflight from San Bernardino International Airport and Ontario International Airport.

City of Corona: The City of Corona has adopted a Maximum Suggested Noise Standard based on general land use categories. The Noise Standard is based on Rating Schemes and Standards as established by the U.S. Protection Agency in Publication Number NT10300.15 entitled: "Fundamentals of Noise Measurement, Rating Schemes and Standards." Corona's standards identify various sound levels and a maximum daily exposure time. The sound levels for interior and exterior noise standards are similar to those reflected in Figure 4.10-2. The noise environment in Corona is dominated by motor vehicle transportation noise sources, including Interstate 15 and State Route 91 and major east-west and north-south arterials. According to its General Plan, the City of Corona is impacted by the east-west railroad tracks (Burlington Northern Santa Fe/Metrolink), which traverse the City and creates noise levels that exceed 70 dBA CNEL adjacent to the track. The City is also impacted by aircraft operations at Corona Municipal Airport.

City of Fontana: The City of Fontana has adopted a land use matrix and interior and exterior noise standards that reflect the noise guidelines contained in Figure 4.10-2. The noise environment in Fontana is dominated by motor vehicle transportation noise sources, including Interstates 10 and 15 and major east-west and north-south arterials. Fontana does not have an airport, but the east-west railroad tracks of both major railways traverse the City and create noise levels that exceed 70 dBA CNEL adjacent to the track, according to its General Plan.

City of Norco: The City of Norco has adopted a land use matrix that reflects the noise guidelines contained in Figure 4.10-2. According to its General Plan, the noise environment in Norco is also dominated by motor vehicle transportation noise sources, including the Interstate 15 and major east-west and north-south arterials. Norco does not have an airport and it also does not have railroad tracks traversing the City to create rail-related noise impacts.

City of Riverside: The City of Riverside has adopted a land use matrix that reflects the noise guidelines contained in Figure 4.10-2. The noise environment in Riverside is dominated by motor vehicle transportation noise sources, including Interstate 215, State Route 60, State Route 91, and major east-west and north-south arterials. The City of Riverside is impacted by railroad tracks (Burlington Northern Santa Fe and Union Pacific) which traverse the City and create noise levels

that exceed 70 dBA CNEL adjacent to the tracks. The City is also impacted by aircraft operations at Riverside Municipal Airport. Although not within the project's area of impact, the Riverside General Plan also cited noise impacts from air operations at March Air Force Reserve Base. In addition to traffic and railroad noise, industrial activities generate substantial noise within the certain portions of the City of Riverside according to its General Plan.

City of San Bernardino: The City of San Bernardino has adopted a land use matrix and interior and exterior noise standards that reflect the noise guidelines contained in Figure 4.10-2. The noise environment in San Bernardino is dominated by motor vehicle transportation noise sources, including Interstates 10, 15 and 215 and State Routes 18 and 30 and major east-west and north-south arterials. According to its General Plan, the City of San Bernardino is impacted by railroad tracks on three major rail lines which traverse the City and create noise levels that exceed 70 dBA CNEL adjacent to the track. The City is also impacted by San Bernardino International Airport.

Riverside County: Riverside County has adopted a land use matrix and interior and exterior noise standards similar to the noise guidelines contained in Figure 4.10-2. Quantitative noise guidelines are contained on Figure VI-11 of the County General Plan. The noise environment in the County unincorporated area is also dominated by motor vehicle transportation noise sources, including the Interstates 15 and 215, State Routes 60, 71 and 91 and major east-west and north-south arterials. Noise from four airports, Chino, Corona, Ontario and Riverside impact this portion of the project area. Major railways have tracks traverse these areas which also create noise impacts adjacent to tracks.

San Bernardino County: The County has adopted interior and exterior noise standards similar to the noise guidelines contained in Figure 4.10-2. Quantitative noise guidelines are contained within Appendix C of the Noise Element of the County General Plan. The noise environment in this area is dominated by motor vehicle transportation noise sources, including the Interstates 10, 15 and 215, and major east-west and north-south arterials. Noise from three airports, Chino, Ontario International and San Bernardino International impact this portion of the project area. Major railways have tracks traverse these areas which also create noise impacts adjacent to tracks.

The picture that is portrayed by the data is that as transportation related noises increase with buildout of a community, the amount of sensitive land uses exposed to unacceptable noise levels will significantly increase. Note that stationary sources of noise, such as industrial operations, can generally be controlled to meet local noise standards because they typically are located within areas of similar use, where the noise does not pose an adverse impact, or where noise attenuation is mandatory and the impacts on any adjacent sensitive noise receptors is reduced to an acceptable level.

4.10.3 Project Impacts

The project's potential to generate noise was included in this PEIR based on the potential for future specific projects to cause short-term and long-term changes in the noise environment surrounding the future RIX Recycled Water Sales Program facilities. Short-term noise increases could result from construction activities and the long-term noise increases could be associated with the operation of the facilities, such as pump stations.

4.10.3.1 Significance Criteria

Noise impact criteria are described in detail in section 4.10.2.2 above. The following criteria will be used to determine whether noise levels have been significantly increased:

For residential areas, an exterior noise level of up to 65 dBA CNEL is permitted, if the exterior areas are substantially mitigated and the interior noise exposures do not exceed 45 dBA CNEL with windows and doors closed. If windows and doors are required to be closed to achieve an acceptable interior noise level, then the use of air conditioning or mechanical ventilation will be required.

In community noise assessments, a long-term change in noise levels greater than 3 dBA is often identified as significant, while changes less than one dBA will not be discernible to the human ear. In the range of one dBA to 3 dBA, people who are very sensitive to noise may perceive a slight change in noise level. No scientific evidence is available to support the use of 3 dBA as the significance threshold. In laboratory testing situations, humans are able to detect noise level changes of slightly less than one dBA. However, in a community situation the noise exposure is averaged over a long time period, and changes in noise levels occur over years, rather than the immediate comparison made in a laboratory situation. Therefore, the level at which changes in community noise levels become intrusive, rather than discernible, is some value greater than one dBA, and 3 dBA is generally accepted as the appropriate threshold for most community noise situations.

For purposes of this evaluation, noise impacts are considered significant if the project is forecast to increase noise levels by 3 dBA (CNEL) where: (1) the existing noise levels already exceed the 65 dBA (CNEL) residential standard or (2) the project increases noise levels from below the 65 dBA (CNEL) standard to above 65 dBA (CNEL).

In most of the jurisdictions described above, construction noise impacts are generally not considered significant if they are restricted to daylight hours and if very high noise activities are attenuated by mufflers, portable noise barriers or enclosures. This general threshold will also be utilized when construction noise impacts are considered.

4.10.3.2 Noise Impact Analysis

Short-term Construction Noise Sources

As noted above, since construction noise is of a temporary nature, most jurisdictions do not require such noise to be mitigated to the specific threshold levels outlined above. However, they do require operational considerations (i.e., limitation of construction hours, the muffling of construction equipment, noise complaint response programs, etc.) to minimize noise impacts during the construction process. Construction noise levels affecting sensitive receptors may exceed the significance thresholds during the day, but eliminating this source of noise at night can reduce these short-term impacts to a non-significant level. Mitigation measures are identified below which ensure that construction activities do not intrude on sensitive receptors in the evening or expose such receptors to damaging levels of noise at any time. The most effective method of controlling construction noise is generally by local limitation of construction hours to normal weekday working

hours, typically from daylight to dusk, or from 6 a.m. to 7 p.m., whichever is shorter. With implementation of these measures, short-term construction activities are not forecast to cause significant adverse noise impact.

Permanent Operation Noise Sources

The RIX Recycled Water Sales Program is primarily a contractual arrangement to deliver recycled water from the RIX facility to a private water wholesaler and will therefore not result in significant operational noise. Facilities associated with the construction of the propose project would be enclosed to control dust and exposure to the elements, such as a pump station, or placed underground, such as a pipeline. Thus, based on the type of facilities and operations, noise generation will be minimized. Therefore, no significant increase in noise exposure is expected for any sensitive receptors that might be located close to these facility during their operation.

a. Will the project result in the development of housing, health care facilities, schools, libraries, religious facilities or other noise sensitive uses in areas where existing or future noise levels exceed an Ldn of 65 dB(A) exterior and an Ldn of 45 dB(A) interior?

The proposed project is primarily a contractual arrangement to deliver recycled water from the RIX facility to a private water wholesaler. The project will not result in the development of housing, health care facilities, schools, libraries, religious facilities or other noise sensitive uses in areas where existing or future noise levels exceed an Ldn of 65 dB(A) exterior and an Ldn of 45 dB(A) interior. Future Water Sales Program facilities will be primarily new underground pipelines within existing rights-of-way, new pump stations and existing structures at the RIX facility and utilization sites, such as recharge basins. During the period of construction, noise levels would be increased over that of the ambient background levels intermittently when the equipment is operating. However, this increase in noise levels would only be temporary. The temporary increase in noise exposure would cease at the completion of construction. None of the permanent operation activities associated with implementing the proposed project are forecast to generate any severe noise levels that could adversely impact the sensitive residential population within the Project Area.

b. Will the Project result in the development of new or expansion of existing industrial, commercial or other uses which generate noise levels above an Ldn of 65 dB(A) exterior or an Ldn of 45 dB(A) interior that may affect areas containing housing, schools, health care facilities or other sensitive uses?

Implementation of the proposed project will result in direct physical change to existing land uses within the project's area of potential impact which will facilitate indirect changes in land use by contributing to an adequate water supply to meet long-term, ultimate growth and development projections within the area. However, the proposed project is not forecast to change land uses or otherwise create activities that can increase noise impacts beyond those anticipated in the local agencies General Plans. During the period of construction, noise levels would be increased over that of the ambience intermittently when the equipment is operating. However, this increase in noise levels would only be temporary. The temporary increase in noise exposure would cease immediately at the completion of construction. None of the permanent operation activities associated with implementing the proposed projects are forecast to generate any severe noise

levels that could adversely impact noise sensitive receptors within the project's area of potential impact.

c. *Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance*

Construction activities have a potential to generate noise levels in excess of the standards identified above. Specifically, jack hammers and other noise generating equipment can cause noise levels to exceed acceptable levels, even during daylight hours. Therefore, mitigation is identified below that must be implemented to control continuous noise generating activities that exceed 80 dB to acceptable levels, 65 dB, at the nearest sensitive receptor.

The only project-related operating activity that could generate significant adverse noise impacts is the operation of a pump station(s). Where pump stations are located near sensitive noise receptors (residences, etc.), mitigation required below shall be implemented to reduce exterior noise levels to 50 dB at the property boundary of the sensitive noise receptor. With noise levels controlled to this level, no noise levels are forecast to exceed noise standards.

d. Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?

As described in previous sections, short-term construction activities and operation of certain facilities, such as pump stations can cause groundborne noise levels. Mitigation is presented below to reduce these potential noise impacts to a nonsignificant level. None of the construction or operational activities associated with this project have a potential to significantly increase groundborne vibration levels. No mitigation is required.

e. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

Potentially significant permanent increases in noise levels are associated with pump station operations. Mitigation is presented below to reduce this potential noise impact to a nonsignificant level.

f. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

The potential temporary noise generation associated with construction activities is outlined above. Mitigation measures have been identified to reduce this potential temporary noise impact to a nonsignificant level.

g. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

The proposed project will not expose people residing or working to excessive noise levels. No permanent facilities will be occupied by people, and in the short-term, construction employees will not be exposed to excessive noise levels related to public airport operations since no facilities are being placed within airport noise overlay zones at this point in time. No mitigation is required.

h. For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

The proposed project will not expose people residing or working to excessive noise levels. No permanent facilities will be occupied by people, and in the short-term, construction employees will not be exposed to excessive noise levels related to private airport operations since no facilities are being placed within airport noise overlay zones at this point in time. No mitigation is required.

4.10.4 Mitigation Measures

The evaluation of potential noise impacts presented above identified potentially significant noise impacts. The potential noise impacts from implementing the proposed project range from non-significant without mitigation to potentially significant unless mitigation or other measures are implemented. During construction, grading, site clearance and structural construction activities generate the most noise. The following mitigation measures will be implemented to reduce noise impacts to the minimum level achievable.

4.10-1 Construction shall be limited to the hours of 7 a.m. to 7 p.m. on Monday through Friday, and between 9 a.m. to 6 p.m. on Saturday increase with sensitive receptors, and shall be prohibited on Sundays and federal holidays except in emergencies.

4.10-2 Utilize construction methods or equipment that will provide the lowest level of noise impact, i.e., use newer equipment that will generate lower noise levels.

4.10-3 All construction vehicles and fixed or mobile equipment shall be equipped with properly operating and maintained mufflers.

4.10-4 Schedule the construction such that the absolute minimum number of equipment would be operating at the same time.

4.10-5 Maintain good relations with the school and community such as keeping people informed of the schedule, duration, and progress of the construction, to minimize the public objections of unavoidable noise. Communities should be notified in advance of the construction and the expected temporary and intermittent noise increases during the construction period.

4.10-6 All employees that will be exposed to noise levels greater than 75 dB over an 8-hour period shall be provided with adequate hearing protection devices to ensure no hearing damage will result from construction activities.

4.10-7 If equipment is being used that can cause hearing damage at adjacent noise receptor locations (distance attenuation shall be taken into account), portable noise barriers or

other attenuation devices shall be installed that are demonstrated to be adequate to reduce noise levels at receptor locations below hearing damage thresholds.

4.10-8 All pump stations in areas with sensitive noise receptors shall have their noise levels attenuated to 50 dBA CNEL at 50 feet from the well head.

4.10-9 Project facilities shall be constructed and operated so that noise levels from operations do not exceed 50 dB during night hours and 65 dB averaged over the 12 hours of day time when located adjacent to existing or future sensitive land uses. This can be achieved by siting relatively noisy operations a sufficient distance from sensitive noise receptors; by incorporating attenuation features in the facility or designing attenuation features at the boundary of the property.

These measures ensure that implementation of the RIX Recycled Water Sales Program will not cause significant noise impacts during construction or cause hearing damage to employees or nearby receptors from severe noise levels. Potentially significant noise impacts where residential uses or other sensitive uses abut major facilities will have noise impacts reduced to a non-significant level by implementing the above measures.

4.10.5 Cumulative Impact

The noise forecast data contained in the local agency general plans demonstrates that future traffic noise levels from general growth (cumulative traffic increases) within the project's area of potential impact are likely result in significant noise impacts. However, the Water Sales Program is not forecast to cause or contribute to such cumulative noise impacts which can be attributed to the land use mix contained in the local agency general plans and the inability to reduce potential traffic noise impacts to a non-significant level. The operating equipment noise effects will fall below a level that would contribute to cumulative significant noise impacts, or they will be controlled to a non-significant impact level by installing noise attenuation features on the equipment. Any traffic generated by the Water Sales Program operations is considered an insignificant contribution to cumulative traffic related noise impacts (refer to the traffic section of this document). Because implementation of the Water Sales Program will not constitute a significant contribution to the cumulative increases in traffic, the proposed project is not forecast to cause any cumulatively significant noise impacts.

4.10.6 Unavoidable Adverse Impact

The noise evaluation presented above indicates that the proposed project has a potential to cause potentially significant and unavoidable adverse noise impact from implementing certain short-term activities and operation of facilities over the long-term. As noted above, mitigation measures have been identified that can reduce both short-term and permanent noise impacts below a significant level. Therefore, no potentially unavoidable significant adverse impacts are forecast to result from implementing the proposed project.

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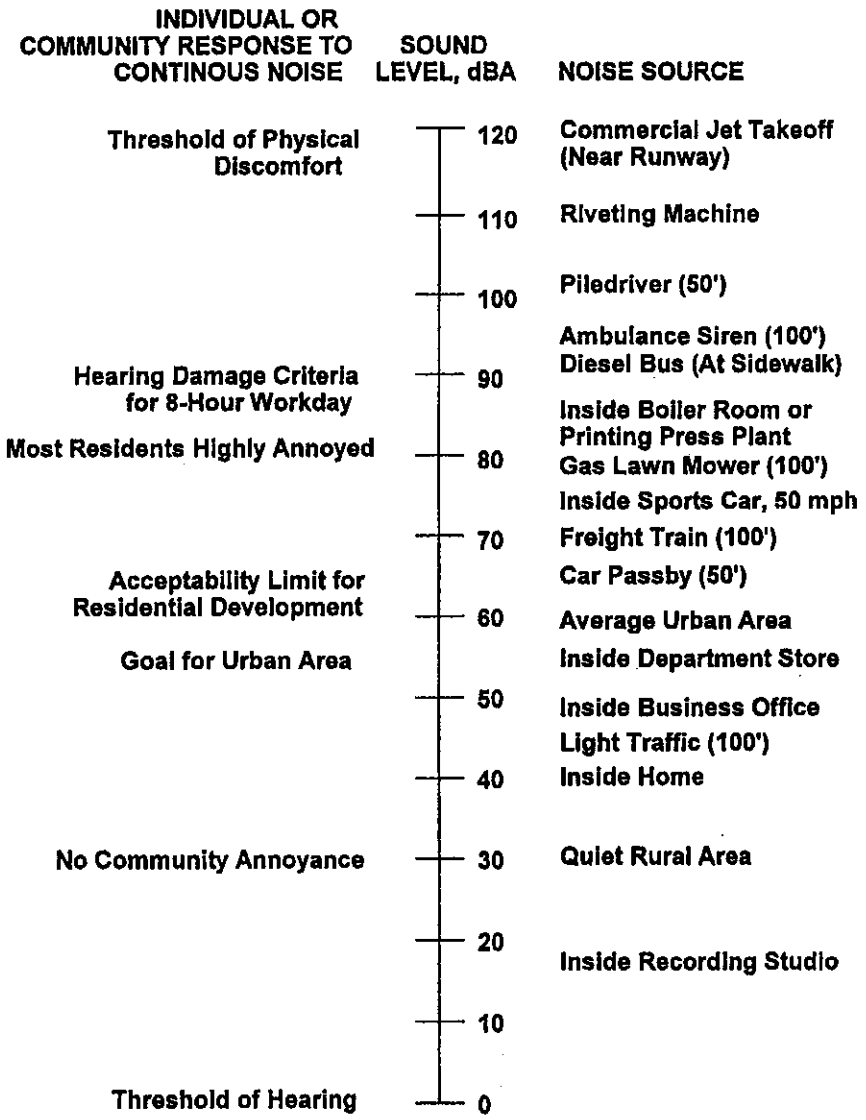
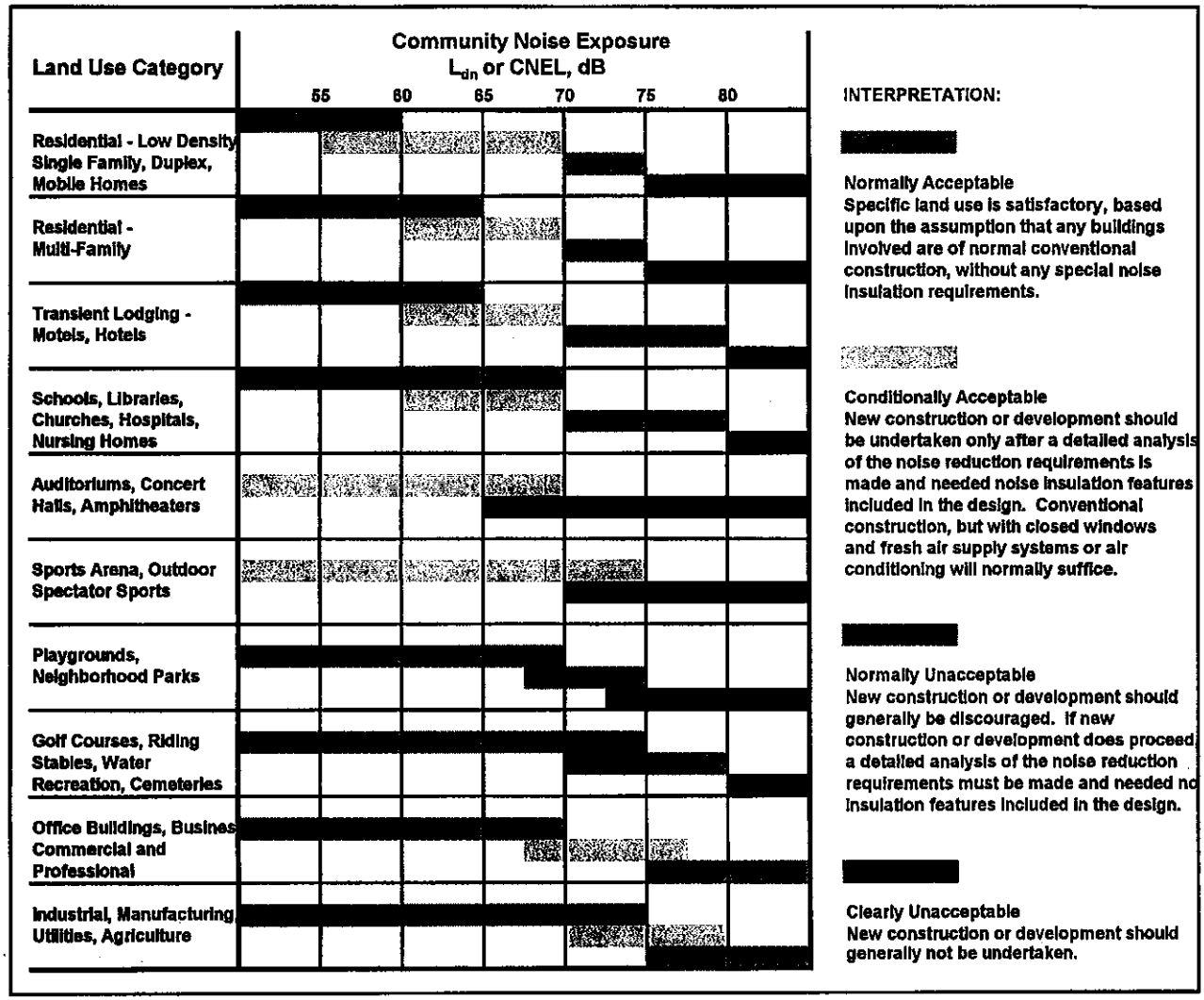
FIGURE 4.10-1
Typical Sound Levels from Indoor and Outdoor Noise Sources



Source: Parsons Engineering Science, Inc.

FIGURE 4.10-2
Land Use Compatibility Guidelines



Source: State of California General Plan Guidelines. Governor's Office of Planning & Research, 1998.

4.11 PUBLIC SERVICES

4.11.1 Introduction

This subchapter of the PEIR relies primarily upon data contained in the county and city general plans for the project area. These planning documents include the general plans for the following agencies: cities of Colton, Corona, Fontana, Norco, Riverside, and San Bernardino; and the counties of Riverside and San Bernardino. The evaluation focuses on the public services supplied to the Study Area and the potential impacts to these service systems from implementing the Water Sales Program.

4.11.2 Environmental Setting: Public Services

4.11.2.1 Fire and Emergency Services

Fire and Emergency Services within the project's area of impact are provided by forces from the individual cities, the Riverside County Fire Department and the San Bernardino County Fire Department. Levels of service are established within the General Plans for the cities and unincorporated portions of the two counties and these are met based upon the overall population of the specific jurisdiction.

4.11.2.2 Police

Police protection within the proposed project's are of impact is provided by law enforcement forces from the cities, the Riverside County Sheriff, the San Bernardino County Sheriff and the California Highway Patrol. As with fire protection, levels of service are established within the General Plans for the cities and unincorporated portions of the two counties and these are met based upon the overall population of the specific jurisdiction.

4.11.2.3 Schools

School facilities are administered through the school districts within the project's area of impact. The school districts work closely with the cities and unincorporated portions of the counties to ensure that adequate educational facilities are provided and future facilities are planned to meet the growth within their respective districts.

4.11.2.4 Parks and Recreation

Park and recreation facilities are provided by the individual cities, Riverside County Regional Park and Open Space District and the County of San Bernardino within the project's area of impact. The cities and counties work to ensure that adequate facilities are provided and future facilities are planned to meet the growth within their respective cities and districts.

4.11.2.5 Solid Waste

Solid waste disposal sites are those facilities used for the final disposition of wastes onto land. Wastes are categorized by the State into four general types: Class I (Hazardous), Class II (Designated Wastes), Class III (Municipal) and Inert Wastes.

Solid waste collection within the project's area of impact is provided by the individual cities or counties and by private haulers through franchise agreements with the individual cities or counties.

Solid waste from the project's area of impact is disposed of one of several landfills, located in both San Bernardino and Riverside Counties. The cities and counties are mandated to implement source reduction and recycling objectives that meet or exceed the requirements of State Assembly Bill 939, which mandates a 50 percent reduction in waste volumes from 1990 levels by the year 2010. In addition, hazardous waste can be landfilled or recycled at several facilities throughout the State. Any hazardous wastes generated within the project's area of impact are managed in accordance with existing laws and regulations. These materials are stored and handled in accordance with federal and state requirements.

4.11.2.6 Libraries

Like parks, open space, and recreational facilities, libraries contribute to the quality of life in a community. Library facilities are provided throughout the project's area of impact by the cities and counties. Again, these are provided according to levels of service established through the respective jurisdictions General Plans.

4.11.3 Project Impacts: Public Services

The implementation of the Water Sales Program will result in direct physical change to existing land uses within the project area of impact by providing a more efficient and effective water supply to meet long-term, ultimate growth and development projections within the area. The public service issues of focus in this evaluation are those changes in the environment due to the project that may increase demand for public services that would exceed the capacity of the existing service system to provide at an adequate level of service.

4.11.3.1 Threshold of Significance

The public service issues of concern in this evaluation are increased demand for services without adequate existing capacity or comparable increases in capacity from implementing the RIX Recycled Water Sales Program. The following criterion will be used to determine whether a significant public service impact will be created by the proposed project:

- The project will result in significant impacts to public services if it causes demand for a service to exceed a system's capacity and creates a need to develop new service system capacity without a means of funding the required system capacity expansion.

a. Will the project have an effect upon, or result in a need for new or altered fire protection and medical aid services?

The project will not cause a significant demand for fire protection nor emergency medical aid services. Implementation of the propose project will result in direct physical change to existing land uses within the project's area of impact which will facilitate indirect changes in land use by contributing to an adequate water supply to meet long-term, ultimate growth and development projections within the area; however, the proposed project is not forecast to change land uses or otherwise create activities that can increase demand for additional fire protection or medical aid services beyond that anticipated in their General Plans. Fire protection is currently provided by fire departments and agencies under authority of the various jurisdictions that comprise the project's area of potential impact. Any future facilities requiring structures (such as sound attenuation enclosures) will be required to meet building codes, including those related to fire protection. Mitigation is not required to reduce potential structural fire hazards to a non-significant level. Overall levels of fire service will be supported by the proposed project because it will provide additional water supplies to meet future fire protection requirements. No potential for any significant demand for fire protection services is identified and no mitigation is required.

b. Will the project have an effect upon, or result in a need for new or altered police protection services?

The project has no potential to cause a significant demand for police protection services. Implementation of the proposed project will result in limited direct physical change to existing land uses within the project's area of potential impact which will facilitate indirect changes in land use by contributing to an adequate water supply to meet long-term, ultimate growth and development projections within the area; however, it is not forecast to change land uses or otherwise create activities that can increase demand for additional police protection services beyond that anticipated in the jurisdiction's General Plans.

The area of potential impact is currently served by police departments and agencies under authority of the various jurisdictions that comprise the project's area of potential impact. Aside from a threat of trespass, the type of facilities being proposed by the RIX Recycled Water Sales Program do not have a potential to create significant new demand for police services. Although probably not significant, illegal trespass can be minimized by controlling access to project construction areas and operating facilities, such as recharge basins or pump stations. Overall levels of police service will also be increased based upon the future population based demands of the local agencies. No potential for any significant demand for police protection services is identified. Mitigation is proposed to address trespass issues.

c. Will the project have an effect upon, or result in a need for new or altered school room capacity?

The project will not cause a significant demand for school room capacity. As stated above, implementation of the proposed project will result in direct physical change to existing land uses within the project's area of potential impact which will facilitate indirect changes in land use by contributing to an adequate water supply to meet long-term, ultimate growth and development projections within the area; however, it is not forecast to change land uses or otherwise create

activities that can increase demand for additional school room capacity beyond that anticipated in the local agency's general plans. Implementation of the Water Sales Program is not forecast to change existing land uses or increase either the number of residential units located within the area or the number of students generated from the area beyond that anticipated in the local agency general plans. School districts in the project's area of potential impact have adopted classroom loading standards (number of students per classroom) and collect development fees per square foot of residential, commercial and industrial development. Because the proposed project is not forecast to change land uses, or create activities that can increase demand for additional school capacity beyond that anticipated in the jurisdiction's General Plans, and because there are adopted classroom loading standards (number of students per classroom) and development fees are collected for new development, no potential for adverse impacts to schools is identified. No mitigation is required for schools due to implementing the proposed project.

d. Will the project have an effect upon, or result in a need for new or altered parks or other recreational facilities?

The project will not cause a significant demand for parks and recreational opportunities. Implementation of the proposed project will result in direct physical change to existing land uses within the project's area of potential impact which will facilitate indirect changes in land use by contributing to an adequate water supply to meet long-term, ultimate growth and development projections within the area; however, it is not forecast to change land uses or otherwise create activities that can increase demand for additional parks or recreational opportunities beyond that anticipated in local agency general plans. Park and recreational opportunities are currently provided by the County and local agencies under authority of the various jurisdictions that comprise the Study Area. Water Sales projects will not produce any direct demand for parks or contribute to indirect demand for such services. Further, the availability of lower cost, recycled water for landscape irrigation and enhance the amount and quality of existing and future recreation facilities. Mitigation is not required to reduce potential park and recreation impacts to a non-significant level since none is forecast to occur. No potential for any significant demand for parks is identified and no mitigation is required.

e. Will the project have an effect upon, or result in a need for new or altered solid waste disposal?

The project will not cause a significant demand for solid waste disposal capacity. Implementation of the Water Sales Program will result in a direct physical change to existing land uses within the project's area of potential impact which will facilitate indirect changes in land use by contributing to an adequate water supply to meet long-term, ultimate growth and development projections within the area; however, it is not forecast to change land uses or otherwise create activities that can increase demand for solid waste disposal capacity beyond that anticipated in the jurisdiction's General Plans. Because the proposed project is not forecast to change land uses, increase population, or otherwise create activities that can increase demand for additional solid waste disposal capacity beyond that anticipated in the jurisdiction's General Plan land use designations, no potential for adverse impacts to the area landfills are identified.

The only potential impact could come from vegetation clearing to install proposed facilities. Such vegetation can be chipped and use to support composting operations and not place any demand

for landfill capacity. No potential for any significant solid waste disposal impacts is identified. Mitigation is proposed to address project-related impacts during construction clearing and grubbing.

f. Will the project have an effect upon, or result in a need for new or altered maintenance of public facilities, including roads?

The project will not cause a significant change in the maintenance of public facilities. Implementation of the proposed project will result in direct physical change to existing land uses within the project's area of potential impact which will facilitate indirect changes in land use by contributing to an adequate water supply to meet long-term, ultimate growth and development projections within the area; however, it is not forecast to change land uses or otherwise create activities that can increase maintenance services beyond that anticipated in local agency general plans. Maintenance of public facilities is currently provided by the counties, cities and local agencies under authority of the various jurisdictions that comprise the area of potential impact. Water Sales projects will not produce any direct demand for new or altered public facility maintenance or contribute to indirect demand for such services. Mitigation is not required to reduce potential maintenance impacts to a non-significant level since none is forecast to occur. No potential for any significant demand for maintenance services is identified and no mitigation is required.

g. Will the project have an effect upon, or result in a need for new or altered library capacity?

The project will not cause a significant demand for library capacity. Implementation of the proposed project will result in direct physical change to existing land uses within the project's area of potential impact which will facilitate indirect changes in land use by contributing to an adequate water supply to meet long-term, ultimate growth and development projections within the area; however, it is not forecast to change land uses or otherwise create activities that can increase demand for additional library capacity services beyond that anticipated in local agency general plans. Libraries are currently provided by the County and local agencies under authority of the various jurisdictions that comprise the area. Water Sales projects will not produce any direct demand for library capacity or contribute to indirect demand for such services. Mitigation is not required to reduce potential library capacity impacts to a non-significant level since none is forecast to occur. No potential for any significant demand for library services is identified and no mitigation is required.

4.11.4 Mitigation Measures

The following mitigation measures are recommended as a condition of Program approval to mitigate impacts to library resources:

4.11-1 Water Sales Program facilities shall be fenced or otherwise have access controlled to prevent illegal trespass to attractive nuisances, such as construction sites or tank sites.

4.11-2 Where feasible, vegetation removed from facility sites, including pipelines, shall be chipped and delivered to licensed composting facilities to minimize the volume of organic solid waste delivered to area landfills for disposal.

4.11.5 Cumulative Impact

The RIX Recycled Water Sales Program activities are specifically designed to provide a more efficient and effective program for managing all of the water resources that occur within the project's area of potential impact. The proposed project has been evaluated as being fully consistent with the area general plans and has been determined not to contribute to future growth as envisioned in the affected area's land use planning documents. The proposed project can be implemented without causing or contributing to future significant cumulative growth or development within the region. Based upon this analysis, implementation of the proposed project is not forecast to contribute to any significant increases in demand for public services that could be considered cumulatively significant and adverse.

4.11.6 Unavoidable Adverse Impact

The public services impact evaluation presented above indicates that implementation of the proposed project will be consistent with the area jurisdiction's general plan land use designations and policies regarding growth. Implementing the proposed project is not forecast to cause any direct or indirect significant adverse public service impacts after implementation of the mitigation measures outlined above. Therefore, no significant unavoidable adverse public services impacts are forecast to occur if the proposed project is approved and implemented.

4.12 UTILITIES

4.12.1 Introduction

This subchapter of the PEIR addresses the utility/service system issues and has been compiled by relying primarily upon data contained in the general plans for the project area. These planning documents include the general plans for the following agencies: cities of Colton, Corona, Fontana, Norco, Riverside, and San Bernardino; and the counties of Riverside and San Bernardino. The evaluation focuses on the utilities supplies to utilized by the proposed project and the potential impacts to these utility systems from implementing the proposed project.

4.12.2 Environmental Setting: Utilities

4.12.2.1 Electricity / Natural Gas

Electricity

Electricity in the project's area of potential impact is provided by Southern California Edison (SCE) and the Cities of Riverside and Colton. Utility policies allow the individual connections to purchase electricity from a variety of sources, but this electricity will still be distributed to consumers over local electricity distribution system. The existing consumption of electrical energy within the area has not been quantified.

The energy consumption of new buildings in California is regulated by the State Building Energy Efficiency Standards, embodied in Title 24 of the California Code of Regulations. The efficiency standards apply to new construction of both residential and non-residential buildings, and regulate energy consumption for heating, cooling, ventilation, water heating, and lighting. These building efficiency standards are enforced through the local building permit process.

Natural Gas

Available natural gas supplies are delivered to the project's area of potential impact by The Gas Company. Adequate natural gas is generally available to meet demand within the area, but they can be affected by external influences and may not always be accessible. The amount of natural gas consumed by users within the area have not been quantified.

4.12.2.2 Communication Services

Telephone service is provided to the project's area of potential impact by Pacific Bell and Verizon. The total number of phone connections in the area have not been quantified. Pacific Bell and Verizon systems are demand responsive and they expand their phone system capacity based on commercial demand for service which it identifies through continuous evaluation and forecasts of service.

Cable television services are provided by a variety of companies through franchises granted by the various local jurisdictions. Cable television is demand responsive and the company has not

encountered any constraints in providing service to residents of the area. The total number of cable connections in the Study Area have not been quantified.

4.12.2.3 Water Supplies

The principal water supply in the Upper Santa Ana Basin area is groundwater pumped from underlying aquifers, other local groundwater and surface water, imported water purchased from Metropolitan Water District of Southern California (MWDSC) and recycled water. Each of these sources is discussed below.

Groundwater – The Chino Basin is the largest groundwater basin in the Santa Ana River system. Adjudication within the Basin limits the amount of extraction permitted within the Basin, and extractions greater than permitted must be offset by purchase of other water within the Basin or imported water. Other groundwater supplies in the study area include the Claremont Heights, Live Oak, Pomona and Spadra Basins in Los Angeles County, the Riverside South and Temescal Basins in Riverside County, and the Colton-Rialto, Cucamonga, Lytle Creek, Bunker Hill, and Riverside North Basins in the two county area. Orange County groundwater basins provide local supplies to water agencies in Orange County. Agencies using other local groundwater include: City of Pomona, City of Upland, City of Norco, Jurupa Community Services District, Cucamonga County Water District, City of Corona, City of Chino, City of Chino Hills, Cucamonga County Water District, Fontana Water Company, San Antonio Water Company, Southern California Water Company, West End Consolidated Water Company, West San Bernardino County Water District, City of Colton, City of Riverside, City of San Bernardino and others. Generally, most of the groundwater sources within the project's area of potential impact are essentially fully developed.

Surface Water – A number of water supply agencies, which produce groundwater from the area of potential impact, obtain a small portion of their water supplies from local surface water sources. These agencies include the: City of Pomona, City of Upland, Cucamonga County Water District, Fontana Water Company, San Antonio Water Company, West End Consolidated Water Company, City of San Bernardino and West San Bernardino County Water District. The principal surface water sources include San Antonio Canyon, Cucamonga Canyon, Day Creek, Deer Creek, Lytle Creek, Deep Canyon, Upper Santa Ana River and tributaries and several smaller surface sources. For the most part, these surface water sources are fully developed and no significant additional supplies are anticipated to be developed in the future.

Imported Water – Two regional agencies are responsible for imported water deliveries within the study area: MWDSC (Inland Empire Utilities Agency, Western Municipal Water District, and Orange County Water District) and San Bernardino Valley Municipal Water District (SBVMWD). MWDSC is a wholesale water agency serving supplemental imported water to 27 members (city and water agencies) in portions of Los Angeles, Orange, Riverside, San Bernardino, San Diego and Ventura counties. This service area has a current population of more than 16 million people. Approximately one-half of the total water used throughout the entire MWDSC service area is imported water purchased from MWDSC to supplement the local water supplies in its service area. MWDSC obtains imported supplies from the Colorado River and the State Water Project (SWP). SBVMWD is a wholesale water purveyor in the

easternmost portion of the study area and adjacent portions of San Bernardino County. It receives imported water from the SWP.

Recycled Water – There are several existing sources of recycled water in use within the Study Area. These are from regional plants operated by Inland Empire Utilities Agency, and Indian Hills Water Reclamation Plant.

4.12.2.4 Wastewater Collection and Treatment Facilities

This section summarizes existing and proposed municipal wastewater treatment and disposal plans for the project's area of potential impact. Several agencies are responsible for wastewater treatment and disposal for their respective areas. The Cities of San Bernardino, Colton and Rialto provide wastewater reclamation utilities in the eastern portion of the area. In western San Bernardino County, IEUA performs this role. In Riverside County, several agencies are responsible for wastewater treatment, including the cities of Riverside and Corona, and Jurupa Community Services District.

There are four basic wastewater serving agencies within the area of potential impact. These agencies include the City of San Bernardino and Colton system (RIX), and the City of Rialto. The IEUA System (Western San Bernardino County) encompasses the western portion of the Upper Santa Ana River watershed. IEUA is the only system currently delivering recycled water to some customers on a routine basis. The Riverside County System encompasses areas downstream of the RIX facility in Riverside County and the Orange County Wastewater Reclamation Authority provides wastewater treatment for much of Orange County.

4.12.2.5 Storm Drain Facilities

Storm drains and flood control facilities within the project's area of potential impact include: channels, storm drains, street waterways, natural drainage courses, dams, basins, and levees. Storm drain and flood control facilities in the area are administered by the individual cities, the Riverside County Flood Control and Water Conservation District, the San Bernardino County Flood Control District, the Orange County Flood Control District and the Army Corps of Engineers. Systems administered by these agencies incorporate both natural and man-made elements.

4.12.3 Project Impacts: Utilities

The implementation of the RIX Recycled Water Sales Program will result in direct physical change to existing land uses within the project's area of potential impact by contributing to an adequate water supply to meet long-term, ultimate growth and development projections within the area. The utility issues of focus in this evaluation are those changes due to the project that may increase demand for utilities that would exceed the capacity of the existing service system to provide at an adequate level of service.

4.12.3.1 Threshold of Significance

The utility issues of concern in this evaluation are increased demand for utility capacity without adequate existing capacity or comparable increases in capacity from implementing the proposed project. The following criterion will be used to determine whether a significant utility impact will be created by the proposed project:

- The project will result in significant impacts to utilities if it causes demand for a utility to exceed the system's capacity and creates a need to develop new utility service system capacity without a means of funding the required system capacity expansion.

a. Will the project cause a significant demand for electricity and natural gas services?

The project will create a demand for several pump stations which will be operated on electricity. The pump station electricity demand may periodically required up to one megawatt of electricity to move water to required elevations. This will not be a continuous demand. Because the electricity can be utilized during off-peak periods, no potential exists to cause significant effects on the electricity supply system. At the regional scale, implementation of the proposed project will result in a direct physical change to existing land uses within the project's area of potential impact which will facilitate indirect changes in land use by contributing to an adequate water supply to meet long-term, ultimate growth and development projections within the area; however, it is not forecast to change land uses or otherwise create activities that can increase demand for additional electricity or natural gas service beyond that anticipated in the jurisdiction's's General Plans. The proposed project will not place any demand on the natural gas system. No potential for any significant electricity or natural gas service system impacts are identified. No mitigation is required; however, mitigation measures are provided to ensure the insignificance of project related impacts upon utility purveyors and to insure that energy conservation is practiced in accordance with existing State requirements.

b. Will the project cause a significant demand for communication system services?

The project will not place any direct demand for communication service systems. Implementation of the proposed project will result in a direct physical change to existing land uses within the project's area of potential impact which will facilitate indirect changes in land use by contributing to an adequate water supply to meet long-term, ultimate growth and development projections within the area; however, it is not forecast to change land uses or otherwise create activities that can increase demand for additional communication services beyond that anticipated in the jurisdiction's General Plans. Portions of the Project Area are already served by Pacific Bell, Verizon and cable service with adequate connections located in the Area. The project is not forecast to create growth or new connections that would place additional demands on communication systems. No potential for any significant communication service system impacts are identified. No mitigation is required;.

c. Will the project cause a significant demand for water supply capacity?

The project will not cause a significant demand for water supply capacity. Implementation of the RIX Recycled Water Sales Program will enhance water supplies for the area of potential impact. Regarding future regional development, the proposed project will result in a direct physical change

to existing land uses within the area which will facilitate indirect changes in land use by contributing to an adequate water supply to meet long-term, ultimate growth and development projections within the region; however, it is not forecast to change land uses or otherwise create activities that can increase demand for water supply capacity beyond that anticipated in the jurisdiction's General Plans. The proposed project activities are specifically designed to provide an alternative and effective program for managing water resources that occur within the area of potential impact. This would serve to meet the existing and future demand of development and improve flow requirements for the area. The project is not forecast to create growth or demand for new connections that would place additional demand on the existing water supply system beyond that anticipated in the jurisdiction's General Plans. No potential for any significant water supply impacts are identified. No mitigation is required.

d. Will the project cause a significant demand for wastewater collection or treatment system capacity?

The project envisions uses for recycled water that will not result in additional delivery of water to wastewater treatment systems within the area of potential impact. Thus, this project will not cause a significant direct demand for wastewater collection or treatment system capacity. Implementation of the RIX Recycled Water Sales Program will result in a direct physical change to existing land uses within the project's area of potential impact which will facilitate indirect changes in land use by contributing to an adequate water supply to meet long-term, ultimate growth and development projections within the area; however, it is not forecast to change land uses or otherwise create activities that can increase demand for wastewater collection or treatment system capacity beyond that anticipated in the jurisdiction's General Plans. The project is not forecast to create growth or new connections that would place significant demand on either the existing wastewater collection or treatment systems. No mitigation is required.

e. Will the project cause a significant demand for storm water drainage capacity?

The project has no potential to cause a significant demand for storm water drainage capacity. Implementation of the RIX Recycled Water Sales Program will result in a direct physical change to existing land uses within the project's area of potential impact which will facilitate indirect changes in land use by contributing to an adequate water supply to meet long-term, ultimate growth and development projections within the Study Area; however, it is not forecast to change land uses or otherwise create activities that can increase demand for storm water drainage capacity beyond that anticipated in the jurisdiction's General Plans. The project is not forecast to create growth or new connections that would place significant demand on either the existing storm water drainage systems. No mitigation is required.

f. Will the project result in a disjointed pattern of utility extensions?

The project will not result in a disjointed pattern of utility extensions. Implementation of the RIX Recycled Water Sales Program will result in a direct physical change to existing land uses within the project's area of potential impact which will facilitate indirect changes in land use by contributing to an adequate water supply to meet long-term, ultimate growth and development projections within the area; however, it is not forecast to change land uses or otherwise create activities that can result in a disjointed development pattern. The majority of the construction activities are anticipated

to be the installation of pipelines within existing road rights-of-way. The project is not forecast to create growth or new connections that would disrupt the planned development pattern. No mitigation is required.

4.12.4 Mitigation Measures

To further insure the insignificance of project related impacts upon utility purveyors, the following measures should be incorporated into individual projects as deemed appropriate:

4.12.4.1 Electricity

4.12-1 ***When electricity consuming facilities are installed in support of the project, the City shall coordinate with SCE and other power companies regarding the location and phasing of required on-site electrical facilities.***

4.12-2 ***Proposed structure construction should comply with Title 24 of the California Administrative Code (i.e., Uniform Building Code).***

4.12-3 ***Onsite electrical lines should be installed underground.***

4.12-4 ***Project planners and architects should consult with SCE or other electricity providers regarding current energy conservation techniques for any above ground facilities.***

4.12.4.2 Water Supplies

The following mitigation measures are recommended as a conditions of approval for individual projects implemented under the RIX Recycled Water Sales Program:

4.12-5 ***All project-related development/redevelopment projects, including exterior landscape elements, shall employ xeriscape plant design and water conservation concepts. At a minimum xeriscape requirements shall include the following:***

- ***a. The use of drought-tolerant species, drip irrigation systems, soil moisture sensors, and automatic irrigation systems, when appropriate.***
- ***b. Extensive use of mulch in all landscaped areas. Use of mulch will improve water holding capacities of the soil by reducing evaporation and erosion.***
- ***c. A minimal use of lawn, except to accommodate-lawn dependent uses such as playing fields. Warm-season grasses shall be used.***

4.12.5 Cumulative Impact

The RIX Recycled Water Sales Program activities are specifically designed to provide an alternative program for managing water resources that occur within the project's area of potential impact. The proposed project has been evaluated as being fully consistent with the area jurisdictions general plans and has been determined not to contribute to future growth as envisioned in these general plans. The proposed project can be implemented without causing or contributing to future significant cumulative growth or development within the area because this type of project places very little direct demand on utilities and has been determined not to be growth inducing, as

described in the land use subchapter of this document (Section 4.1). Based upon this analysis, implementation of the proposed project is not forecast to contribute to any significant increases in demand for utilities that could be considered cumulatively significant and adverse.

4.12.6 Unavoidable Adverse Impact

The utility impact evaluation presented above indicates that implementation of the proposed project places little or no demand on most utility systems and it will be consistent with the project's area of potential impact jurisdiction's general plan land use designations. Implementing the proposed project is not forecast to cause any direct or indirect significant adverse utility/service system impacts after implementation of the mitigation measures outlined above. Therefore, no significant unavoidable adverse utility impacts are forecast to occur if the proposed project is approved and implemented.

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4.13 AESTHETICS AND VISUAL RESOURCES

4.13.1 Introduction

Visual resources include natural and man-made features that give a particular environment its aesthetic characteristics or qualities. Criteria used in the analysis of these resources include visual sensitivity, which is the degree of public interest in a visual resource and concern over adverse changes in its quality. Visual sensitivity is categorized in terms of high, medium or low levels.

High visual sensitivity exists in areas where views are rare, unique, or in other ways special, such as in remote or pristine environments. High-sensitivity views would generally include landscapes that have landforms, vegetative patterns, water bodies, or rock formations of unusual or outstanding quality (USAF, 1991).

This subchapter relies extensively on the aesthetics/scenic resources/open space evaluations contained in the general plans for the following: the cities of Colton, Corona, Fontana, Norco, Riverside and San Bernardino; and the counties of Riverside and San Bernardino. The evaluation focuses on the potential aesthetic and visual resource impacts from implementing the RIX Recycled Water Sales Program.

4.13.2 Environmental Setting

4.13.2.1 Aesthetic and Visual Resources

Riverside County Environs

The project's anticipated area of potential impact affects two Land Use Planning Areas of the County of Riverside: Jurupa and the Riverside/Corona/Norco. The Jurupa Land Use Planning Area (Area) contains a mixture of land uses as well as important open space uses. There are areas that have urban/suburban densities as well as areas that have a characteristic rural quality. The Riverside/Corona Norco Land Use Planning Area is within the most urbanized area within the County of Riverside, but it is bounded on the north and west by pastoral dairy agricultural operations. The majority of the Area is within the boundaries of the incorporated cities of Riverside, Corona and Norco.

Separating the two Planning Areas is the Santa Ana River Corridor. It is the goal of the County of Riverside to preserve the corridor in an open and natural state, to conserve natural resources, to preserve the scenic beauty, and to define the limits and form of urbanization in this important corner of Riverside County. The northwestern portion of Riverside County located in the project area is essentially flat, bounded on the west and south by the Chino Hills, on the east by the Jurupa Hills and on the south by the Santa Ana Mountains.

There are no designated scenic highways within the Riverside County portion of the project area. The County and the affected cities of Corona, Norco and Riverside have established procedures through their General Plans and Development Codes to make determinations as to scenic value on a case-by-case basis in terms of architectural design review and scenic corridors/highways.

San Bernardino County Environs

The West Valley is the most heavily developed subregion in the County of San Bernardino. The central portion of this area is dominated by an urban landscape of primarily residential, commercial and industrial land uses. However, the west valley also contains areas with low density rural characteristics, such as the dairy agricultural area south of State Highway 60, Chino Hills State Park area to the southwest of State Highway 71 and the San Gabriel Mountains which create a distinct, background visual boundary for the whole area. There are no designated scenic highways within the San Bernardino County portion of the project area. The County and the affected cities of Colton, Fontana and San Bernardino have established procedures through their General Plans to make determinations as to scenic value on a case-by-case basis.

4.13.2.2 Light and Glare

Light and glare within the project area comes from public and private lighting used generally in the commercial and industrial districts, the street lighting in residential districts, and glare from vehicular headlights on major transportation corridors throughout the area of impact. Light and glare is a problem principally when exterior lighting shines on adjacent properties and either conflicts with adjacent existing uses or creates light pollution that diminishes the quality of the night-time visual setting for an area. In addition, light and glare can create traffic hazards if not controlled adjacent to roadways.

The County of Riverside in addition to the cities of Corona, Fontana, Riverside, and San Bernardino have within their General Plans adopted polices and guidelines to address and control impacts from light and glare that may result from new construction and the introduction of new light/glare and shade/shadow sources. The cities of Norco and Colton as well as the County of San Bernardino do not have specific General Plan guidelines or policies dealing with light and glare issues.

4.13.3 Project Impacts

4.13.3.1 Aesthetics and Visual Resources

The implementation of the RIX Recycled Water Sales Program would include installing new infrastructure systems within existing communities and providing water in an alternative manner to meet the future land use mix consistent with the existing general plan and zone designations. The aesthetic and visual resource issues of focus in this evaluation are related to the potential direct alterations in the existing visual character of the visual setting that exists within the project's area of potential impact or views to external areas that may be impacted from implementing the RIX Recycled Water Sales Program. It is assumed that the general plans of each affected jurisdiction will be implemented as presently adopted and that the build-out development of the project's area of potential impact will occur with or without this alternative water source.

The preservation and enhancement of the positive visual aspects, as well as the assurance that new development is aesthetically pleasing, are key features of the general plans within the project area. New construction has the potential to conflict with the views of and from existing neighborhoods and structures. Determination of the visual impact of new development will ultimately have to be made at the specific project level, but guidelines are discussed and established below to

ensure that future RIX Recycled Water Sales Program facilities and activities do not cause significant adverse aesthetic impacts.

4.13.3.2 Significance Criteria

For this analysis the proposed project will be determined to cause significant aesthetic, visual or light/glare impacts if its implementation will cause any of the following physical changes in the environment:

- The project is not consistent with the design guidelines contained in the local jurisdiction's general plan and other local plans;
- The change in the visual setting caused by a future specific project creates a substantial contrast or negative change to the existing visual setting; and
- The installation of night lighting creates a substantial conflict with adjacent uses or causes negative changes to an existing nighttime visual setting.

4.13.3.3 Aesthetic and Light / Glare Impact Analysis

a. Will the project result in the obstruction of any significant or important scenic view or scenic highway?

Future RIX Recycled Water Sales Program facilities will consist primarily of new underground pipelines within existing rights-of-way, some new pump stations and existing structures at the RIX facility and various recharge locations, including . The proposed project facilities and activities are not forecast to cause any significant adverse impacts to a scenic vista or scenic highway because these facilities will not be located in areas or be of a size or height to adversely impact such vistas or scenic highways.

There are eligible scenic highways within the project's area of impact, but no officially designated scenic highways. The Counties of Riverside and San Bernardino do have scenic corridors within the project area and have established planning standards that should be employed with development. With implementation of mitigation outlined below, development under the proposed project will be consistent with current general plan and development code requirements for protecting scenic vistas and scenic highway visual values.

The most significant visual resources are the hills and mountains surrounding the project area of impact. The activity with the highest potential to conflict with local agency design guidelines is construction disturbance of the landscape. Such disturbance can be reduce to an acceptable level by landscaping or revegetating disturbed areas (pipelines, recharge basins, and structural developments) either with landscaping that is consistent with local design guidelines or with native vegetation consistent with that which occurs naturally in the area, where required. Measures are identified below to ensure that existing landscaping is revegetated where appropriate.

b. Will the project create aesthetically offensive changes in the existing visual setting or have a demonstrable negative aesthetic effect?

The proposed project will utilize a combination of existing facilities, underground systems and new facility (pipelines or pump stations) construction to meet its objectives. Installation of surface facilities has a minimal potential to modify existing views or the visual setting at future specific project sites which could cause a negative visual impact. This is because the proposed new facilities will be installed below ground or will be of small size (pump stations) with limited potential to disrupt view within the generally developed (urban and agricultural) setting in which the proposed project will be implemented. To address, the minimal potential for disruption of high quality views or scenic vistas, measures outlined below can ensure that construction disturbance is mitigated by replacing vegetation and controlling potential negative aesthetic effects due to landscapes scarring. For above ground structures, such as pump stations, compliance with local agency design guidelines will ensure that new facilities do not cause significant negative aesthetic effects.

c. Will the project create light or glare that could impact sensitive receptors?

The only proposed facility that may require night lighting is the pump stations. Installation of night lighting could possibly occur in areas where little or no night lighting currently exists. Glare from new light fixtures that may be installed as part of the proposed project improvements has a potential to cause a significant negative impact upon adjacent uses, including sensitive receptors such as residential, rural or wildlife habitat portions of the Project Area. Such impacts can be fully mitigated by implementing measures for street lighting and down shielded commercial lighting which are generally an accepted element of urbanization. Lighting can increase nighttime visibility and thereby achieve a greater degree of safety for motorists, residents, and business owners.

Future specific projects will include pump stations and these facilities may require the installation of infrastructure improvements and roadway improvements. Night lighting installed in support of future project-related development projects will be mitigated to a non-significant level consistent with existing regulations controlling lighting requirements in each jurisdiction by controlling the amount of night light (lumens), by positioning of night lights, by selecting the appropriate type of lighting for the specific site and location, and by directing the lights through use of hoods and other directional controls.

The last potentially significant adverse light-and-glare impact relates to headlights from vehicles traveling on project area roadways. The majority of increased vehicle trips that may be attributable to the proposed project will occur during construction when pipeline is being installed. Typically, a pipeline construction team consists of about 20 employees. The added 40 trips during such construction is minimal given the millions of trips per day in project area of potential impact. During operations, maintenance related trips to project facilities in the future are forecast to be less than ten trips per day. Few, if any, of these trips are expected to occur during the nighttime, except in emergencies. Thus, no nighttime trips are forecast to occur during construction or operations on a routine basis. The proposed project's contribution to road related glare is so small relative to existing trips on roadway that no significant cumulative contribution to headlight glare is anticipated to affect light sensitive receptor areas. No unusual or unique sources of light and glare are anticipated to be required in support of the propose project.

4.13.4 Mitigation Measures

The scenic views from and toward the foothill and mountain areas should be protected against development impacts. This can be accomplished by carefully planning the location and extent of development and, in some cases, by clustering development to maximize open space and by encouraging the underground placement of utilities, where practicable.

4.13-1 ***All surface areas disturbed by Water Sales Program construction activities, except those area containing structures or hardscapes, shall be revegetated, either with native vegetation in natural landscapes or in accordance with a landscape plan in man-made landscape areas (note that native vegetation is also eminently suited to man-made landscapes and requires less maintenance). Once construction is completed, revegetation shall begin immediately and, where a formal landscape plan is being implemented, it shall be coordinated with the local agency and the local design guidelines for consistency.***

4.13-2 ***Where facilities are proposed to be located adjacent to scenic highways, corridors or other scenic features identified in local agency planning documents, Water Sales Program facility implementation will conform with design requirements established in planning documents for these designated scenic area.***

4.13-3 ***Where facilities will disrupt views from occupied areas with significant scenic vistas, a visual simulation analysis shall be performed of the facility's impact on the important view. If the analysis identifies a significant impact on a scenic vista, the facility shall be relocated, redesigned to reduce the impact to a non-significant level, or a subsequent environmental evaluation shall be prepared.***

4.13-4 ***When Water Sales Program above ground facilities are constructed in the future, the local agency design guidelines for the project site shall be followed to the extent that they do not conflict with the engineering and budget constraints established for the facility.***

4.13-5 ***All utilities for Water Sales Program facilities shall be placed underground unless such undergrounding is not technically feasible.***

4.13-6 ***Future project review and implementation shall implement the following:***

- ***Use of low pressure sodium lights where security needs require such lighting to minimize impacts of glare.***
- ***Height of lighting fixtures shall be lowered to the lowest level consistent with the purpose of the lighting to reduce unwanted illumination.***
- ***Directing light and shielding shall be used to minimize off-site illumination.***
- ***No light shall be allowed to intrude into sensitive light receptor areas.***

4.13.5 Cumulative Impact

Since the proposed project has no potential to significantly impact any existing aesthetic qualities of the project area or significant views to or from the area after implementing mitigation measures, the proposed project cannot contribute to any cumulative adverse aesthetic or visual resource impacts.

4.13.6 Unavoidable Adverse Impact

The aesthetics and visual resources evaluation presented above indicates that although the proposed project has a potential to cause limited changes in visual settings, no significant adverse impact to aesthetics or visual resources are forecast to occur based on implementation of mitigation measures. Therefore, no significant unavoidable adverse aesthetic or visual resource impacts are forecast to occur if the proposed project is implemented as outlined above.

4.14 CULTURAL RESOURCES

4.14.1 Introduction

Cultural Resources" is a term meant to encompass both archaeological, historic, and prehistoric resources. Archaeological and historic resources may occur together on the same site. Although cultural resources are in fact man-made features, they occur on the landscape as a result of previous human activities, and thus are addressed in the CEQA process in a manner similar to natural resources.

Archaeological resources are the physical remains of past human activities, and can be either prehistoric or historic in origin. Such resources include artifacts, refuse, and features in both surface and subsurface contexts, an are greater than 50 years in age and/or meet other established criteria to qualify as historic in nature.

Prehistoric archaeological resources may include the remains of villages and campsites, food processing locations, lithic (stone) resource procurement and tool-making location, and burial and cremation areas. They may also consist of trails, rock are and geoglyphs (ground figures) and isolated artifacts. Prehistoric archaeological resources are the result of cultural activities of the ancestors and predecessors of contemporary Native Americans, and in many cases, retain special traditional and sacred significance for those people.

Historic archaeological resources include refuse deposits such as can and bottle dumps, filled-in privy pits and cisterns, melted adobe walls and foundations, collapsed structures and associated features, and roads and trails. They may relate to mission activities, travel an exploration, early settlement, homestead activities, cattle and sheep herding, lumbering, and mining, among other themes. In San Bernardino County, historical archeological resources date from the earliest Spanish Mission activities (ca. 1770) to the turn of the century.

Historic resources are intact structures of any type that are 50 years or more of age. These resources are sometimes called the "built environment" and include houses or other structures, irrigation works, and engineering features, among other items.

Paleontological resources are the fossil remains or traces of past life forms, including both vertebrate and invertebrate species, as well as plants. These resources are found in geologic strata conducive to their preservation, typically sedimentary formations. All vertebrate fossils are considered to be significant; other kinds of paleontologic resources must be evaluated individually for significance depending on their potential scientific value.

Because both archaeological and paleontological resources can be exposed when grading or other ground disturbing activities are carried out, they are considered together in this cultural resources section of the PEIR. Known cultural resources are those which have been identified through formal recognition on one or more of the following inventories: National Register of Historic Places, California Archaeological Inventory, California Historic Resources Inventory, California Historical Landmarks, Points of Historic Interest and others.
The purpose of this PEIR is to provide the San Bernardino Municipal Water Department (SBMWD) and other interested parties with the necessary information and analysis to determine whether the

proposed implementation of the RIX Facility Water Sales Program three master plans would have any adverse effects on archaeological resources, as defined by the National Historic Preservation Act (NHPA) Section 106 and CEQA, that may exist within the area of potential effect (APE), or on paleontological resources; collectively termed cultural resources in this document

Since the specific location of future improvements are either generally known or unknown at this time, future ground disturbing activities could adversely impact cultural resources. The type of alignments for pipelines and other facilities will, in most cases, occur within already disturbed areas, where the potential for discovery of any significant cultural resources in their natural condition is very low. In addition, most, not all cultural resource impacts are mitigable by implementation of appropriate measures that ensure proper management of discovered resources (including proper curation) and dissemination of the knowledge gleaned from such discoveries. Note that prior to future construction or implementation of specific project's in the future, the areas of potential effect will be reviewed by qualified archaeologists, historians or paleontologists, and where appropriate, construction activities will be monitored by qualified cultural resource professionals.

To provide background information for the cultural resources of the region, a cultural resources study was prepared for the proposed project by Christopher E. Drover. This document is included in Appendix 8.5 of this PEIR. In addition, some information regarding paleontological resources for the region has been abstracted from the Facilities Master Plan PEIR prepared by Tom Dodson & Associates for the Inland Empire Utilities Agency.

4.14.2 Environmental Setting

The proposed project involves the construction of new and utilization of existing facilities (such as recharge basins); with activities including pipeline installation, construction of new pump station facilities and a variety of ground disturbing operations. The nature and potential location of projects within the project area are relatively ill-defined at this time. In most cases, pipelines will be installed along existing roadways and easements where development has already occurred, thus the chances of uncovering previously unidentified cultural resources are diminished. During construction of new structures where foundations are required, the chances of encountering cultural resources are greater than along existing roadways, however the actual potential of discovery at each location is substantially different in probability, and is highly site/project specific.

4.14.2.1 Project Area History

Initial human occupation of southern California is believed to have begun around 10000 BC. Theories of earlier occupation exist, but have not yet been substantiated. It is know that prior to the Luiseno or other Native Americans, perhaps Hokan language speakers, occupied the region employing different artifact assemblages and exploiting different resources. These groups are primarily recognized now as archaeological traditions.

Several different cultural chronologies have been proposed by researchers [Wallace (1955), Treganza and Bierman (1958), Warren (1968) and Kowta (1969)]. These chronologies are based on changes in the archaeological traditions as reflected either in the artifact assemblage pattern or subsistence pattern. At the present time archaeologists have divided the prehistory of the region into four main stages.

The Early Man (Wallace 1955)/San Dieguito Tradition (Warren 1968). This tradition dates between 9,000-12,000 before present (BP). Warren (1968) describes it as a hunting tradition which a tool kit consisting of scrapers, scraper planes, choppers, crescentics, and large blades and points.

The San Dieguito/Early Man tradition is followed by the La Jolla (Wallace 1955) or Encinitas Tradition (Warren 1968). This period began around 8000 BP - 9000 BP and lasted to about 1,000 BC. This tradition reflected a shift in the economy from one based primarily on hunting to one of seed and shellfish collecting. The assemblage is characterized by the use of millingstones, flaked cobble tools, retouch flakes and flexed burials.

The Pauma Complex, which was first identified by Delbert L. True (1958), was primarily restricted to the areas east of Escondido in the peninsular ranges of norther San Diego County (Morrato 1984). It appears to have been a millingstone complex based more on a hunting and seed gathering economy than shellfish gathering. This Complex, dated to around 8000 BP, is characterized by an assemblage of San Dieguito-like crescents, leaf-shaped points, La Jollan millingstone artifacts, core scrapers and stone discoidals. It is not known whether the Pauma Complex was an inland variant of the La Jolla Complex or represents seasonal inland encampments and adaptations of the main coastal groups (Morrato 1984). While chronology is yet unclear, the southern coast and intermontane valleys may have lacked Wallaces's Intermediate Horizon characterized in Los Angeles and Ventura coastal settings.

The Late Prehistoric period began around the latter part of the night century and continued until historic contact. The period is characterized by three basic shifts in the economy: (a) a more land-based collecting economy, (b) collection of specifically-targeted shellfish resource areas, and (c) the development of a quasi-maritime economy (True 1966). Archaeologically, the period is characterized by the introduction of the mortar and pestle, finer projectile points, cremations, and the introduction of pottery around 1000 A.D. Within the Luiseno territory the later period is represented by the San Luis Rey Complex, which is divided into stages I (A.D. 1400-1750) and II (A.D. 1750-1850). The complex was first proposed by Meighan (1954) based upon hist work at SD-132 and later redefined by True et al. In 1974.

Archaeologically, the San Luis Rey Complex represents a termination of most of the millingstone practices in favor of greater reliance on acorn exploitation and establishment of semi-permanent villages in centralized resource locations (True 1966). San Luis Rey I assemblages are characterized by millingstones, bedrock mortars, cremations and small triangular points. San Luis Rey II contains all those plus pottery, cremation urns and, after contact, glass beads and metal knives (True et al. 1974) and is also seen as an intrusive period of "desert" traits/people from the northeast, possibly related to the desiccation of lake Cahuilla. Researchers believe that this cultural pattern can be linked to Shoshonean expansion into the region and is probably the direct ancestor of the Luiseno culture (True 1966; True et al. 1974; White 1963; Bean and Shipek 1978).

The late Prehistoric period can be said to have ended with the Spanish colonization and establishment of the missions. Disease and forced relocation, which reduced the populations considerably among the coastal settlements, did much to destroy the cultural pattern established at that period (Bean and Shipek 1978).

The Late Prehistoric cultural pattern appears to have lasted longer among the inland groups since it was the policy of Mission San Luis Rey to maintain traditional settlement patterns and economic practices. Even after the missions were secularized in 1834, the inland groups were able to maintain most of their traditional orientation until the arrival of the Anglos from 1859-1879, when most of the Luisenos were displaced and dispersed (Bean and Shipek 1978:558). The name, of Spanish origin and derived from the Mission San Luis Rey de Francia located at present day Oceanside, is applied to the people inhabiting the area of southern Riverside, northern San Diego and eastern Orange counties.

The Luiseno culture may also include the Indians of Mission San Juan Capistrano. Although Kroeber and Harrington had distinguished the Luiseno from the Indians at the Mission San Juan Capistrano based upon linguistic differences, later work by R.C. White (1963) had shown both groups to be one ethnic nationality (Bean and Shipek 1978).

The Luiseno territory covered 1,500 square miles. It included most of the San Luis Rey and Santa Margarita river drainages and was bordered along the coast by Aliso Creek on the north and Hedoinda Creek to the south. Inland it ran from Santiago Peak on the northeast down the east side of the Elsinore fault valley to the east side of Palomar Mountain and the southern slope of the San Jose Valley (Bean and Shipek 1978, White 1963).

Linguistically, the Luiseno belonged to the Cupan group of the Takic subfamily of the more widespread Uto-Aztecan family. This was earlier called the Southern California Shoshonean and includes the languages of the Gabrielino, Serrano, Cahuilla, and Cupeno (Bean and Shipek 1978).

A number of researchers [Sparkman (1908), Krober(1925), White (1963) and Bean and Shipek (1978)] have attempted to reconstruct past Luiseno lifeways. Based upon their work the following conclusions are suggested. The Luiseno were intensive hunters and gatherers that utilized both coastal and inland resources. They lived in large sedentary villages that were typically located along valley bottoms, streams, coastal strands, and mountain ranges. These villages were usually in good defensive locations near perennial water sources with every village having access to a number of well-defined and well-defended resource areas that were usually within a day of travel from the village. These resources areas were owned either individually, by a family, or by the village as a whole and it was only with permission that one could exploit another's territory (Bean and Shipek 1978).

Typically, the village contained specialized activity areas that included residence houses, sweat-houses and special ceremonial enclosures (True 1966). Each village was a politically independent clan triblet of patrilineally-related people which was headed by a hereditary chief whose powers included religious, economic and warfare duties. The headman was assisted by a council of ritualist specialists and shamans whose positions were also hereditary (Sparkman 1908; and Bean and Shipek 1978).

Although most of the villages were sedentary or semi-permanently located, full time occupation of the village was not always the case. Small working parties would move to temporary camps to hunt, harvest seeds, or conduct special ceremonies. At least once a year most of the village would move and establish temporary camps, either on the coast to collect shellfish or in the mountains to harvest acorns or other resources not available near the main village. Therefore, within the

Luiseno region several different temporary site types can occur such as hunting camps, fishing camps, or acorn gathering camps.

Today, the Luiseno recognize their heritage and are attempting to maintain and relearn much of it (Bean and Shipek 1978). They have no central tribal organization, but are loosely organized into a number of groups or bands enrolled on the reservations at La Jolla, Rankine, Pauma, Pechanga, Pala and Soboba.

The northern portion of the project area (San Bernardino Valley) lies mostly within the traditional territory of the Gabrielino, a Native American group generally considered to be the most populous and most powerful ethnic nationality in aboriginal southern California. The Gabrielino's territory was centered in the Los Angeles Basin, but their influence spread as far as the San Joaquin Valley, the Colorado River, and Baja California. Along the eastern edge of the project area, the Gabrielino's territorial claim overlapped with the those of two other Native American groups: the Serrano of the San Bernardino Mountains, and the Luiseño of the Perris-Elsinore region. During the 19th century, a late influx of Cahuilla from the San Gorgonio Pass and Coachella Valley occurred in the present-day Riverside-San Bernardino region, further complicating the ethnic composition of the native population in the early historic period.

Although the first European explorers traveled through the vicinity as early as the 1770s, for more than half a century the arid inland area received little physical impact from the Spanish colonization activities along the Pacific coast. After the establishment of Mission San Gabriel in 1771, the project area gradually became a loosely defined mission rancho used for food production, including crops and cattle, but no Europeans are known to have settled in the area until the late-1830s. In 1834, the Mexican government, which had inherited Alta California from Spain when it gained independence in 1821, began to dismantle the mission system through the process of secularization. Like all other former mission land holdings throughout Alta California, the rancho was divided and granted to various prominent citizens of the territory. Between 1838 and 1846, several large private ranchos was created in and around the project area, including Santa Ana del Chino, Cucamonga, Jurupa, La Sierra (Sepulveda), La Sierra (Yorba), and El Rincon. As elsewhere in southern California during the Rancho Period, cattle raising was the most prevalent economic activity on these ranchos, until the influx of American settlers eventually brought an end to this now-romanticized lifestyle during the second half of the 19th century.

In the 1880s, spurred by the completion of the competing Southern Pacific and the Santa Fe Railroads, a land boom swept through much of southern California. A large number of towns, surrounded by irrigated agricultural land, were laid out in the project area before the end of the 19th century. Following the successful introduction of the naval orange in the mid-1870s, the project area became an important part of southern California's prosperous citrus industry. In the meantime, different communities in the project area also developed distinctive local characteristics in their economic and social life. The Chino area, for example, was long known as the dairy capital of southern California, while the Rancho Cucamonga area was closely associated with vineyard cultivation and wine-making. By the mid-20th century, however, the forces of industrialization and urbanization began to rapidly alter this predominantly agrarian setting of the project area. In particular, the establishment of the Kaiser Steel Mill in the early 1940s dramatically changed the cultural landscape of the Fontana area. During the more recent decades, due to the ever increasing demand for affordable housing by commuters who work in the Greater Los Angeles area,

citrus groves and vineyards have given way to housing tracts, as the cities and towns in the project area took on more and more of the characteristics of "bedroom communities."

The potential for paleontological resources to occur within the project area varies with the underlying geology. Crystalline bedrock (found in many of the mountains and hills in the project area) does not contain any fossils. Sedimentary strata outcrops in several area (such as portions of the Chino Hills) and fossils are commonly encountered in these areas. Fossils are also occasionally found in alluvial sediments, particularly older alluvium, throughout the area. The Division of Geological Sciences of the San Bernardino County Museum (SBCM) completed a literature review and records search for the proposed western San Bernardino Valley. Previous geologic mapping of this area is indicative of the potential paleontological resources that may be encountered throughout the whole of the study area, which include surface exposures of a variety of sediments dating from the Pleistocene Epoch to recent times. The varied components of the project, the sediments upon which they are located, and the paleontologic sensitivity of those sediments are discussed below.

4.14.3 Project Impact

The development of water sales delivery facilities within the project area would include installing a variety of new infrastructure systems. The cultural resources of focus in this evaluation are related to the types of possible alterations to project sites from construction of pipeline and pump station facilities, and the potential damage or loss of historical structures that may exist within the area of potential impact that may be impacted from implementing this project.

4.14.3.1 Thresholds of Significance

The purpose of this study is to assist the SBMWD in determining whether potential cultural resources (as defined above) meet the official definitions of “historic resources,” as provided in the California Public Resources Code, in particular CEQA, or significant paleontological resources.

According to PRC §5020.1(j), “historical resource’ includes, but is not limited to, any object, building, site, area, place, record, or manuscript which is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California.” Specifically, CEQA guidelines states that the term “historical resources” applies to any such resources listed in or determined to be eligible for listing the California Register of Historical Resources, included in the local register of historical resources, or determined to be historically significant by the Lead Agency (Title 14 CCR §15064.5(a) (1)-3)).

Regarding the proper criteria for the evaluation of historical significance, CEQA guidelines mandate that “a resource shall be considered by the lead agency to be ‘historically significant’ if the resource meets the criteria for listing on the California Register of Historical Resources” (Title 14 CCR §15064.5(a)(3)). A resource may be listed in the California Register if it meets any of the following criteria:

(1) Is associated with events that have made a significant contribution to the broad patterns of California’s history and cultural heritage.

(2) Is associated with the lives of persons important in our past.
(3) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.
(4) Has yielded, or may be likely to yield, information important in prehistory or history. (PRC §5024.1(c))

A significant cultural resource impact would be any one impact that resulted in the unmitigable damage, disturbance or destruction of an archeological, paleontological, or other historic/cultural resource.

4.14.3.2 Archaeological and Historical Resources

Activities requiring the excavation (for example, pipeline construction) or movement of soil material at any location within the project area have the potential to adversely effect cultural resources. As noted in the discussion of the existing environmental setting above, the location of most proposed infrastructure required to support the RIX Recycled Water Sales Program (pipelines and pump stations) will occur within existing disturbed rights-of-way where the potential for finding archaeological or historical resources is low. Regardless, the implementation of the proposed project activities in the area of potential impact could encounter and destroy or permanently alter the archaeological or historical sites and resources. The loss or significant damage to such resources or their information value would be considered a significant impact of the proposed project. Mitigation measures have been identified below that will ensure archaeological or historical sites and resources will not experience significant damage or loss. This will be accomplished by preserving the resources and their information value. Implementation of the measures outlined below can ensure that archaeological and historical resources are managed in a manner that does not cause significant adverse impacts.

4.14.3.3 Paleontological Resources

Activities requiring the excavation (for example, pipeline construction) or movement of soil material at any location within the project area have the potential to adversely effect cultural resources. As noted in the discussion of the existing environmental setting above, the location of most proposed infrastructure required to support the RIX Recycled Water Sales Program (pipelines and pump stations) will occur within existing disturbed rights-of-way where the potential for finding or exposing paleontological resources is low. Further, many of the locations where new RIX Recycled Water Sales Program will be installed is underlain by young alluvium where potential for encountering buried paleontological resources of significant value is low.

Regardless, the implementation of the proposed project activities in the area of potential impact could encounter and destroy or permanently alter the paleontological resources. The loss or significant damage to such resources or their information value would be considered a significant impact of the proposed project. Mitigation measures have been identified below that will ensure paleontological resources will not experience significant damage or loss. This will be accomplished by preserving the resources and their information value. Implementation of the measures outlined below can ensure that paleontological resources are managed in a manner that does not cause significant adverse impacts.

4.14.4 Mitigation Measures

Mitigation measures are required to reduce potential archaeological, historical and paleontological resource impacts to a nonsignificant level. The following mitigation measures will be implemented, where appropriate, for future projects being developed in support of the RIX Recycled Water Sales Program:

4.14-1 ***Future facility improvements will avoid damaging cultural resources where feasible. Should avoidance prove not feasible, the importance of the site shall be evaluated by a qualified archaeologist, historian or paleontologist. The first step in the process shall be the conduct of a records search for known cultural resource sites within the area of potential effect (APE). If the records search indicates a potential for cultural resources to be located within the APE, the APE shall be surveyed by a qualified cultural resources professional. If resources are found, they shall be treated in accordance with measures outlined below. If determined necessary, the construction activities shall be monitored.***

4.14-2 ***A monitoring plan and discovery clause/treatment plan, to be implemented during the earthmoving phase of project implementation, will be developed by the archaeologist specifying procedures to be implemented in the event archaeological remains are uncovered during earth moving activities. The plan will provide for evaluation of anticipated and unanticipated cultural resources, provide mitigation alternatives for unavoidable archaeological impacts, and include contingency procedures for times when the archaeological monitor is not present on-site.***

4.14-3 ***The archaeological monitor will attend a pre-construction meeting to explain the mitigation program to construction contractor staff.***

4.14-4 ***An archaeological monitor, qualified in historical archaeology, shall be present during any demolition or earthmoving operations where a potential for significant cultural resources has been identified. The archaeological monitor shall be empowered to halt work to allow evaluation and removal of buried cultural remains. The monitor will complete a form daily summarizing the location being monitored, the nature of the work being done, soil conditions and other observations, and itemizing any cultural resources observed.***

4.14-5 ***When the monitor observes other than minor, isolated archaeological resources, the monitor will request the construction contractor to divert activities within an area deemed large enough to encompass the deposit, feature, structure or other resource observed. The monitor will report the discovery to the lead agency.***

4.14-6 ***If the resources is determined to be significant, based upon integrity or scientific potential, the supervising archaeologist will prepare a research design acceptable to the City outlining measures to mitigate site impacts.***

4.14-7 ***Should any prehistoric sites or features be encountered during excavation, a Native American monitor from the list approved by the Native American Heritage Commission (NAHC) will be added. In the event human remains are encountered, all work will be halted in the vicinity of the observation, and the County Corner and NAHC will be contacted. Treatment of remains will be determined in consultation with the Native American monitor and appropriate tribe or ban of affected Native Americans.***

4.14-8 ***Prior to any demolition of historic structures, an advertisement shall be placed in a newspaper of regional circulation and one or more historical societies, announcing the availability of the structures for relocation. The announcement shall provide a minimum 30-day period for submittal of proposals for removal of structures. Mutually satisfactory arrangements for removal of structures shall be negotiated. If no proposals are received, or if a mutually satisfactory arrangement cannot be negotiated, the demolition will proceed. Demolition at and below present grade will be monitored. In this case, the existing site records, or the records as they may be updated, are considered to fulfill any mitigation requirement.***

4.14-9 ***Prior to authorizing second-tier projects when specific locations are known, the APE shall be assessed for paleontological resources by conducting a records check, literature review or a review of the APE by a qualified professional. If resources are found, they shall be treated in accordance with measures outlined below. If determined necessary, the construction activities shall be monitored.***

4.14-10 ***Prior to any earthmoving at proposed sites, a qualified vertebrate paleontologist will develop a storage agreement with the local museums to allow for the permanent storage and maintenance of any fossil remains recovered at construction sites and for archiving of associated specimens and corresponding geologic and geographic site data.***

4.14-11 ***The paleontologist will develop a mitigation plan and discovery clause/treatment plan to be implemented during the earthmoving phase of project implementation. The treatment plan will allow for the recovery and subsequent treatment of any fossil remains and associated data recovered as a result of the mitigation program. This treatment plan will include approved procedures and lines of communication to be implemented if fossil remains are uncovered by earthmoving activities, including those times when the paleontological monitor is not present on the site.***

4.14-12 ***A qualified paleontologist monitor will attend a pre-construction meeting to explain the mitigation program to the construction contractor staff.***

4.14-13 ***Paleontological monitoring of earthmoving will be conducted only in areas where previously undisturbed sedimentary rock or alluvial sediments will be disturbed by earthmoving activities. Monitoring will not be required in areas underlain by younger alluvium until earthmoving has reached a depth of four feet below current grade.***

4.14-14 ***If fossil remains are found by the monitor, earthmoving activities will be diverted around the fossil site until the remains have been removed. If not already in effect, monitoring will be increased to full time in areas underlain by the fossil-bearing rock unit, at least in the immediate vicinity of the fossil site.***

4.14-15 ***Any recovered fossil remains will be prepared to the point of identification and identified to the lowest taxonomic level feasible by knowledgeable paleontologists. The remains then will be curated (e.g., assigned and labeled with the local museum's specimen and corresponding site numbers; mounted and placed in vials, if necessary; and placed in specimen trays with completed specimen data cards) and catalogued. The specimen and corresponding geologic and geographic site data will be archived (specimen and site numbers and corresponding data entered into appropriate museum catalogs and***

computerized data bases) by a laboratory technician. The fossil remains then will be sent to the museum, where they will be permanently stored, maintained, and made available for future study by qualified investigators.

4.14-16 A final report of findings with an inventory of recovered fossil specimens will be prepared by the paleontologist for submission to the lead agency and appropriate museum.

Implementation of the above measures can reduce potential adverse cultural resource impacts to a level of nonsignificance.

4.14.5 Cumulative Impact

Cumulative cultural resource impacts can only occur when such resources are not avoided or are not recovered, evaluated and their data value placed in the broader context of such resources. Based on the above mitigation requirements to ensure that such resources are avoided or otherwise protected and evaluated, no cumulative significant cultural resource impacts are forecast to occur if the proposed project is implemented.

4.14.6 Unavoidable Adverse Impact

The cultural resource evaluation presented above indicates that, with implementation of appropriate mitigation measures, the proposed project will not cause any significant unavoidable adverse impacts. Therefore, no significant unavoidable adverse cultural resource impacts are forecast to occur if the proposed project is implemented.

4.15 RECREATION

4.15.1 Introduction

Recreation issues were not considered potential significant effects in the Initial Study, but to ensure that the PEIR is a comprehensive document, this issue is being evaluated as part of the PEIR. Under the present proposal, the proposed project has little potential to directly affect existing recreational facilities or to create additional indirect demand for recreational facilities. The availability of recycled water to irrigate recreational facilities can be considered a beneficial effect of the proposed project because the use of recycled water reduces demand for potable groundwater extracted from regional aquifers.

4.15.2 Environmental Setting: Recreation

There are three types of recreational facilities that occur within the area of potential impact. Local neighborhood parks, regional parks, school facilities and private recreational facilities, such as baseball facilities and active recreational facilities. A mix of local cities, special districts, cities and counties provide recreational facilities within the region. State parks are also located within the region (such as Chino Hills State Park), but most of these facilities are nature parks that require little or no irrigation.

Based on the alignment of proposed pipelines and the flexibility in locating pump stations, no parks are located in the preliminary locations considered for such facilities. However, several recreational facilities, private and public, do occur in the corridor from the RIX facility and the RP-3 site. These facilities are generally south of Jurupa Avenue and include: El Rivino Country Club; Martin Tudar-Jurupa Hills Regional Park; Mary Vagle Museum and Nature Center; Village Park; and Southridge Park.

In addition, several recreational facilities occur along the Santa Ana River, including the Santa Ana River Trail, a mixture of existing and proposed trail facilities. Parks within the general vicinity of the of the Santa Ana River Channel include: AB Brown Sports Complex; Riverside Golf Club; Fairmont Park, Mt. Rubidoux Park; Santa Ana River Wildlife Area; Martha McClean Anza Narrows Park; Jurupa Hills Country Club, Paradise Knolls Golf Course; and Santa Ana River Regional Park.

4.15.3 Project Impacts: Recreation

The implementation of the proposed RIX Facility Recycled Water Sales Program includes the installation of sufficient infrastructure facilities to distribute the recycled water to potential users in the region, including the west San Bernardino Valley (Chino Basin); Riverside County downstream of the RIX facility; and Orange County downstream of Prado Dam. The potential direct impacts are installation of major distribution facilities across existing park and recreation areas and potential indirect effects are those related to increased demand for recreational facilities.

4.15.3.1 Significance Criteria

The following criteria will be used to determine whether a significant recreational service impact will be created by the proposed project:

- The project will result in significant impact to recreational services if it causes demand for such services to exceed that related to future growth forecasts contained in regional growth projection documents.

- The project will result in significant impact to recreational services if it causes substantial damage or loss of existing recreational facilities or acreage.

4.15.3.2 Project Impact

a. Will the project cause a significant demand for recreational services?
b. Will the project affect any existing recreational opportunities?

The proposed project is designed to deliver recycled water that can be used to support recreational facility landscape areas within the area of project impact. Implementation of the proposed project is not forecast to change land uses, increase population, or otherwise create activities that can increase demand for additional recreational services. The Project Area is already served by the existing recreational resources and based on preliminary infrastructure improvements, no recreational facilities are located within any of the areas proposed for installation of improvements. No potential for any significant recreational service impacts is identified at this stage of review. However, if future RIX facility infrastructure facilities must be installed within park or recreation areas with a concurrent significant reduction in recreation capacity, the mitigation measure outlined below will be implemented.

4.15.4 Mitigation Measure

The following mitigation measure will be implemented to reduce future potential significant loss of recreational capacity.

4.15-1 If future infrastructure facilities cause a significant loss of recreational capacity at any facility, the Department will offset the loss by providing comparable capacity either on or off the recreation site.

4.15.5 Cumulative Impact

The data presented above concludes that the proposed project will not contribute to future recreational services demand and therefore will not cause cumulative significant effects on existing recreational facilities or demand for such facilities. Thus, implementation of the proposed project is not forecast to contribute to any significant increases in demand for recreational service that could be considered cumulatively significant and adverse.

4.15.6 Unavoidable Adverse Impact

The recreational service evaluation presented above indicates that the proposed project has no potential to cause adverse impact to demand for recreation without mitigation. A low potential exists for future infrastructure facilities to significantly reduce the capacity of existing recreational facilities. However, circumstances could arise where such impact could occur, so mitigation has been identified to reduce this potential impact to a nonsignificant level. Therefore, no significant unavoidable adverse recreational service impacts are forecast to occur if the proposed project is implemented.

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CHAPTER 5 - ALTERNATIVES

5.1 INTRODUCTION

The California Environmental Quality Act (CEQA) and the State CEQA Guidelines require an evaluation of alternatives to the proposed action in an environmental impact report (EIR) to examine ways to reduce potentially significant adverse environmental impacts to a nonsignificant level. Section 15126(d) of the State CEQA Guidelines indicates that the "discussion of alternatives shall focus on alternatives capable of eliminating any significant adverse environmental effects or reducing them to a level of not significant..." In this case no significant adverse impacts have been identified. The State Guidelines also state that "a range of reasonable alternatives to the project....which could feasiblely attain the basic objectives of the project" and "The range of alternatives required in an EIR is governed by "rule of reason" that requires the EIR to set forth only those alternatives necessary to permit a reasoned choice."

The project evaluated in this Program EIR (PEIR) is the sale of up to 18,000 acre-feet of recycled water produced by the San Bernardino Municipal Water Department (SBMWD) RIX treatment facility. Adequate infrastructure would be constructed to deliver the RIX recycled water to customers for direct (landscape or industrial use) or indirect (recharge to groundwater aquifers) use. One of the alternatives that must be evaluated in an EIR is a "no project alternative" regardless of whether it is a feasible alternative to the proposed project, i.e., would meet the project objectives or requirements. Under this alternative the environmental impacts that would occur if the proposed project is not approved and implemented are identified. In addition to the no project alternative, one other alternative is evaluated in this chapter. This alternatives is:

1. A Reduced Size Project, Sale of a Maximum 5,000 Acre-Feet of Recycled Water.

The alternative of relocating the project was discussed in Chapter 3, Section 3.4.3. The evaluation of this alternative in Chapter 3 concluded: *The RIX facility recycled water sales program is a proposal for sale of recycled water from a specific facility, of which the majority of the wastewater is contributed by the City of San Bernardino. There is no other location or facility under the City's control which could provide this volume of water to meet the project objectives. It is not possible to transfer this recycled water resource and its potential sale to another facility or location and reasonably meet the project objectives defined above. The Supreme Court ruled that it is not necessary to consider alternative locations when such an alternative is not reasonable or feasible. Therefore, the alternative of implementing the proposed project at another location is not considered a reasonable or feasible alternative to the proposed project and will not be given further consideration.*

The following evaluation will also include identification of an environmentally superior alternative as required by the State CEQA Guidelines.

5.2 NO PROJECT ALTERNATIVE

The SBMWD is mandated to provide adequate tertiary-equivalent wastewater treatment to the water generated by its customers. The RIX facility was constructed to treat wastewater generated

by Colton and San Bernardino customers to a level that meets the discharge requirements by the Santa Ana Regional Water Quality Control Board (Regional Board). In meeting the Regional Boards discharge requirement, the treated effluent meets Title 22 standards for recycled water that can be used for most purposes, except direct consumption. Thus, the recycled water being produced by the RIX facility is suitable for a variety of uses, including direct uses such as industrial water and landscape irrigation and indirect uses such as recharge of groundwater aquifers.

The No Project Alternative would result in eliminating the sale of up to 18,000 acre-feet of RIX recycled water and continue discharging the existing volume and future volumes of recycled water to the Santa Ana River. This water would continue to flow downstream where it would either be utilized by downstream consumptive uses (such as water for in-channel riparian vegetation growth) or it would flow into the ocean. The inability to use a portion of the RIX facility discharge for sale to future customers would not meet the project objectives stated in Chapter 3 and is not considered a reasonable or feasible alternative. Further, the no project alternative would result in the loss of an important resource produced by the residents of the City of San Bernardino and Highland, the primary contributors to these flows. The residents pay for the high level of wastewater treatment provided by the RIX facility, and the value of this costly treatment would be foregone to the residents. Elimination of sale of any RIX recycled water would eliminate most of the adverse impacts associated with the proposed project.

Under the no project alternative a second scenario could possibly occur, such that another agency or entity downstream of the discharge would capture these flows and use them for similar purposes as proposed by the SBMWD. This scenario could result in comparable volumes of RIX recycled water being diverted from the Santa Ana River channel. Under this scenario, RIX recycled water could be removed from the channel at any location where it can be reused for beneficial purposes. Potential impacts of this scenario could be similar to the impacts forecast for the proposed project, depending upon where the flows would be diverted. This alternative could also result in the same type of infrastructure facilities being constructed to divert and distribute the recycled water flows. This scenario would only not meet the objectives of the project. Potential impacts associated with this scenario would be similar to the proposed project and would not be considered environmentally superior.

Implementation of the no project alternative will result in the following environmental effects when compared to the proposed project.

1. Land Use and Planning: The proposed project was identified as having two potentially significant adverse land use/planning impacts. First, a potential to remove agricultural land from production and second, a potential for future infrastructure to create incompatible land use activities, such as noise near a sensitive noise receptor. Mitigation was identified to reduce these impacts to a level of nonsignificant impact for the proposed project. The no project alternative would eliminate these potential nonsignificant land use/planning impacts and is not forecast to cause any different potential land use/planning impacts. Because the proposed project land use/planning impacts can be mitigated to a nonsignificant level, the no project alternative is not considered environmentally superior to the proposed project for land use and planning issues.

2. Population and Housing: The proposed project was identified as having no potentially significant adverse direct or indirect population and housing impacts. The no project alter-

native would have the same nonsignificant land use/planning impacts and is not forecast to cause any different potential population and housing impacts. Because the proposed project population and housing impacts will be nonsignificant without mitigation, the no project alternative is not considered environmentally superior to the proposed project for population and housing issues.

3. Geology and Soils: The proposed project was identified as having potentially significant adverse geology and soils impacts related to construction of new infrastructure facilities. Construction projects have a potential to be exposed to significant geotechnical constraints and/or cause geologic/soil impacts, such as an increased potential for loss of topsoil due to erosion. Mitigation was identified to reduce these impacts to a level of nonsignificant impact for the proposed project. The no project alternative would eliminate these potential non-significant geology and soils impacts by eliminating the need to install new infrastructure. This alternative is not forecast to cause any different potential geology and soil impacts. Because the proposed project geology and soils impacts can be mitigated to a nonsignificant level, the no project alternative is not considered environmentally superior to the proposed project for geology and soils issues.

4. Water Resources/Hydrology/Water Quality: The proposed project was identified as having potentially significant adverse water resources/hydrology/water quality impacts related diversion of up to 18,000 acre-feet of RIX discharges to the proposed water sales program. Based on the most current data, this would leave a residual RIX discharge of ~31,400 acre-feet per year downstream in the Santa Ana River channel. Mitigation was identified to reduce these potentially significant impacts to a level of nonsignificant impact for the proposed project. The no project alternative would eliminate these potential nonsignificant water resource/hydrology/water quality impacts by eliminating the 18,000 acre-feet diversion and retaining the current ~49,400 acre-feet of discharge to the downstream areas of the Santa Ana River channel. This alternative has a potential to cause a separate adverse impact to water resources/hydrology/water quality. Without the availability of recycled water for use within the project's area of potential impact, potable water resources will be consumed at a higher rate, contributing to potentially cumulative significant water resources impacts within the area of potential impact. Because the proposed project water resources/hydrology/water quality impacts can be mitigated to a nonsignificant level and the no project alternative may contribute to cumulative significant water resource impacts, it is considered to have worse environmental impacts than the proposed project for water resources/hydrology/water quality issues.

5. Air Quality: The proposed project was identified as having one potentially significant adverse air quality impact related to construction of new infrastructure facilities, adverse effects on adjacent land uses from construction related emissions. Mitigation was identified to reduce this impact to a level of nonsignificant impact for the proposed project. The no project alternative would eliminate this potential nonsignificant air quality impacts by eliminating the need to install new infrastructure. This alternative is not forecast to cause any different potential air quality impacts. Because the proposed project air quality impacts can be mitigated to a nonsignificant level, the no project alternative is not considered environmentally superior to the proposed project for air quality issues.

6. Transportation and Circulation: The proposed project was identified as having potentially significant transportation and circulation impacts related to construction of new infrastructure facilities, adverse traffic flow and safety effects on roadways during construction. Mitigation was identified to reduce these impacts to a level of nonsignificant impact for the proposed project. The no project alternative would eliminate these potential nonsignificant transportation and circulation impacts by eliminating the need to install new infrastructure. This alternative is not forecast to cause any different potential transportation and circulation impacts. Because the proposed project transportation and circulation impacts can be mitigated to a nonsignificant level, the no project alternative is not considered environmentally superior to the proposed project for transportation and circulation issues.

7. Biological Resources: The proposed project was identified as having potentially significant adverse biological resource impacts related to construction of new infrastructure facilities and diversion of up to 18,000 acre-feet of RIX recycled water. Mitigation was identified to reduce these impacts to a level of nonsignificant impact for the proposed project. The no project alternative would eliminate these potential nonsignificant biological resource impacts by eliminating the diversion of RIX recycled water and the need to install new infrastructure. The no impact alternative has a potential to contribute to a cumulative adverse impact based on continuing discharges that, along with other discharges above Prado Dam, may contribute to the loss of riparian vegetation due to too much water accumulating behind the dam. This concern has been raised by the U. S. Fish and Wildlife Service in comments submitted to the Inland Empire Utilities Agency on its Optimum Basin Management Program Program Environmental Impact Report. Because the proposed project biological resources impacts can be mitigated to a nonsignificant level and the no project alternative may contribute to cumulative significant loss of habitat behind (upstream of) Prado Dam, it is considered to have worse environmental impacts than the proposed project for biological resource issues.

8. Energy and Mineral Resources: The proposed project was identified as having one potentially significant adverse energy impact related to consumption of energy for pumping RIX recycled water to potential customers. Mitigation was identified to reduce this impact to a level of nonsignificant impact for the proposed project. The no project alternative would eliminate this potential nonsignificant energy impact by requiring pumping to occur during off-hours so as not to increase energy demand during peak demand periods. This alternative is not forecast to cause any different potential energy impacts. Because the proposed project biological resources impacts can be mitigated to a nonsignificant level, the no project alternative is not considered environmentally superior to the proposed project for energy and mineral resource issues.

9. Hazards and Risk of Upset: The proposed project was identified as having potentially significant adverse hazard/risk of upset impacts related to construction of new infrastructure facilities, adverse effects due to accidental spills, discovery of contaminated soil during construction and disruption of emergency or evacuation routes. Mitigation was identified to reduce these impacts to a level of nonsignificant impact for the proposed project. The no project alternative would eliminate these potential nonsignificant hazard/risk of upset impacts by eliminating the need to install new infrastructure. This alternative is not forecast to cause any different potential hazard/risk of upset impacts. Because the proposed project hazard and risk of upset impacts can be mitigated to a nonsignificant level, the no project alternative

is not considered environmentally superior to the proposed project for hazard and risk of upset issues.

10. Noise: The proposed project was identified as having potentially significant adverse noise impacts related to construction of new infrastructure facilities and operating pump stations to distribute up to 18,000 acre-feet of RIX recycled water. Mitigation was identified to reduce these impacts to a level of nonsignificant impact for the proposed project. The no project alternative would eliminate these potential nonsignificant noise impacts by eliminating the diversion of RIX recycled water and the need to install new infrastructure. This alternative is not forecast to cause any different potential noise impacts. Because the proposed project noise resources impacts can be mitigated to a nonsignificant level, the no project alternative is not considered environmentally superior to the proposed project for noise issues.

11. Public Services: The proposed project was identified as having potentially significant adverse public service impacts related to demand for police services and generation of solid waste during construction. Mitigation was identified to reduce these impacts to a level of non-significant impact for the proposed project. The no project alternative would eliminate these potential nonsignificant public service impacts by requiring control of construction sites and properly managing solid waste generated during construction. This alternative is not forecast to cause any different potential public service impacts. Because the proposed project public service impacts can be mitigated to a nonsignificant level, the no project alternative is not considered environmentally superior to the proposed project for public service issues.

12. Utilities and Service Systems: The proposed project was identified as having potentially significant adverse utilities and service system impacts related to demand for energy and consumption of water at infrastructure facility locations. Mitigation was identified to reduce these impacts to a level of nonsignificant impact for the proposed project. The no project alternative would eliminate these potential nonsignificant public service impacts by requiring energy conservation and by requiring xeriscape landscaping at future infrastructure facilities. This alternative is not forecast to cause any different potential utilities and service system impacts. Because the proposed project utilities and service system impacts can be mitigated to a nonsignificant level, the no project alternative is not considered environmentally superior to the proposed project for utilities and service system issues.

13. Aesthetics: The proposed project was identified as having potentially significant adverse aesthetic impacts related to scarring of the landscape and possible changes in visual settings where future infrastructure facilities are installed. Mitigation was identified to reduce these impacts to a level of nonsignificant impact for the proposed project. The no project alternative would eliminate these potential nonsignificant aesthetic impacts by requiring revegetation and design of the future facilities to reduce the contrast with the surrounding visual setting. This alternative is not forecast to cause any different potential aesthetic impacts. Because the proposed project aesthetic impacts can be mitigated to a nonsignificant level, the no project alternative is not considered environmentally superior to the proposed project for aesthetic issues.

14. Cultural Resources: The proposed project was identified as having potentially significant adverse cultural resource impacts related to construction activities exposing potential sub-surface cultural resources. Mitigation was identified to reduce these impacts to a level of

nonsignificant impact for the proposed project. The no project alternative would eliminate these potential nonsignificant aesthetic impacts by eliminating the need to install the infrastructure. This alternative is not forecast to cause any different potential cultural resource impacts. Because the proposed project cultural resource impacts can be mitigated to a nonsignificant level, the no project alternative is not considered environmentally superior to the proposed project for cultural resource issues.

15. Recreation: The proposed project was identified as having potentially significant adverse recreation impact related to loss of recreational resources due to installation of project related infrastructure. Mitigation was identified to reduce this impact to a level of nonsignificant impact for the proposed project. The no project alternative would eliminate this potential nonsignificant recreation impact by eliminating the need to install the infrastructure. This alternative is not forecast to cause any different potential recreation impacts. Because the proposed project recreation impacts can be mitigated to a nonsignificant level, the no project alternative is not considered environmentally superior to the proposed project for recreation issues.

The comparative analysis of the no project alternative to the proposed project indicates that the no project alternative may result in more significant adverse environmental impacts than the proposed project. The proposed project is not forecast to cause project specific or cumulative significant adverse environmental impacts with implementation of the identified mitigation measures. On the other hand, implementing the no project alternative might increase significant adverse environmental effects for water resources and biological resources. Under the no project alternative the recycled water discharged from the RIX facility will remain the same and actually increase in the future as normal population growth of the RIX service area occurs. The continued growth in treatment plant discharges has substantially increased and is currently estimated to be about 180,700 acre-feet (2001) behind Prado Dam. This contributes to such a high water table behind the dam that riparian vegetation is being killed by the high water table.

The no project alternative would continue contributing the same volume to this cumulative discharge, while the proposed project would reduce the RIX facility contribution. Thus, the no project alternative may contribute to the significant adverse effect described above. The no project alternative will also eliminate the use of RIX recycled water as an offset to potable water resources that must be pumped from local aquifers. The net result is that the demand for water resources may cause adverse impacts, short- or long-term to these aquifers, which could be offset by RIX recycled water.

Because of these two potentially significant adverse impacts, the no project is not considered environmentally superior to the proposed project.

5.3 REDUCED SIZE PROJECT

The difficulty with a reduced size project scenario is that, as outlined under the no project discussion above, implementation of the proposed project is not forecast to cause any significant adverse impacts that cannot be mitigated to a level of nonsignificant impact. Assuming that a maximum volume of 5,000 acre-feet of RIX water is diverted for sale, some infrastructure system improvements must still be constructed to transfer the water to future users. This will result in all of the potential construction related impacts remaining the same as forecast for the proposed

project. Further, similar to the no project alternative, the reduced size project alternative would allow greater volumes of RIX recycled water to reach the sensitive riparian area behind Prado Dam and would still require pumping of a substantial additional volume of water (13,000 acre-feet per year) to meet water demand that could be offset by the proposed project.

Thus, based on the analysis, the reduced size project could have greater adverse impacts on the environment than the proposed project. The reduced size alternative is not considered to be an environmentally superior alternative to the proposed project.

5.4 DISCUSSION OF ALTERNATIVE TO THE PROPOSED PROJECT

Of the two alternatives considered to the proposed project, the no project alternative and reduced size project have been determined to be the environmentally inferior to the proposed project which is identified as the environmentally superior alternative. Given the type of impacts associated with retaining all or most of the discharge from the RIX facility, the question might be asked whether additional RIX recycled water should be diverted as a more environmentally sound project. The answer to that question is complicated, but for two reasons the SBMWD does not choose to alter the 18,000 acre-foot maximum diversion at this time. First, the 18,000 acre-feet RIX recycled water diversion volume was selected based on the potential customer base. Therefore, this volume of water meets the current objectives of the SBMWD.

Second, the discussion above illustrates the complicated problem of how much water is enough at a given location. Wastewater discharges are accumulating behind Prado Dam and appear to be having an adverse effect on this significant riparian resource. However, sufficient flows are needed between the RIX facility and at least the Riverside Narrows to ensure protection of listed fish species and the riparian habitat within the river channel that supports other endangered species of birds. The analysis in Section 4.4 indicates that the residual recycled water flows from RIX, after removing the maximum of 18,000 acre-feet per year, will be sufficient to assure adequate flows in the channel to meet both the needs of the fish and the riparian habitat, with an adequate margin of safety. SBMWD concluded that lowering the volume of RIX recycled water discharge further at this stage of review could go beyond the ability to forecast impacts based on available data and management requirements for both the individual species and the riparian plant community.

Therefore, the proposed project appears to represent a reasonable volume of RIX recycled water discharge that will be protective of the downstream environment, while substantially reducing (10%) the volume of water being delivered to the area behind Prado Dam.

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CHAPTER 6 - TOPICAL ISSUES

6.1 GROWTH INDUCEMENT

The growth inducement issues is fully addressed in Subchapter 4.2, Population and Housing, of this document. Traditionally, significant growth is induced in one of three ways. In the first instance, a project is located in an isolated area and when developed it brings sufficient urban infrastructure to cause new or additional development pressure on the intervening and surrounding land. This type of induced growth leads to conversion of adjacent acreage to higher intensity uses, either unexpectedly or through accelerated development. This conversion occurs because the adjacent land becomes more suitable for development and, hence, more valuable because of the availability of the new infrastructure. This type of growth inducement is typically termed "leap frog" or "premature" development because it creates an island of higher intensity developed land within a larger area of lower intensity land use.

The proposed project will not cause or contribute to "leap frog" or "premature" development because its purpose is deliver recycled water to existing users and it cannot be used as potable water to support residential growth. Because the proposed project and support facilities envisioned by this project do not extend service to new uses or areas not already served by existing water supplies, it has no potential to cause or contribute to accelerated development within the project's area of potential impact. Thus, implementation of the proposed project cannot cause or contribute to leap frog or premature growth.

A second type of growth inducement is caused when a project of large size, relative to the surrounding community or area, is developed within a community and impacts the surrounding community by producing a "multiplier effect," which results in substantial indirect community growth, not necessarily adjacent to the project site or of the same type of use as the project itself. This type of stimulus to community growth is typified by the development of major destination recreation facilities, such as Disney World near Orlando, Florida, or around a military base, such as the Marine Corps Air Ground Combat Center near Twentynine Palms. The proposed project is not a new development that has a potential to cause growth through a "multiplier effect." Development within the project area will be consistent with growth decisions already made by local agencies governing land use decisions, and further, that the proposed project does not remove any existing constraint on future development because existing areas to be served by the proposed project have alternative means (perhaps not as cost or environmentally effective as the proposed project) to meet future water demands within the project area. No new "large" projects are proposed or contingent on the implementation of the proposed project and no potential for this type of multiplier growth inducement can be caused by the implementing the proposed project.

A third and more subtle type of growth inducement occurs when land use plans are established that create a potential for growth because the available land and the permitted land uses result in the attraction of new development. This type of growth inducement is also attributed to other projects designed to provide new infrastructure necessary to meet the land use objectives, or community vision, contained in the governing land use agencies' general plans. In this case, the proposed project will install new infrastructure, but it will serve existing uses or water agencies that will not attract new development. It is assumed that the proposed project's recycled water will allow water

purveyors to meet the demand for water within their service area and conserve potable water for direct consumption uses.

The question still remains as to whether the proposed implementation of the proposed project accommodates growth and the related environmental impacts caused by the increased population that can occupy the project's area of potential impact in the future. The answer to this question can be found in the land use planning process which now determines the future vision of a community to which the proposed project is a small component. The ultimate vision of the area of potential impact is established by the regional planning agencies in conjunction with local general plans. These plans assume that the utility infrastructure required to support the region's population will be in place as growth occurs in the future. The net effect of these general plans is to create a set of expectations regarding future land use and growth that may or may not occur depending upon the actual carrying capacity of the various utility and service resources required to meet future growth. The proposed project provides one alternative source of water to meet this defined future growth.

It also seems clear that the established planning process and the overall growth pressures in southern California are the primary causes of future growth, i.e. they induce the actual growth that occurs, and the various local utilities are effectively forced to create master plans that can accommodate such growth, at least within the limits of current or future resources that may be available. Without the necessary resources or without long-term plans required to support growth, it is also apparent that growth can be constrained or limited.

The position taken in this document is that the utility planning process is appropriately a passive (accommodating) role, not an active (inducing) role, in future growth that is dictated by local land use plans and the unabated growth of population throughout southern California. If communities within the project's area of potential impact chose to restrict growth and maintain a certain vision of the future as a static or slowly growing entity, the land use planning agencies (cities and counties) had the opportunity during the general planning process to establish such plans for the establishment of a carrying capacity based land us plan. Under such circumstances, the utility providers, including those that may purchase RIX recycled water, would have designed their future service plans to accommodate a level of future growth consistent with such a planning vision. In this instance, the SBMWD's RIX recycled water is accommodating a level of future growth that is established, and the proposed project does not modify this level of future growth.

Under this circumstance, this evaluation of the third type of growth inducement for the proposed project concludes that it is not significantly growth inducing; rather, it is growth accommodating. It will not provide a water supply for a population greater than that contained in both regional Southern California Association of Government (SCAG) planning documents, such as the Regional Comprehensive Plan and Growth and local growth forecasts and it does not include infrastructure designed to support more intensive uses of land. Therefore, the proposed project is not judged to cause significant growth inducing impacts.

6.2 CUMULATIVE IMPACTS

The following text summarizes the cumulative impact analysis provided in Chapter 4. The intent of a cumulative impact evaluation is to provide the public and decision-makers with an understanding of a given project's contributions to area-wide or community environmental impacts when

added to other or all development proposed in an area. The state CEQA Guidelines provide two alternative methods for making cumulative impact forecasts: (1) a list of past, present and reasonably anticipated projects in the project area, or (2) the broad growth impact forecast contained in general or regional plans. There are no regional water plans that describe existing cumulative demand and future cumulative demand for recycled water within the project's area of potential impact. Thus, the only other project known to be proposing significant use of recycled water is the Inland Empire Utilities Agency (IEUA). The cumulative effects of this use for water resources is outlined below.

The cumulative impacts of implementing the proposed project are outlined in Chapter 4 for each environmental issue. The proposed project was evaluated in the context of the cumulative effect on affected resources. Chapter 4 analysis for all topical issues regarding cumulative impacts determined either that there was no potential for significant cumulative impacts resulting from the implementation of the proposed project, or that with the implementation of proposed mitigation measures that potential cumulative impacts would be reduced to less than significant levels. This is because the proposed project's contributions to such cumulative impacts can be controlled so that the implementation of the RIX recycled water sales program will not cause or contribute to significant cumulative impacts.

Regarding the IEUA plans to utilize recycled water, the key issue is the amount of recycled water that will continue to be delivered to Prado Dam, since there are no other projects that will remove recycled water above this location. Approximately 180,700 acre feet of water are presently delivered to the area behind (upstream) of Prado Dam. According to the U.S. Fish and Wildlife Service this volume of water appears to be contributing to the loss of riparian vegetation because of the high water table or standing water behind the dam. IEUA envisions diverting as much as 50,000 to 75,000 acre-feet of recycled water in the future, but has made a commitment to maintain discharge of 17,000 acre-feet (Facilities Master Plans Program Environmental Impact Report) in the future. Given that IEUA's recycled water discharge is currently about 62,000 acre-feet, it could currently divert up to 45,000 acre-feet of flow. Under a worst case scenario, the cumulative diversions of recycled water could reach 63,000 acre-feet (18,000 SBMWD and 45,000 IEUA). Given that current discharge is about 180,000 acre feet, a residual flow of 117,000 would still be delivered immediately upstream of Prado Dam. This volume of water is still probably too much for the riparian habitat behind Prado Dam, but it is definitely sufficient to meet the water demand of the riparian habitat and flow requirements downstream of Prado Dam.

In summary, implementation of the proposed project and mitigation measures is judged not to contribute to any cumulatively significant adverse impacts.

6.3 IRREVERSIBLE ENVIRONMENTAL CHANGES

If the RIX Recycled Water Sales Program is approved and implemented, the following irreversible and/or environmental changes would be involved:

a. The construction, installation and maintenance of recycled water distribution facilities, as proposed in the project description, will involve the irreversible consumption of natural resources in the form of construction materials, water, and energy sources. Money and manpower will be expended to develop and maintain the facilities.

b. The utilization of individual properties for RIX infrastructure facilities, will, for all intents and purposes, eliminate the possibility of development of the land for other uses. Fortuitously, the location of such facilities will most often be collocated with other public facilities, such as roads or utility facilities.

c. A commitment of economic and manpower resources will be required for the long-term implementation of the proposed project.

d. Building materials, including forest and mineral products, will be permanently committed to above ground construction projects related to the long-term implementation of the proposed project.

All other potential adverse impacts from implementing the proposed project are reversible. Air pollutant emissions and impacts to water resources and water quality can be changed by both humans and nature over time by cleaning air and water and by reducing or eliminating the recycled water diversions in the future. Soils and geologic resources will be affected but can be modified in the future to suit different purposes. As long as the proposed project does not contribute to the loss of any endangered plant or animal species (for which mitigation measures have been identified), biological resources can be maintained or enhanced with sufficient resources. Land uses and population growth can be considered irreversible on the short term, but the growth forecast for these two issues is not considered to be attributable to the proposed project.

Thus, through the incorporation of recommended mitigation measures together with the implementation of the proposed project, no significant irreversible environmental changes will be caused within the project area that can be attributable to the proposed project, and implementation of the suite of mitigation measures in this document will insure that all irreversible and/or unavoidable environmental impacts, as identified above and described within Chapter 4 of this PEIR, can be adequately mitigated to a level of insignificance.

CHAPTER 7 - PREPARATION RESOURCES

7.1 REPORT PREPARATION

7.1.1 Lead Agency

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CHAPTER 8 - APPENDICES

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8.3 AERIAL PHOTOGRAPHS OF THE SANTA ANA RIVER

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APPENDIX 8.1

NOTICE OF PREPARATION
(Initial Study and Comment Letters)

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CITY OF SAN BERNARDINO MUNICIPAL WATER DEPARTMENT
NOTICE OF PREPARATION OF A
DRAFT ENVIRONMENTAL IMPACT REPORT

PROPOSED SALE OF RECLAIMED WATER
FROM THE RIX FACILITY

Notice is hereby given that the City of San Bernardino Municipal Water Department will prepare a Program Environmental Impact Report (EIR) for the reclamation and sale of treated effluent from the RIX treatment facility located north of the Santa Ana River, east of Riverside Avenue and south of Agua Mansa Drive. This EIR will be undertaken in accordance with the California Environmental Quality Act (CEQA) for the purpose of deciding whether the project may have any significant adverse effects on the environment.

The proposed program would provide 18,000 acre-feet of reclaimed water per year to a private water wholesaler, with a maximum of 360,000 acre-feet over a 20 year period. The high quality effluent produced by the RIX plant is currently discharged to the Santa Ana River. Under the proposed program the water could also be used for irrigation, groundwater recharge, environmental enhancement, and/or surface storage throughout the Inland Empire, Los Angeles Basin, Orange County, and San Diego County. Reclaimed water could be delivered to users by way of existing facilities, however, physical improvements for treatment, conveyance, or storage are likely to be necessary. The nature and location of such improvements are unknown at this time.

On the basis of an initial study, the following areas have been identified for further evaluation in the forthcoming Program EIR: (1) aesthetic/visual, (2) air quality, (3) biological resources, (4) cultural resources, (5) geology/soils, (6) hydrology/water quality, (7) land use/planning, and (8) noise. The District is currently seeking information from agencies and individuals who are potentially affected by the proposed project or who have knowledge about resources in the project area. Information received through the notice of preparation review period will be considered in the detailed environmental analysis that will be presented in the draft environmental impact report for this project.

Copies of the notice of preparation are available for public review during normal business hours (Monday through Thursday, 7:30 a.m. to 5:30 p.m., and Friday, 7:30 a.m. to 4:30 p.m.) at the City Water Department, 300 North "D" Street, 5th Floor, San Bernardino. Written comments on the notice of preparation will be accepted through November 19, 1999 at:

Albert A. Webb Associates
3788 McCray Street
Riverside, CA 92506

Attention: Kathleen Dale

The Department contact person is Stacey R. Aldstadt, Deputy General Manager, City of San Bernardino Municipal Water Department, (909) 384-5141.

INITIAL STUDY

for the

SALE OF RECLAIMED WATER FROM THE RIX FACILITY

Prepared for: City of San Bernardino Municipal Water Department
300 North "D" Street
San Bernardino, CA 92418

Contact: Stacey R. Aldstadt
Deputy General Manager
(909) 384-5141

Prepared by: Albert A. Webb Associates
3788 McCray Street
Riverside, CA 92506-2927

Contact: Kathleen Dale
Principal Environmental Specialist
(909) 686-1070

October 1999

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I. INTRODUCTION, PROJECT DESCRIPTION, AND SETTING

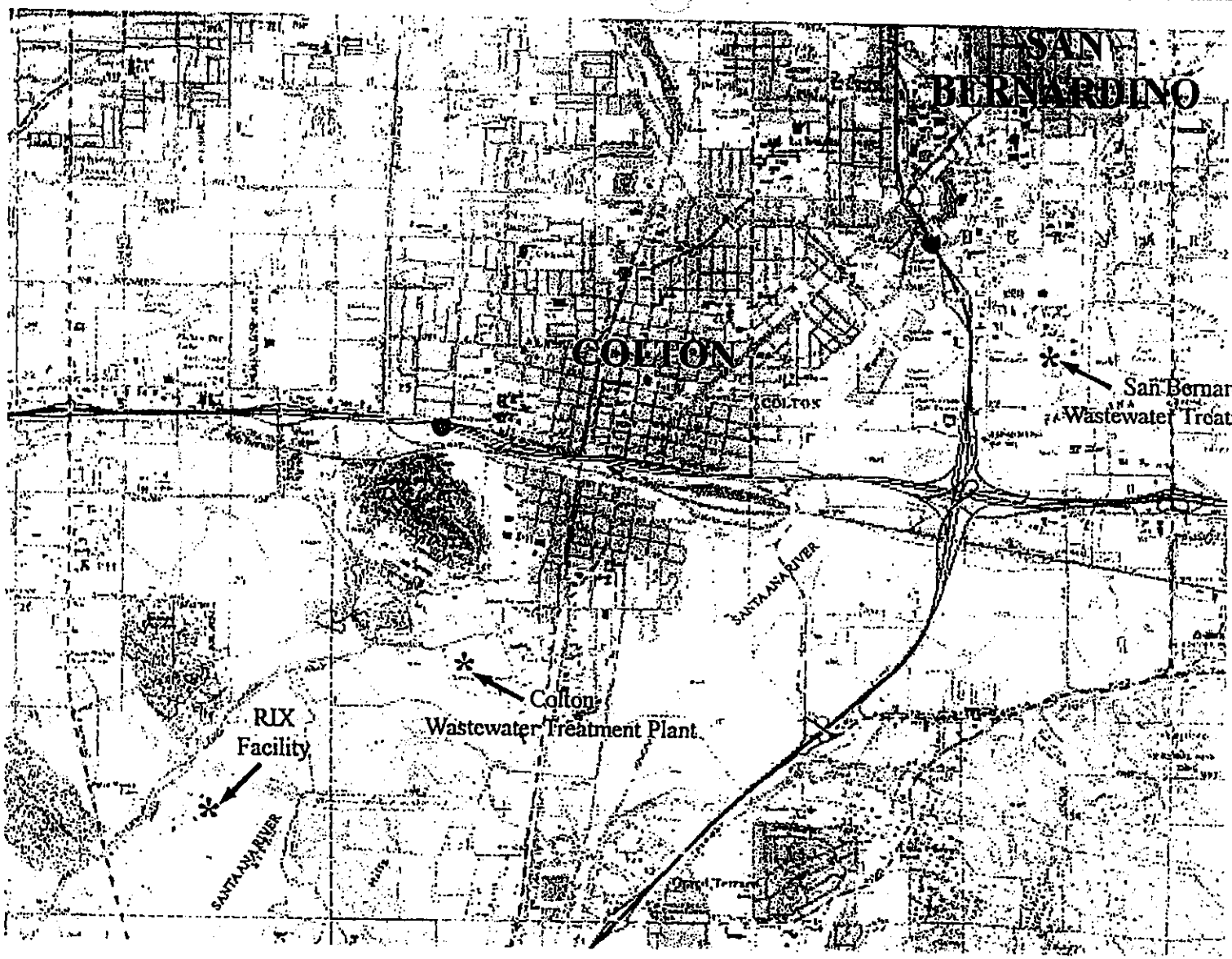
INTRODUCTION

The scope of activity presented in this project description addresses concepts for reclamation of treated effluent from an established treatment facility. These concepts have been derived through evaluation of a multitude of physical, financial, and institutional factors. The nature of specific uses for the reclaimed water, and the nature or location of any associated physical improvements, are unknown at this time.

Accordingly, this description identifies proposed activities on a programmatic level. This programmatic description will serve as the basis for environmental analysis in conjunction with early approvals toward initiation of a reclamation program by the City of San Bernardino Board of Water Commissioners. The program environmental document will address the overall scope of proposed activity as it can reasonably be defined at this time, while recognizing the potential need for future subsequent analysis as conditions change, as alternate uses or users are identified, or as specific physical improvements are proposed.

PURPOSE AND NEED FOR PROJECT

The cities of San Bernardino and Colton cooperatively operate a facility known as the RIX plant, located north of the Santa Ana River, east of Riverside Avenue and south of Agua Mansa Drive (Figure 1). The RIX facility utilizes a rapid infiltration and extraction process that uses natural soils in infiltration basins to provide tertiary treatment of secondary effluents produced at other treatment facilities operated by the participating entities. The RIX plant serves an area of approximately 50 square miles consisting of the City of Loma Linda, the former Norton Air Force Base, East Valley Water District, Patton State Hospital, some unincorporated land, and the cities of San Bernardino, Colton and Grand Terrace. Source of supply for water within the service area is primarily groundwater, but also includes imported water. The wastewater generated in this area is of a general domestic nature, coming from homes, businesses, and industries, with no unusual water quality characteristics.



W.O. 99-0013
October 1999
Source: USGS Quad Sheet
San Bernardino South

ALBERT A. WEBB ASSOCIATES
ENGINEERING CONSULTANTS

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Figure 1

RIX Facility Location
City of San Bernardino Municipal Water Department
Sale of Reclaimed Water from the RIX Facility
Notice of Preparation

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Current inflows to the RIX plant consist of 26 million gallons per day (mgd) from the City of San Bernardino plant and 5 mgd from the City of Colton, for a total of 31 mgd. Permitted treatment capacity is 41 million gallons per day (33 mgd for San Bernardino and 8 mgd for Colton). Permitted discharge is 45 mgd, reflecting a 10% overextraction rate.[1] The facility has recently reached 75% of design capacity; accordingly, design work for an expansion has begun. Expansion is expected to occur in 5 to 10 mgd increments. Evaluation of the expansion site is currently underway.

The California Regional Water Quality Control Board - Santa Ana Region has recognized the RIX process as equivalent to traditional tertiary treatment processes on the basis of demonstration testing and ongoing monitoring. The high quality effluent produced by the RIX plant meets Title 22 requirements for reclamation use. The effluent is presently discharged to the Santa Ana River.

The City of San Bernardino is currently considering a proposed contractual arrangement to provide reclaimed water to a private water wholesaler. The proposed agreement includes an initial term of three years for market development, followed by a term of 20 years, renewable in ten-year increments. Under the proposed agreement, the City would deliver 18,000 acre-feet (AF) of reclaimed water per year, with a maximum of 360,000 acre-feet over the 20-year period. The private wholesaler would also have right of first refusal for additional volumes of reclaimed water during the period of the agreement. The City would receive rights for capacity in any conveyance facilities established by the private wholesaler.

Only the City of San Bernardino component of the RIX effluent is considered for reclamation use in this analysis. It is possible that other sources of reclaimed water generated by the City of San Bernardino (specifically, tertiary effluent produced at the San Bernardino Water Reclamation Plant) would also be part of future reclamation activity.

[1] Extraction values in subsequent discussions are presented in acre-feet per year. The existing 26 mgd flow to the RIX facility for the City of San Bernardino, plus the 10 percent overextraction, represents 32,032 acre-feet per year. The City of San Bernardino component of the permitted capacity (33 mgd), plus overextraction, represents approximately 40,656 acre-feet per year.

OBJECTIVES

The proposed reclaimed water sales are directed at achieving the following objectives:

Objective 1	Provide for beneficial reuse of recycled water from City treatment facilities while ensuring (1) obligations for minimum flows at Riverside Narrows and Prado Dam, (2) protection of local groundwater resources, and (3) maintenance of minimum flows to support existing riverine biological resources.
Objective 2	Establish a means to equitably distribute City treatment costs by providing for financial participation by those benefiting from the recycled water resource.
Objective 3	Develop a broader market for City recycled water.
Objective 4	Further State legislative intent to make recycled water available to meet growing water requirements in the State.
Objective 5	Serve general public interest by supplementing local surface and groundwater supplies.
Objective 6	Provide a recycled water resource complying with Regional Board discharge requirements, as well as other applicable federal, State, or county statutes, laws, ordinances, rules, and court orders.

SETTING

Water Supply Trends. A recent study *(CH2MH 1998)* of reclaimed water as a component of regional supply was sponsored by the U.S. Bureau of Reclamation and funded in a cooperative effort also involving the Metropolitan Water District of Southern California, California Department of Water Resources, Central Basin Municipal Water District, West Basin Municipal Water District, City of Los Angeles, City of San Diego, San Diego County Water Authority, Santa Ana Watershed Project Authority, and South Orange County Reclamation Authority. This study compiled a database of sources of reclaimed water and potential users, demonstrating a substantial market for reclaimed water in Southern California. In assessing the regional water supply, the study concludes that demand will continue to rise, while traditional sources of supply will remain constant through 2040. A study by the Metropolitan Water District of Southern California *(MWDSC 1996)* projects a potential regional shortfall of 1.1 million acre-feet per year for 2000 and 2.2 million acre-feet

per year for 2020. A study by the Santa Ana Watershed Project Authority *(SAWPA 1996)* projects a sub-regional shortfall of 466,000 acre-feet per year for the year 2000 and 654,000 acre-feet per year for 2020. Development of sources of reclaimed supply and development of an enhanced market of reclaimed water users is essential to ensuring that traditional supply sources are available for uses requiring higher quality supply.

Legislative Support for Reclamation. The State Legislature has recognized the importance of reclaimed water, also termed recycled water, as a supplement to existing water supplies and as a means of reducing the impacts of growing water demand on sensitive natural water bodies. Declarations of policy in the State Water Code recognize the use of recycled water as a cost-effective, reliable method of helping to meet California's water supply needs and also recognize the environmental benefits of use of recycled water in reducing demand for water in the Sacramento-San Joaquin Delta, reducing discharge of waste into the ocean, and enhancing groundwater basins, recreation, fisheries, and wetlands. The substitution of recycled water for potable and imported water is encouraged, with specific recognition of support for cooperative ventures between recycled water producers, retail water suppliers, and entities responsible for groundwater replenishment. The Legislature has established a statewide goal to recycle 700,000 acre-feet of water per year by the year 2000 and 1,000,000 acre-feet per year by the year 2010. A 1996 study by the Metropolitan Water District of Southern California *(MWDSC 1996)* identified a contribution of approximately 160,000 acre-feet per year through existing recycling programs. A 1996 study by the Santa Ana Watershed Project Authority *(SAWPA 1996)* identified approximately 59,000 acre-feet per year of reclaimed water use within the Santa Ana Watershed.

Public Health Regulations. Title 22 of the California Administrative Code establishes regulatory criteria governing the use of reclaimed water. Treatment requirements and effluent quality standards are defined for various uses, dependent upon the degree of public contact with the reclaimed water. Suitable uses include recreation impoundment, landscape impoundment, irrigation, domestic sanitary plumbing, industrial cooling, industrial process, construction site wetting, wetting unpaved roads, aggregate processing, and concrete manufacture. Prohibitions center around uses where there is potential for direct human

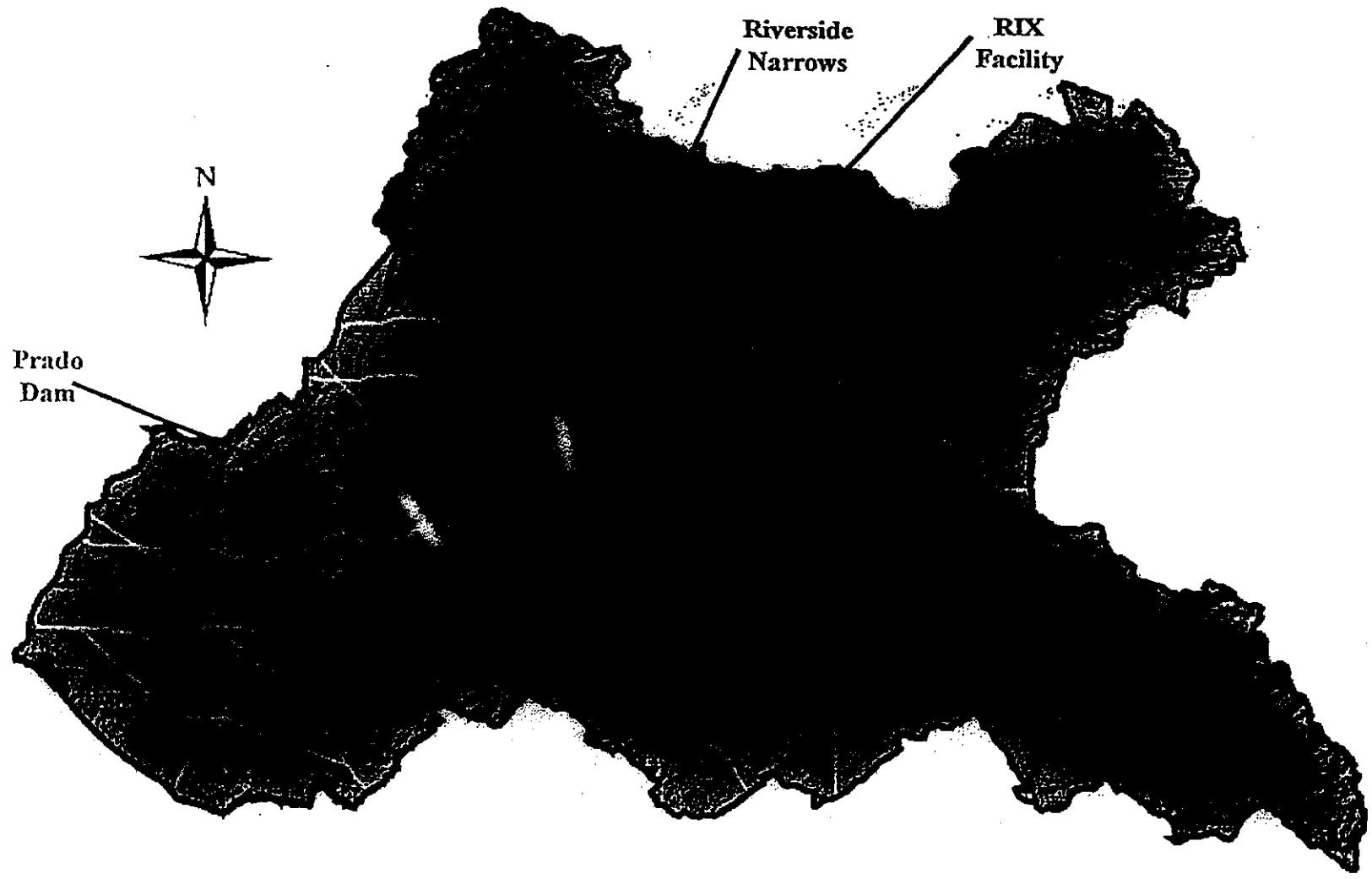
ingestion of reclaimed water or ingestion of objects that may have been in direct contact with the reclaimed water.

Santa Ana River Basin (Figure 2). Santa Ana River flow originates from multiple sources – wastewater treatment plant discharges, surface runoff, and rising groundwater. Flow is perennial downstream of the City of Rialto wastewater treatment facility outfall, with the flow being largely influenced by discharges from numerous wastewater treatment facilities. Rising groundwater occurs in the vicinity of La Cadena Avenue, at Riverside Narrows, and at Prado Dam, as well as in Warm Creek, which is tributary to the river. The adjudication of groundwater rights in the upper Santa Ana watershed has resulted in an increase in rising groundwater tributary to the river in the Chino and Riverside basins. The RIX discharge is the dominant component of river flow from the facility outfall to Riverside Narrows.[2] Below the Narrows, the influence lessens as rising groundwater and other treatment plant discharges enter the river.

The portion of the upper Santa Ana River watershed tributary to Prado Basin is regulated under a 1969 court judgment (Orange County Water District vs. City of Chino, et al., Case No. 117628 - County of Orange). The judgment requires an annual accounting and reporting of various surface flow and groundwater parameters. Relevant to the proposed reclamation project, the judgment recognizes the river as consisting of an Upper Area and a Lower Area, separated by Prado Dam. The judgment sets forth a declaration of rights as to water users in each area, providing that users in the Lower Area (below Prado Dam) have rights to receive certain average and minimum amounts of non-storm flows reaching Prado Dam, together with the right to all storm flow reaching Prado Dam.

The Orange County judgment establishes minimum flow obligations at two locations – Riverside Narrows and Prado Dam. The minimum flow obligations are adjusted depending upon water quality and accumulated volumes. Recognizing suitable water quality and

[2] For the water year October 1, 1996 to September 30, 1997, baseflow at Riverside Narrows was 62,618 acre-feet. Total discharge from the RIX facility for the same period was 42,800 acre-feet. *(SARI' 1998)*



W.O. 99-0013
October 1999
Source: Santa Ana Watershed
Project Authority 5/17/99

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Figure 2

Santa Ana River Watershed
City of San Bernardino Municipal Water Department
Sale of Reclaimed Water from the RIX Facility
Notice of Preparation

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substantial accumulated credits, the current minimum annual flow obligation at Riverside Narrows is 12,420 acre-feet and the minimum flow obligation at Prado Dam is 34,000 acre-feet. San Bernardino Valley Municipal Water District is responsible for ensuring that the Riverside Narrows obligation is met; Western Municipal Water District and Inland Empire Utilities Agency (formerly Chino Basin Municipal Water District) are jointly responsible for ensuring that the minimum obligation at Prado Dam is met. By agreement with San Bernardino Valley Municipal Water District, the City of San Bernardino is contractually obligated to deliver 16,000 acre-feet per year to the river.

As long as minimum downstream flows are met, upstream users are free to implement conservation measures to enhance upstream beneficial uses. The judgment specifically recognizes the rights of upper area users to divert, pump, extract, conserve, store, and use – by spreading, impoundment, or other methods – surface or groundwater originating in the Upper Area. The judgment also addresses interbasin acquisition of rights, providing that acquisition of upper area rights by downstream users, or downstream rights by upper area users, would not alter the obligations and entitlements provided for under the judgment. For the water year ending September 30, 1997, total wastewater treatment plant discharges to the Santa Ana River above Prado Dam equaled approximately 154,000 acre-feet *(SARW 1998)*.

In addition to river flow requirements established under the Orange County judgment, mitigation measures adopted with establishment of the RIX facility also provide for monitoring of facility operation to document effects on riparian resources in the Santa Ana River. The adopted measures require monitoring of groundwater levels and biological resources within the river reach between the City of San Bernardino water reclamation plant and the RIX facility. These measures were instituted to address potential impacts associated with the relocation of effluent discharge to the RIX site, which is approximately five miles downstream from the City water reclamation plant. The mitigation program provides for remedial action if water levels in designated monitoring wells drop more than ten feet below pre-project levels. Monitoring to date has not identified any demonstrable change in riparian resources as a result of the altered discharge regime.

There is an application on file with the State Water Resources Control Board in which OCWD is seeking to appropriate river flows. The City understands that the intent is to appropriate storm water and recycled flows. The City has objected to this appropriation application on the basis that the Santa Ana River is fully appropriated. In the absence of water available for appropriation, the necessary precedent to a filing to appropriate is lacking. The State Water Resources Control Board has now scheduled hearings for December 1999 to consider revising the fully appropriated status for the Santa Ana River. Relative to recycled flows, the City of San Bernardino Municipal Water Department claims the exclusive right to the treated wastewater from its facilities.

PROJECT COMPONENTS

The RIX facility is in operation, and an established network of conveyance facilities is in place that would accommodate a variety of end uses of the plant effluent. Although the need for physical future improvements is probable, the potential nature and location of any such improvements are not known at this time. Accordingly, the following presents an inventory of possible markets, uses, and users. These options are drawn from an extensive market feasibility study conducted by the U.S. Bureau of Reclamation *(BOR 1996 and CH2MH 1998)*.

Market. The Bureau of Reclamation study included a feasibility evaluation of an expansive area of Southern California defined by the Colorado River and South Coastal hydrologic regions, encompassing portions of Ventura, Los Angeles, Orange, San Diego, San Bernardino, Riverside, and Imperial Counties. Considering public policy, economics, institutional structure, and regulatory constraints, four subregions were ultimately defined (Inland Empire, Los Angeles Basin, Orange County, and San Diego County – see Figure 3) within which further reclamation studies would be focused. These smaller subregions were defined largely on the basis of the cost of establishing a regional conveyance system to move reclaimed water from points of origin to points of use. However, considering the opportunities for transfers, substitutions, and exchanges, the potential geographic limits of the market area could potentially include locations well beyond the subregions defined in the Bureau study.



W.O. 99-0013
October 1999
Source: Southern California Comprehensive Water Reclamation and Reuse Study

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Figure 3

Regional Reclaimed Market Areas

City of San Bernardino Municipal Water Department
Sale of Reclaimed Water from the RIX Facility
Notice of Preparation

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For the RIX facility, local markets are likely to be defined by direct deliveries. Established pipelines, canals, surface waters, and wells provide a system to move water throughout a large portion of the upper Santa Ana River basin. The opportunities for establishment of new conveyance facilities are wide-reaching and would depend upon identification of specific users, completion of further studies, and compliance with various permitting and regulatory requirements. Regional markets may be served by direct deliveries or by way of exchanges – using existing conveyance facilities or relying upon new facilities, the nature and location of which could vary significantly depending upon the ultimate use and user. It is also conceivable that exchange programs could be developed that would result in effects. Again, such use could conceivably be achieved through existing infrastructure, or could require new facilities, the location and nature of which cannot be determined at this time. For all of these market options, the primary issue beyond the physical effects of conveyance improvements or user improvements would be the diversion of effluent from its present discharge to the Santa Ana River.

With the market area defined, the optional uses for reclaimed water are summarized as follows:

Direct Use. Direct use would include applications such as landscape irrigation, industrial process, and agricultural irrigation. Service would be provided through established infrastructure or could require construction of new improvements for treatment, conveyance, or storage. The nature and location of any such improvements are unknown at this time.

Groundwater Recharge. The Bureau of Reclamation study *(CH2MH 1998)* evaluated 101 potential recharge sites based upon criteria including water quality, depth to groundwater, blending potential, conflict with other uses, conflicts with basin strategies, complexity of required implementation agreements, cost, overdraft condition, and ability to lessen demand on imported supplies. The Bureau study identified known reclaimed water recharge projects in Orange, Los Angeles, and San Diego counties involving approximately 73,000 acre-feet per year. Potential groundwater recharge sites for the conservative scenario (recharge with blend of 20% reclaimed source) identified opportunity for recharge of approximately 178,000 acre-feet of reclaimed water per year. This includes 44,700 acre-feet per year in the Bunker

Hill/Lytle Creek area, 29,000 acre-feet per year in the Chino Basin, and 2,900 acre-feet per year in the Rialto-Colton Basin.

A local project known as Project 16 *(MJW 1993, 1994A, 1994B, 1994C)* would use RIX effluent to recharge the Colton and Riverside groundwater basins on a continuous basis, with recovery by pumping from May to November. Lower quality groundwater would be pumped from the basin in late spring, summer and early fall, with higher quality reclaimed water used for recharge in late fall, winter and spring. Groundwater quality would progressively improve as higher quality water is used for recharge. This concept would provide for another cycle of local use and ultimate disposition consistent with current patterns via the Santa Ana River. This concept was originally proposed in early 1990s as a cooperative effort between Orange County Water District, San Bernardino Valley Municipal Water District, Western Municipal Water District, and the City of San Bernardino. Benefits include reduced dependence on imported water sources, baseflow management to optimize opportunity for reuse in the local area, and enhanced management of OCWD recharge facilities. Implementation of such an effort could involve physical improvements to convey water to recharge areas and to provide means to enhance recharge (basins, levees). This particular project had been dormant for several years and has recently been reinitiated by the Santa Ana Watershed Project Authority. While use of RIX water for this project is not contemplated at this time, it is an option. Also, a similar approach to groundwater recharge could be implemented at other locations.

Surface Storage. Department of Health Service rules requires a 50% dilution factor and one-year retention time for storage of reclaimed water in surface impoundments. This essentially limits use to larger reservoirs (of capacity greater than 10,000 acre-feet, 100,000 acre-feet preferred). The 1996 Bureau of Reclamation study *(BOR 1996)* included a screening of 63 lakes and reservoirs in the Southern California study area. Of the 63 sites evaluated, only 11 were determined to be free of fatal flaws that would eliminate potential for acceptance of reclaimed water. Canyon Lake, Lake Hemet, and Vail Lake were identified as possible locations for surface storage augmentation in Riverside County. The other facilities identified as possible sites for surface water augmentation are: El Capitan Reservoir, Lake

Henshaw, Lake Hodges, Lower Otay Reservoir, and Sutherland Reservoir in San Diego County; Irvine Lake and Villa Park Dam in Orange County; and Morris Lake in Los Angeles County. Use of reclaimed water at allowable dilution rates in surface reservoirs would free existing supply sources for other uses. Besides allowing reuse, reclamation options involving storage in surface or groundwater allow more control over the timing of reclaimed water availability, thereby maximizing recapture opportunity.

Environmental Enhancement. The Bureau of Reclamation study *(CH2MH 1998)* evaluated options for use of reclaimed water for environmental enhancement based on 20 criteria, with primary input by the U.S. Fish and Wildlife Service. The evaluation provided a ranked list of potential sites reflecting both feasibility and greatest likelihood of meeting environmental enhancement goals. The identified sites are concentrated in Orange and San Diego Counties; however, several potential environmental enhancement sites were identified in inland areas, including Lake Skinner, San Timoteo Creek, Temecula Creek, Lake Perris, and Murrieta Creek.

Exchanges. This potential application of the reclaimed water supply presents the most potential variability in the location, nature, and timing of use. Reclaimed water could be provided for any of the uses described above as a substitute for imported supply or other higher quality supplies, which could then be redirected to another use requiring higher quality water. Such exchanges are in place throughout the region and are likely to become an increasingly important component of water resource management. The possible combinations of sources of water and participating entities are virtually limitless.

Physical Improvements. While opportunities exist for delivery of reclaimed water to users by way of existing facilities, implementation of a successful reclamation program is likely to require construction of physical improvements for treatment, conveyance, or storage. Treatment improvements are most likely to involve desalting and could occur at the reclamation plant site, at the place of use, or at other locations between the two. Conveyance could involve new pipelines, canals, wells, or pumping facilities. Storage could require

tanks, surface impoundments, or new groundwater recharge basins. The nature and location of any such improvements are unknown at this time.

REQUIRED PERMITS AND APPROVALS

The following presents a brief statement as to each of the permits and approvals that are presently known to be required for project implementation.

California Regional Water Quality Control Board – Santa Ana Region is the permitting authority for the existing National Pollution Discharge Elimination System (NPDES) permit for the RIX treatment plant. Effluent limits established under the NPDES permit are designed to further objectives of the basin water quality control plan, which in turn are directed at protecting designated beneficial uses for receiving waters. The existing NPDES permit includes Water Reclamation Requirements that require further approvals prior to delivery of reclaimed water to any new user – including a report to the Regional Board discussing the delivery system, the use for which the reclaimed water is intended, and plans to assure that no untreated or inadequately treated wastewater will be delivered to the use area. Depending upon the ultimate use and place of use, it is possible that approvals would also be required from the Regional Boards for the Colorado, Los Angeles, San Diego and/or Lahontan regions.

California Department of Fish and Game is a trustee agency with respect to biological resources associated with the Santa Ana River and the larger region. Future physical improvements could be governed by Fish and Game Code Section 1600 *et seq.*, which requires streambed alteration agreements for activities encroaching into waters of the State. Similarly, involvement of any state-listed endangered species would require compliance with State endangered species regulations.

California Department of Water Resources oversees operation of the State Water Project (SWP). Approval by affected State Contractors would be required if conveyance or storage concepts involve use of SWP facilities.

California Department of Health Services oversees Title 22 regulations and regulates reclaimed water use with respect to potential effects on public health.

State Water Resources Control Board approval could be required if reclamation activities involve a change in place of use or type of use from the existing discharge regime. The State Board would also be involved if financial support under the State Revolving Fund program is pursued for any future improvements.

United States Army Corps of Engineers has jurisdiction over activities that would affect waters of the United States under Section 404 of the Clean Water Act. It is likely that alterations of the current discharge regime, or future physical improvements, could involve activities that would be subject to the Section 404 permitting requirements.

United States Fish and Wildlife Service may be involved with activities that would affect the Santa Ana River or other habitats of several endangered species that are known from the RIX facility area and the larger surrounding region. In the immediate vicinity of the RIX plant, the following protected species are known: Santa Ana River woollystar, Delhi sands flower-loving fly, Santa Ana sucker, arroyo chub, San Bernardino kangaroo rat, least Bell's vireo, and southwestern willow flycatcher.

County Flood Control Departments could have approval authority over proposals that would use the surface waters or flood control facilities for conveyance of reclaimed water. Depending upon the location and nature of future activities, agencies in the counties of Riverside, San Bernardino, Orange, or Los Angeles are likely be involved.

County Health Departments regulate reclaimed water use with respect to potential effects on public water supplies. Depending upon the location and nature of future activities, agencies in the counties of Riverside, San Bernardino, Orange, or Los Angeles are likely be involved.

In addition to these agencies with regulatory authority, the following agencies are expected to have a vested interest in proposed reclamation activities. Interest may arise from concern as to the effect of reclamation on local water resources, or may derive from status as a possible beneficiary of reclamation activities.

City of Colton
City of Corona
City of Rialto
City of Riverside
Inland Empire Utilities Agency
East Valley Water District
Eastern Municipal Water District
Elsinore Valley Municipal Water District
Jurupa Community Services District
Riverside Highland Water Company
Rubidoux Community Services District
Metropolitan Water District of Southern California
Orange County Water District
San Bernardino Valley Municipal Water District
San Bernardino Valley Water Conservation District
Santa Ana Watershed Project Authority
Western Municipal Water District
West San Bernardino County Water District
Yucaipa Valley Water District
Santa Ana River Watermaster
Chino Basin Watermaster
Riverside County Regional Parks and Open Space District
San Bernardino County Regional Parks Division
Farm Bureau

II. ENVIRONMENTAL EVALUATION

PROJECT INFORMATION

1. **Project Title:** Sale of Reclaimed Water from the RIX Facility

2. **Lead Agency Name and Address:**

   City of San Bernardino Municipal Water Department
   300 North "D" Street
   San Bernardino, CA 92418

3. **Contact Persons and Phone Numbers:**

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   City of San Bernardino Municipal Water Department
   (909) 384-5141

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   (909) 248-4262

4. **Project Location:** Please see Section I

5. **Project Sponsor's Name and Address:**

   City of San Bernardino Municipal Water Department
   300 North "D" Street
   San Bernardino, CA 92418

6. **Description of Project:** Please see Section I

7. **Other Public Agencies Whose Approval Is Required:** Please see Section I

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" or "Potentially Significant Unless Mitigation Incorporated" as indicated by the checklist on the following pages. These are the issue areas that will be the focus of the forthcoming draft environmental impact report.

■ Aesthetics	☐ Agricultural Resources	■ Air Quality
■ Biological Resources	■ Cultural Resources	■ Geology/Soils
☐ Hazards & Hazardous Materials	■ Hydrology/Water Quality	■ Land Use/Planning
☐ Mineral Resources	■ Noise	☐ Population and Housing
☐ Public Services	☐ Recreation	☐ Transportation/Traffic
☐ Utilities/Services Systems	■ Mandatory Findings of Significance	

DETERMINATION:

(TO BE COMPLETED BY THE LEAD AGENCY)
On the basis of this initial evaluation:

I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared..... ☐

I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because the mitigation measures described on an attached sheet have been added to the project. A NEGATIVE DECLARATION will be prepared..... ☐

I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required. ■

I find that the proposed project MAY have a significant effect(s) on the environment, but at least one effect (1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and (2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets, if the effect is a "potentially significant impact" or "potentially significant unless mitigated." An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed..... ☐

I find that although the proposed project could have a significant effect on the environment, there WILL NOT be a significant effect in this case because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project. NOTHING FURTHER IS REQUIRED..... ☐

Stacey Aldstadt — Signature

10-15-99 — Date

Stacey R. Aldstadt, Deputy General Manager — Printed Name

City of San Bernardino Municipal Water Department — For

EVALUATION OF ENVIRONMENTAL IMPACTS:

The proposed project involves an immediate administrative action to enter into an agreement for sale of reclaimed water, with limited information available at this time as to any specific end user, any required physical improvements, or any operational characteristics that present the potential for a variety of environmental effects. The following analysis recognizes those impact categories that are potentially affected by future implementing actions. The nature and timing of more specific evaluation will depend on the circumstances of each future delivery and user. Possible scenarios include:

- → Delivery through existing facilities, to an existing end user. It is possible that such an implementing action would be exempt from CEQA.
- → Delivery to an end user for which CEQA compliance documentation has already been completed through the applicable local land use authority (or other CEQA lead agency), with reclamation-related effects addressed in the associated CEQA document.
- → Delivery to an end user pursuing land use approvals from a local land use agency, with reclamation-related effects addressed in the associated CEQA document.
- → Delivery to an end user in a situation where there is no other CEQA lead agency. In this case, the City of San Bernardino Municipal Water Department would likely assume lead agency authority.

The following evaluation recognizes that many site-specific details necessary to provide detailed environmental conclusions are not known at this time. The City's intent is to address potential effects in a generalized manner in the forthcoming EIR, recognizing environmental conditions known to exist within the region and developing a program of performance criteria and mitigation measures that can be applied to future implementing actions to reduce the effects of future implementing actions to below a level of significance. In the event the adopted program of performance criteria and mitigation measures would not reduce impacts below a level of significance for any future implementing actions, then the specific implementing action would be subject to the subsequent documentation procedures defined in CEQA Guidelines Section 15162.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
1. AESTHETICS. Would the project:				
a) Have a substantial adverse effect on a scenic vista?	☐	■	☐	☐

While the proposed project may ultimately include physical improvements that would present the potential for effects related to visual and scenic resources, the placement of any future improvements, such as tanks or pump stations, is not yet known. The forthcoming Draft Environmental Impact Report (DEIR) will include a program of performance criteria and mitigation measures intended to minimize potential aesthetic impacts of future improvements.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a scenic highway?	☐	■	☐	☐

See response to 1a.

c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	■	☐	☐

See response to 1a.

d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	■	☐

Low-intensity security lighting may be necessary in the future if structures are built to support the project. Hooded lighting fixtures similar to those used in residential neighborhoods would be used, so as not to create a significant new source of light or glare.

2. **AGRICULTURAL RESOURCES.** In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	■	☐

The physical improvements typically associated with reclamation projects would either avoid designated farmlands or would be placed underground so as not to interfere with agricultural uses. This is not expected to be a significant issue and is not targeted for further evaluation in the forthcoming DEIR.

b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	■	☐

See response to 2a.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use?	☐	☐	■	☐

See response to 2a.

3. **AIR QUALITY.** Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:

a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	■	☐	☐

Construction of possible future improvements may result in temporary emissions, including exhaust and dust. If treatment or pumping facilities are required in the future, facility operation would produce long-term emissions. Because the type and location of any such improvements are not known, the impacts cannot be precisely assessed at this time. The issue will be addressed in the forthcoming DEIR, recognizing South Coast Air Quality Management District significance thresholds and a program of performance criteria against which future improvements may be evaluated to determine whether impacts remain within the scope of impacts addressed in the EIR.

b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	■	☐	☐

See response to 3a.

c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is designated as a non-attainment area under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	■	☐	☐

See response to 3a.

d) Expose sensitive receptors to substantial pollutant concentrations?	☐	■	☐	☐

Evaluation of this potential effect requires facility location information that is not known at this time. Typical facilities and operations for water reclamation and delivery do not present the potential for such impacts. The forthcoming DEIR will include performance criteria for facility locations that would result in impacts that are less than significant, and mitigation measures to lessen effects if emission-producing facilities are established where they could affect sensitive receptors. Future facilities presenting the potential for such effects that do not conform to the performance criteria would require subsequent documentation.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	■	☐	☐

See response to 4a.

c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	■	☐	☐

See response to 4a.

d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	■	☐

Considering the nature of facilities and operations typical of reclaimed water delivery and use, the proposed project is not expected to interfere substantially with wildlife movement or corridors.

e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	■	☐	☐

See response to item 4a.

f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	■	☐	☐

There are a number of adopted plans and plans that in various stages of development and permitting throughout the potential market region. See responses to items 4a and 9c.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
5. CULTURAL RESOURCES. Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☐	■	☐	☐

The southern California region is known to contain significant cultural resources. Because the type and location of any future physical improvements is not yet known, the potential environmental effects cannot be analyzed at this time. The forthcoming DEIR will develop a program of performance criteria and mitigation measures that could be applied to future projects to reduce impacts below a level of significance.

b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	■	☐	☐

See response to 5a.

c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	■	☐	☐

See response to 5a.

d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	■	☐	☐

See response to 5a.

6. GEOLOGY AND SOILS. Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	■	☐	☐

The southern California region is known to be susceptible to various hazards related to seismic and geological conditions. Because the type and location of any future physical improvements is not yet known, the potential environmental effects cannot be analyzed at this time. The forthcoming DEIR will develop a program of performance criteria and mitigation measures that could be applied to future projects to reduce impacts below a level of significance. Any unusual site-specific conditions that would not be addressed by the EIR program of criteria and measures would trigger the need for a subsequent environmental evaluation.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
ii) Strong seismic ground shaking?	☐	■	☐	☐

See response to 6a(i).

iii) Seismic-related ground failure, including liquefaction?	☐	■	☐	☐

See response to 6a(i).

iv) Landslides?	☐	■	☐	☐

See response to 6a(i).

b) Result in substantial soil erosion or the loss of topsoil?	☐	■	☐	☐

See response to 6a(i).

c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	☐	■	☐	☐

See response to 6a(i).

d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	■	☐	☐

See response to 6a(i).

e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	■

The proposed project will not generate sewage.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
7. HAZARDS AND HAZARDOUS MATERIALS. Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☐	■

Potential future facilities are not anticipated to involve use of hazardous substances.

b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	■	☐	☐

See response to item 7a.

c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	■	☐	☐

See response to item 7a. The performance criteria and mitigation measures to be included in the forthcoming DEIR will specifically address facility siting with respect to schools.

d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment?	☐	■	☐	☐

It is expected that future facility siting would avoid such sites. However, in the event siting constraints require placement of facilities on or across a contaminated site, the performance criteria and mitigation measures to be included in the forthcoming DEIR will address this issue.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	■

Typical facilities and operations for water reclamation and delivery do not present the potential for creation of such safety hazards. If unusual circumstances associated with siting of a particular future facility would in fact result in such an impact, subsequent evaluation would be required.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	■

See response to 7e.

g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	■

Typical facilities and operations for water reclamation and delivery do not present the potential for interference with emergency response or evacuation. If unusual circumstances associated with siting of a particular future facility would in fact result in such an impact, subsequent evaluation would be required.

h) Expose people or structures to a significant risk or loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	■	☐	☐

It is possible that future facility construction could occur within or adjacent to wildlands, with associated hazard of wildland fires as a result of construction activity and/or facility operation. The forthcoming DEIR will develop a program of performance criteria and mitigation measures that could be applied to future projects to reduce impacts below a level of significance.

8. **HYDROLOGY AND WATER QUALITY.** Would the project:

a) Violate any water quality standards or waste discharge requirements?	☐	☐	☐	■

The RIX plant operates in compliance with its water discharge permit, which currently allows discharge of 45 million gallons of effluent per day. Reclamation use of plant effluent is subject to approval of separate water reclamation requirements by the applicable regional water quality control board(s). This issue is not intended to be addressed further in the forthcoming DEIR.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	■	☐	

The project may have beneficial impacts on groundwater supplies and recharge. The reclaimed water could supply agricultural, recreational, and industrial uses with high quality recycled water, which would reduce dependence upon groundwater. The reclaimed water could also, under the regulation of the Department of Health Services and the Regional Water Quality Control Board, be used to recharge local groundwater basins. However, the project may involve the diversion of water previously discharged into the Santa Ana River, and in turn affect the wells which depend upon the river flow for recharge. This issue will be examined in greater detail in the forthcoming DEIR. As with other issues, the EIR will develop a program of performance standards and mitigation measures to avoid and minimize potential effects upon groundwater recharge.

c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☐	■	☐	☐

The proposed project may alter the drainage patterns in the Santa Ana River or other surface waters that may be used as conveyances for reclaimed water delivery or within areas that would be used as recharge facilities for possible groundwater recharge. The possibility for erosion or siltation cannot be ruled out. This issue will be examined in greater detail in the forthcoming DEIR. The intent is to develop a program of performance criteria and mitigation measures to reduce potential impacts below a level of significance.

d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☐	■	☐	☐

The proposed project may alter the drainage patterns in the Santa Ana River or other surface waters that may be used as conveyances for reclaimed water delivery, or within areas that would be used as recharge facilities for possible groundwater recharge. The possibility of flooding cannot be ruled out. This issue will be examined in greater detail in the forthcoming DEIR. The intent is to develop a program of performance criteria and mitigation measures to reduce potential impacts below a level of significance.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	■	☐	☐

The Santa Ana River is a regional stormwater conveyance facility. Other stormwater facilities could conceivably serve as conveyance or recharge facilities. This document is being circulated to area stormwater management entities for input as to the scope and content of the forthcoming DEIR. It is intended that the EIR include performance criteria and mitigation measures to allow cooperative use of stormwater facilities in a manner that would not significantly adversely affect the primary stormwater control function.

f) Otherwise substantially degrade water quality?	☐	☐	☐	■

Use of reclaimed water is subject to permitting by the applicable Regional Board(s) with jurisdiction over the source and place of use. Regional Board permits are issued on the basis of criteria designed to protect the designated beneficial uses of potentially affected waters through application of discharge limits established to maintain or achieve adopted water quality objectives. In accordance with CEQA Guidelines Section 15064 (h), potential changes in water quality as a result of operations conducted in accordance with stipulated discharge limits are, by definition, not significant.

g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	■

The proposed project does not involve the construction of housing.

h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	■

The location and nature of any future improvements are not expected to measurably affect 100-year flood hazards. This issue is not intended to be addressed in the forthcoming DEIR.

i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	■	☐	☐

The proposed project may involve future facilities (reservoirs or tanks) that would present flood hazards to surrounding uses in the event of a structural failure. Established design standards are available to address this condition. The forthcoming DEIR will include performance criteria and mitigation measures to address potential flooding hazard.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
j) Inundation by seiche, tsunami, or mudflow?	☐	■	☐	☐

The proposed project may involve future facilities (reservoirs or tanks) that would present seiche hazards to surrounding uses. Established design standards are available to address this condition. The forthcoming DEIR will include performance criteria and mitigation measures to address potential seiche hazard.

Tsunami and mudflow are not relevant issues considering the project area and the nature of proposed facilities and operations.

9. **LAND USE AND PLANNING.** Would the project:

a) Physically divide an established community?	☐	☐	☐	■

The proposed project may require some future improvements, such as pipelines and holding tanks. However, these improvements, by their nature, would not divide an established community.

b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, the general plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	■

Any future improvements needed to implement the proposed project are not expected to conflict with land use and zoning plans, policies, or ordinances.

c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	■	☐	☐

There are a number of existing and proposed habitat conservation plans throughout the region. The forthcoming DEIR will develop a program of performance criteria and mitigation measures that could be applied to future projects to reduce impacts below a level of significance.

10. **MINERAL RESOURCES.** Would the project:

a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	■

Typical facilities and operations for water reclamation and delivery do not present the potential for loss of mineral resources. If unusual circumstances associated with siting of a particular future facility would in fact result in such an impact, subsequent evaluation would be required.

b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	☐	☐	☐	■

See response to 10a.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
11. **NOISE.** Would the project result in:				
a) Exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	■	☐	☐

Future facility construction or operation could increase existing noise levels. Although the magnitude of such increases is not typically significant, the evaluation of potential significance depends upon specific siting information that is not known at this time. The forthcoming DEIR will include a program of performance criteria and mitigation measures to be applied to future construction and operations to reduce impacts below a level of significance.

b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	■	☐	☐

See response to 11a.

c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	■	☐	☐

See response to 11a.

d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	■	☐	☐

See response to 11a.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	■

The proposed project would not result in construction of new housing or employment centers in proximity to an airport.

f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	■

See response to 11e.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
12. POPULATION. Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure?	☐	☐	☐	■

The proposed project will enhance regional water supplies by creating an alternative source of supply for a variety of uses. Establishment of new sources of supply is often characterized as growth-inducing. In this instance, any information as to ultimate end users of the alternative source of supply is unknown. Further, local land use authorities are the appropriate entity to address this issue through consideration of land use proposals. This issue is not intended for further consideration in the forthcoming DEIR.

b) Displace substantial numbers of existing housing units, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	■

Future improvements would not displace existing housing.

c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	■

See response to item 12b.

13. PUBLIC SERVICES.

a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services:	☐	☐	☐	■
Fire protection?	☐	☐	☐	■

The proposed project is not expected to affect any existing fire protection facilities or substantially change demand for fire protection services.

Police protection?	☐	☐	☐	■

The proposed project is not expected to affect any existing police protection facilities or substantially change demand for police services.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Schools?	☐	☐	☐	■

The proposed project is not expected to affect any existing school facilities or substantially change demand for school services.

Parks?	☐	☐	☐	■

The proposed project is not expected to affect any existing park facilities or substantially change demand for park services.

Other public facilities?	☐	☐	☐	■

Any future improvements will increase maintenance responsibilities; however, this maintenance will be provided by the overseeing agency, and should not affect other cities or agencies. The proposed project is not expected to significantly impact the demand for, or capacity of, any public facilities.

14. **RECREATION.**

a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	■

The proposed project would have no effect on demands for use of recreational facilities.

b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	■

The proposed project is not expected to include construction or expansion of recreational facilities.

15. **TRANSPORTATION/TRAFFIC.** Would the project:

a) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?	☐	☐	☐	■

Typical construction methods and operations for water reclamation and delivery do not present the potential for generation of significant traffic volumes. Standard construction practice and conditions of local agency encroachment permits require implementation of control measures during project construction to minimize congestion and delays.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?	☐	☐	☐	■

See response to 15a.

c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	■

The proposed project will not affect air traffic patterns or levels.

d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	■

Typical facilities and operations for water reclamation and delivery do not present the potential for such hazards. Standard design practice and conditions of local agency encroachment permits require implementation of measures to design hazards and potential conflicts between incompatible uses.

e) Result in inadequate emergency access?	☐	☐	☐	■

Future improvements or operations are not expected to impact emergency access.

f) Result in inadequate parking capacity?	☐	☐	☐	■

Typical facilities and operations for water reclamation and delivery do not present the potential for significant impacts upon parking capacity.

g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks?	☐	☐	☐	■

There are no known policies related to alternative transportation that would be affected by the proposed project.

16. UTILITIES AND SERVICE SYSTEMS. Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	■

The RIX Wastewater Treatment Plant operates in compliance with waste discharge requirements of the Regional Water Quality Control Board. The provisions of the existing permit for the RIX facility require that any future reclamation use is subject to a separate reclamation permit.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	■

It is possible that further treatment could be required to meet quality requirements of a specific future user. The nature and location of any such supplemental treatment facilities could vary significantly. For this reason, any additional treatment facilities will not be considered as part of the project for the forthcoming DEIR. Any future treatment facilities would be subject to separate environmental evaluation.

c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	■

The proposed project will not require the expansion or construction of storm water drainage facilities.

d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☐	■

The proposed project would not represent an additional demand on local water supplies. Reclaimed water availability is a beneficial effect.

e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	■

The proposed project would not require wastewater treatment services.

f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☐	■

The proposed project is not expected to generate significant solid waste.

g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	■

See response 16e.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact

17. MANDATORY FINDINGS OF SIGNIFICANCE.

a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory? ☐ ■ ☐ ☐

As presented previously under item 4, Biological Resources, and item 5, Cultural Resources, the proposed project presents that potential for significant effects to wildlife resources and cultural resources. These issue areas will be addressed in the forthcoming DEIR.

b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.) ☐ ■ ☐ ☐

The proposed project presents the potential for a number of environmental effects, that, in turn present the potential for cumulative effects. Cumulative effects will be addressed in the forthcoming DEIR in accordance with CEQA Guidelines Section 15130.

c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly? ☐ ☐ ☐ ■

Established regulations and permitting programs ensure that reclamation use is conducted in a manner that protects human health and safety.

III. REFERENCES

The following documents were referred to as general information sources during preparation of this document. They are available for public review at the locations abbreviated after each listing and spelled out at the end of this section. Some of these documents are also available at public libraries and at other public agency offices.

BOR 1996 — U.S. Department of the Interior, Bureau of Reclamation. Southern California Comprehensive Water Reclamation and Reuse Study – Phase 1A Interim Report. September 1996. *(Available at SAWPA)*

CEC 1998 — Chadwick Ecological Consultants, Inc. Letter Report: 1998 RBP Habitat, Fish, Benthic Invertebrate, and Mercury Monitoring Data for the Santa Ana River. December 4, 1998. *(Available at City)*

CEPA 1994 — California Environmental Protection Agency. Facility Inventory Data Base Fact Sheet. March 1994. *(Available at City)*

CH2MH 1992A — CH2MHill. Draft Final Report: Rapid Infilteration Extraction (RIX) Demonstration Project. June 8, 1992. *(Available at City)*

CH2MH 1992B — CH2MHill for Santa Ana Watershed Project Authority. Santa Ana Water Reuse Conceptual Study. August 1992. *(Available at SAWPA)*

CH2MH 1998 — CH2MHill for the Bureau of Reclamation, Metropolitan Water District, Department of Water Resources, Central Basin Municipal Water District, West Basin Municipal Water District, City of Los Angeles, City of San Diego, San Diego County Water Authority, Santa Ana Watershed Project Authority, and South Orange County Reclamation Authority. Southern California Comprehensive Water Reclamation and Reuse Study – Phase 1B Summary Report. December 1998. *(Available at SAWPA)*

CRWQCB 1995 — California Regional Water Quality Control Board - Santa Ana Region. Water Quality Control Plan, Santa Ana River Basin (8). 1995. *(Available at RWQCB)*

CSB 1994 — City of San Bernardino. Letter: OCWD General Counsel from Bill Miller of the Law Offices of Pillsbury Madison and Sutro. August 29, 1994. *(Available at City)*

CSB 1998 — City of San Bernardino. Basin Plan Triennial Review Package – Includes October 9, 1998 Regional Board Report and December 22, 1998 Regional Board Letter to City Responding to Comments. August 29, 1998. *(Available at City)*

CSB 1998 — City of San Bernardino Municipal Water Department. Letter: Orange County Water District's Application to Appropriate Water from the Santa Ana River and Supplement (DWR Division of Water Rights File No. 333: MFC: X000206. November 23, 1998. *(Available at City)*

FDD 1990 — Franklin D. Dryden, Consulting Engineer for City of Colton, City of San Bernardino, and San Bernardino Valley Municipal Water District. Evaluation of Water Reuse Options for the Proposed Regional Tertiary Treatment Facilities Serving San Bernardino and Colton. December 1, 1990. *(Available at SAWPA)*

JMM 1991 — James M. Montgomery Consulting Engineers. Historical Water Budget Analysis for Upper Santa Ana Watershed. September 1991. *(Available at SAWPA)*

MJW 1992A — Mark J. Wildermuth. Response of Colton and Riverside 1 Sub-basins to Wastewater Discharge Alternatives (Revised). October 1992. *(Available at SAWPA)*

MJW 1992B — Mark J. Wildermuth. Develop Conjunctive Use Plans to Manage Local and Imported Water and Wastewater above Riverside Narrows – Final Report. December 1992. *(Available at SAWPA)*

MJW 1993A — Mark J. Wildermuth. Comments on the 1993 Revised Water Quality Control Plan Santa Ana River Basin (8) for City of San Bernardino and Yucaipa Valley Water District. September 1993. *(Available at City)*

MJW 1993B — Mark J. Wildermuth. Plan of Study Implementation of a Conjunctive Use Plan for the Colton and Riverside Basins – Final Report. September 1993. *(Available at City)*

MJW 1994A — Mark J. Wildermuth. Principles of Agreement for Colton-Riverside Basins Water Resources Management Program, Version 3. May 17, 1994. *(Available at City)*

MJW 1994B — Mark J. Wildermuth. Draft Engineering Report Initial Environmental Study, Initial Project B and C. June 1994. *(Available at City)*

MJW 1994C — Mark J. Wildermuth. Letter - Response to Comments on Colton-Riverside Basins Water Resources Management Plan Draft Engineering Report and Initial Environmental Study, Initial Projects B and C. September 27, 1994. *(Available at City)*

MJW 1997 — Mark J. Wildermuth. Phase 1A Final Task 2.2 and 2.3 Report – Describe Watershed Hydrology and Identify Current TDS and TIN Inflows in the Watershed. September 1997. *(Available at SAWPA)*

MWDSC 1996 — Metropolitan Water District of Southern California. Southern California's Integrated Water Resources Plan - Report Number 1107. March 1996. *(Available at SAWPA)*

NWRI 1996 — National Water Research Institute, in collaboration with Santa Ana Watershed Project Authority, Co-sponsored by City of San Bernardino Water Department, City of Riverside, Western Municipal Water District, and Orange County Water District. The Santa Ana River Watershed Workshop. March 1996. *(Available at SAWPA)*

RS 1991A — Risk Sciences. 1st Interim Draft Report: Use Attainability Analysis of the Santa Ana River - Assessment of Habitat, Aquatic Biology, and Water Chemistry for the March 1991 Sampling Period. May 23, 1991. *(Available at SAWPA)*

RS 1991B — Risk Sciences. Completion Report: Task Order #1, Use Attainability Analysis of the Santa Ana River – Assessment of Habitat, Aquatic Biology, and Water Chemistry for the March 1991 Sampling Period. June 24, 1991. *(Available at SAWPA*

RS 1991C — Risk Sciences. Completion Report: Task Order #4, Use Attainability Analysis of the Santa Ana River – An Assessment of Habitat, Aquatic Biology, Water Chemistry, and Fish Flesh for November 1991 Sampling Period. May 15, 1992. *(Available at SAWPA)*

RS 1992 — Risk Sciences. Santa Ana River Use Attainability Analysis, Aquatic Biology, Habitat, and Toxicology Analysis: Volume 2. May 1992. *(Available at SAWPA)*

SARW 1998 — Santa Ana River Watermaster for Orange County Water District vs. City of Chino, *et al.* (Case No. 117628 – County of Orange). Twenty-Seventh Annual Report of the Santa Ana River Watermaster for Water Year October 1, 1996 – September 30, 1997. April 30, 1998. *(Available at SAWPA)*

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be Designated with the RARE Beneficial Use Designation. April 1, 1994. *(Available at (Available at SAWPA)*

SAWPA 1996 — Santa Ana Watershed Project Authority. Draft Water Resources Plan. August, 1996. *(Available at (Available at SAWPA)*

SAWPA 1998 — Santa Ana Watershed Project Authority. Agenda and Staff Report – Project Agreement 16 Committee. December 1, 1998. *(Available at SAWPA)*

Location

City — City of San Bernardino Municipal Water Department, 300 North "D" Street, 5th Floor, San Bernardino, CA

SAWPA — Santa Ana Watershed Project Authority, 11615 Sterling Avenue, Riverside, CA 92503

RWQCB — 3737 Main Street, Suite 500, Riverside, CA 92501-3339

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RESPONSES TO NOTICE OF PREPARATION

Number	Received From	Date	Location of Receipt
1.	Santa Ana River Watermaster	2/9/00	Albert A. Webb Associates
2.	California Department of Fish and Game	10/22/99	Albert A. Webb Associates
3.	San Bernardino Valley Municipal Water District	11/12/99	Albert A. Webb Associates
4.	California Department of Fish and Game	11/15/99	San Bernardino Valley Municipal Water District
5.	Western Riverside Council of Governments	11/16/99	Albert A. Webb Associates
6.	San Bernardino County Transportation/Flood Control Department	11/16/99	Albert A. Webb Associates
7.	California Department of Water Resources	11/17/99	Albert A. Webb Associates
8.	Chino Basin Watermaster	11/18/99	Albert A. Webb Associates
9.	United States Fish and Wildlife Service	11/23/99	Albert A. Webb Associates
10.	Orange County Water District	12/10/99	Albert A. Webb Associates
11.	San Diego County Water Authority	7/3/00	Albert A. Webb Associates

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99-0013

SANTA ANA RIVER WATERMASTER

ORANGE COUNTY WATER DISTRICT VS. CITY OF CHINO ET AL.
CASE NO. 117628--COUNTY OF ORANGE

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Richard W. Atwater
Bill B. Dendy
Donald L. Harriger
William R. Mills, Jr.
Robert L. Reiter

MAILING ADDRESS
c/o SBVMWD
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San Bernardino CA 92412-5906
Telephone 909/387-9200
FAX 909/387-9247

February 9, 2000

Ms. Kathleen Dale
Principal Environmental Specialist
Albert A. Webb Associates
3788 McCray Street
Riverside CA 92506-2973

Re: City of San Bernardino Municipal Water Department Proposed sale of Reclaimed Water from the RIX Facility ("Proposed Project")

Dear Ms. Dale:

In 1969 the Orange County Superior Court entered its Judgment in Case No. 117628, Orange County Water District vs. City of Chino, et al. The Judgment incorporated two Stipulations and Orders re: Dismissal of Certain Defendants. The signatories to the Stipulations, including the City of San Bernardino, accepted and adopted the physical solution that is set forth in the Judgment. The physical solution accomplishes, in general, a regional intrabasin allocation of the surface water of the Santa Ana River.

To administer the provisions of the Judgment the Court appoints a Watermaster composed of five persons. The Watermaster's duty is to maintain a continuous accounting of flows and water quality in the River. In order to do so the Watermaster must have detailed knowledge of many factors that might affect such flows and quality from day to day and from year to year. The proposed project would be such a factor.

In order for the Watermaster to prepare to account properly for any impact on River flow or quality of the proposed project we need to have a more detailed project description than is included in your Initial Study dated October 1999. In particular, we need to know when, where and how the physical delivery of the reclaimed water would be made so that we can determine whether any additional data collection will be needed to support our accounting to the Court.

It is possible that we will have to incur costs to monitor the impacts of the proposed project. To assist us in planning for any such monitoring and to help us anticipate how to account for any such impacts we request that you provide detailed descriptions of the physical facilities and the operating plans for such facilities as soon as possible.

We realize that this request is not within the time that you set for comments on your Initial Study. However, the Watermaster typically does not meet to begin its deliberations on

accounting for the prior water year until all flow and water quality data are available, usually about three or four months after the end of the water year on September 30. Hence, at our meeting on February 4, 2000, we began our review of data for water year 1998-99. During that meeting the Proposed Project was brought to our attention and I was directed to request a more detailed project description. Our next meeting will be on March 3, 2000. Your early response will be greatly appreciated.

Robert L. Reiter

Robert L. Reiter
Secretary/Treasurer
Santa Ana River Watermaster

99-001

STATE OF CALIFORNIA - THE RESOURCES AGENCY GRAY DAVIS, Governor

DEPARTMENT OF FISH AND GAME
Eastern Sierra-Inland Deserts Region
330 Golden Shore, Suite 50
Long Beach, California 90802
(562) 590-5113

October 22, 1999

Ms. Kathleen Dale
Albert A. Webb Associates
3788 Mc Cray Street
Riverside, California 92506

Dear Ms. Dale:

Notice of Preparation of a Draft EIR
City of San Bernardino Water Department
Proposed Sale of Reclaimed Water from the Rix Facility
San Bernardino County

The Department of Fish and Game (Department) appreciates this opportunity to comment on the above-referenced project, relative to impacts to biological resources. To enable Department staff to adequately review and comment on the proposed project, we recommend the following information be included in the Draft Environmental Impact Report:

1. A complete assessment of the flora and fauna within and adjacent to the project area, with particular emphasis upon identifying endangered, threatened, and locally unique species and sensitive habitats.

   a. A thorough assessment of rare plants and rare natural communities, following the Department's May 1984 Guidelines for Assessing Impacts to Rare Plants and Rare Natural Communities (Attachment 1).

   b. A complete assessment of sensitive fish, wildlife, reptile, and amphibian species. Seasonal variations in use of the project area should also be addressed. Focused species-specific surveys, conducted at the appropriate time of year and time of day when the sensitive species are active or otherwise identifiable, are required. Acceptable species-specific survey procedures should be developed in consultation with the Department and the U.S. Fish and Wildlife Service.

   c. Rare, threatened, and endangered species to be addressed should include all those which meet the California Environmental Quality Act (CEQA) definition (see CEQA Guidelines, § 15380).

   d. The Department's California Natural Diversity Data Base in Sacramento should be contacted at (916) 327-5960 to obtain current information on any previously reported sensitive species and habitat, including Significant Natural Areas identified under Chapter 12 of the Fish and Game Code.

2. A thorough discussion of direct, indirect, and cumulative impacts expected to adversely affect biological resources, with specific measures to offset such impacts.

   a. CEQA Guidelines, § 15125(a), direct that knowledge of the regional setting is critical to an assessment of environmental impacts and that special emphasis should be placed on resources that are rare or unique to the region.

b. Project impacts should be analyzed relative to their effects on off-site habitats. Specifically, this should include nearby public lands, open space, adjacent natural habitats, and riparian ecosystems. Impacts to and maintenance of wildlife corridor/movement areas, including access to undisturbed habitat in adjacent areas, should be fully evaluated and provided.

c. The zoning of areas for development projects or other uses that are nearby or adjacent to natural areas may inadvertently contribute to wildlife-human interactions. A discussion of possible conflicts and mitigation measures to reduce these conflicts should be included in the environmental document.

d. A cumulative effects analysis should be developed as described under CEQA Guidelines, § 15130. General and specific plans, as well as past, present, and anticipated future projects, should be analyzed relative to their impacts on similar plant communities and wildlife habitats.

e. The document should include an analysis of the effect that the project may have on completion and implementation of regional and/or subregional conservation programs. Under § 2800- §2840 of the Fish and Game Code, the Department, through the Natural Communities Conservation Planning (NCCP) program, is coordinating with local jurisdictions, landowners, and the Federal Government to preserve local and regional biological diversity. Coastal sage scrub is the first natural community to be planned for under the NCCP program. The Department recommends that the lead agency ensure that the development of this and other proposed projects does not preclude long-term preserve planning options and that projects conform with other requirements of the NCCP program. Jurisdictions participating in the NCCP should assess specific projects for consistency with the NCCP Conservation Guidelines.

3. A range of alternatives should be analyzed to ensure that alternatives to the proposed project are fully considered and evaluated. A range of alternatives which avoid or otherwise minimize impacts to sensitive biological resources should be included. Specific alternative locations should also be evaluated in areas with lower resource sensitivity where appropriate.

   a. Mitigation measures for project impacts to sensitive plants, animals, and habitats should emphasize evaluation and selection of alternatives which avoid or otherwise minimize project impacts. Off-site compensation for unavoidable impacts through acquisition and protection of high-quality habitat elsewhere should be addressed.

   b. The Department considers Rare Natural Communities as threatened habitats having both regional and local significance. Thus, these communities should be fully avoided and otherwise protected from project-related impacts (Attachment 2).

   c. The Department generally does not support the use of relocation, salvage, and/or transplantation as mitigation for impacts to rare, threatened, or endangered species. Department studies have shown that these efforts are experimental in nature and largely unsuccessful.

4. A California Endangered Species Act (CESA) Permit must be obtained, if the project has the potential to result in "take" of species of plants or animals listed under CESA, either during construction or over the life of the project. CESA Permits are issued to conserve, protect, enhance, and restore State-listed threatened or endangered species and their habitats. Early consultation is encouraged, as significant modification to the proposed project and mitigation measures may be required in order to obtain a CESA

Permit. Revisions to the Fish and Game Code, effective January 1998, require that the Department issue a separate CEQA document for the issuance of a CESA permit unless the project CEQA document addresses all project impacts to listed species and specifies a mitigation monitoring and reporting program that will meet the requirements of a CESA permit. For these reasons, the following information is requested:

a. Biological mitigation monitoring and reporting proposals should be of sufficient detail and resolution to satisfy the requirements for a CESA Permit.

b. A Department-approved Mitigation Agreement and Mitigation Plan are required for plants listed as rare under the Native Plant Protection Act.

5. The Department opposes the elimination of watercourses and/or their channelization or conversion to subsurface drains. All wetlands and watercourses, whether intermittent or perennial, must be retained and provided with substantial setbacks which preserve the riparian and aquatic values and maintain their value to on-site and off-site wildlife populations.

a. The Department has direct authority under Fish and Game Code § 1600 et seq. in regard to any proposed activity which would divert, obstruct, or affect the natural flow or change the bed, channel, or bank of any river, stream, or lake. Early consultation is recommended, since modification of the proposed project may be required to avoid or reduce impacts to fish and wildlife resources.

b. A discussion of potential adverse impacts from any increased runoff, sedimentation, soil erosion, and/or urban pollutants on streams and watercourses on or near the project site, with mitigation measures proposed to alleviate such impacts must be included.

c. Agreements under Fish and Game Code § 1600, if needed, are required to be processed pursuant to CEQA, and the Department recommends that the document identify potential streambed/biological impacts, if any, and provide adequate mitigation, monitoring, and reporting commitments so that a subsequent CEQA document does not have to be prepared for the Department's issuance of the Streambed Alteration Agreement.

The Department holds regularly scheduled pre-project planning/early consultation meetings. To make an appointment, please call our regional office at (562) 590-5137.

Thank you for this opportunity to comment. Questions regarding this letter and further coordination on these issues should be directed to Mr. Raul Rodriguez, Fishery Biologist, at (909) 393-3965.

Sincerely,

Curt Taucher for
Curt Taucher
Regional Manager

Attachments

cc: See attached list

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ATTACHMENT 1

State of California
THE RESOURCES AGENCY
Department of Fish and Game
May 4, 1984

GUIDELINES FOR ASSESSING THE EFFECTS OF PROPOSED DEVELOPMENTS ON RARE AND ENDANGERED PLANTS AND PLANT COMMUNITIES

The following recommendations are intended to help those who prepare and review environmental documents determine when a botanical survey is needed, who should be considered qualified to conduct such surveys, how field surveys should be conducted and what information should be contained in the survey report.

1. Botanical surveys that are conducted to determine the environmental effects of a proposed development should be directed to all rare and endangered plants and plant communities. Rare and endangered plants are not necessarily limited to those species which have been "listed" by state and federal agencies but should include any species that, based on all available data, can be shown to be rare and/or endangered under the following definitions.

   A species, subspecies or variety of plant is "endangered" when the prospects of its survival and reproduction are in immediate jeopardy form one or more causes, including loss of habitat, change in habitat, over-exploitation, predation, competition or disease. A plant is "rare" when, although not presently threatened with extinction, the species, subspecies or variety is found in such small numbers throughout its range that it may be endangered if its environment worsens.

   Rare plant communities are those communities that are of highly limited distribution. These communities may or may not contain rare or endangered species. The most current version of the California Natural Diversity Data Base's Outline of Terrestrial Communities in California may be used as a guide to the names of communities.

2. It is appropriate to conduct a botanical field survey to determine if, or the extent that, rare plants will be affected by a proposed project when:

   a. Based on an initial biological assessment, it appears that the project may damage potential rare plant habitat;

   b. Rare plants have historically been identified on the project site, but adequate information of impact assessment is lacking; or

   c. No initial biological assessment has been conducted and it is unknown whether or not rare plants or their habitat exist on the site.

3. Botanical consultants should be selected on the basis of possession of the following qualifications (in order of importance):

   a. Experience as a botanical field investigator with experience in field sampling design and field methods;

   b. Taxonomic experience and a knowledge of plant ecology;

   c. Familiarity with the plants of the area, including rare species; and

   d. Familiarity with the appropriate state and federal statutes related to rare plants and plant collecting.

4. Field surveys should be conducted in a manner that will locate any rare or endangered species that may be present. Specifically, rare or endangered plant surveys should be:

   a. Conducted at the proper time of year when rare or endangered species are both "evident" and identifiable. Field surveys should be scheduled (1) to coincide with known flowering periods, and/or (2) during periods of

phenological development that are necessary to identify the plant species of concern.

b. Floristic in nature. "Predictive surveys" (which predict the occurrence of rare species based on the occurrence of habitat or other physical features rather than actual field inspection) should be reserved for ecological studies, not for impact assessment. Every species noted in the field should be identified to the extent necessary to determine whether it is rare or endangered.

c. Conducted in a manner that is consistent with conservation ethics. Collection of rare or suspected rare species (voucher specimens) should be made only when such actions would not jeopardize the continued existence of the population and in accordance with applicable state and federal permit regulations. Voucher specimens should be deposited at recognized public herbaria for future reference. Photography should be used to document plant identification and habitat whenever possible, but especially when the population cannot withstand collection of voucher specimens.

d. Conducted using systematic field techniques in all habitats of the site to ensure a reasonably thorough coverage of potential impact areas.

e. Well documented. When a rare or endangered plant (or rare plant community) is located, a California Native Species (or Community) Field Survey Form or equivalent written form should be completed and submitted to the Natural Diversity Data Base.

5. Reports of botanical field surveys should be included in or with environmental assessments, negative declarations, EIR's and EIS's, should contain the following information:

a. Project description, including a detailed map of the project location and study area.

b. A written description of biological setting referencing the community nomenclature used and a vegetation map.

c. Detailed description of survey methodology.

d. Dates of field surveys.

e. Results of survey (including detailed maps).

f. An assessment of potential impacts.

g. Discussion of the importance of rare plant populations with consideration of nearby populations and total species distribution.

h. Recommended mitigation measures to reduce or avoid impacts.

i. List of all species identified.

j. Copies of all California Native Species Field Survey Forms or Natural Community Field Survey Forms.

k. Name of field investigator(s).

l. References cited, persons contacted, herbaria visited, and disposition of voucher specimens.

ATTACHMENT 2

SENSITIVITY OF TOP PRIORITY RARE NATURAL COMMUNITIES IN SOUTHERN CALIFORNIA*

Sensitivity rankings are determined by the Department of Fish and Game, California Natural Diversity Data Base and based on either number of known occurrences (locations) and/or amount of habitat remaining (acreage). The three rankings used for these top priority rare natural communities are as follows:

S1. - Less than 6 known locations and/or on less than 2,000 acres of habitat remaining.

S2. - Occurs in 6-20 known locations and/or 2,000-10,000 acres of habitat remaining.

S3. - Occurs in 21-100 known locations and/or 10,000-50,000 acres of habitat remaining.

The number to the right of the decimal point after the ranking refers to the degree of threat posed to the natural community regardless of the ranking. For example:

S1.1 = very threatened
S2.2 = threatened
S3.3 = no current threats known

Sensitivity Rankings (February 1992)

Rank	Community Name	
S1.1	Mojave Riparian Forest	Southern Dune Scrub
	Sonoran Cottonwood Willow Riparian	Southern Coastal Bluff Scrub
	Mesquite Bosque	Maritime Succulent Scrub
	Elephant Tree Woodland	Riversidean Alluvial Fan Sage Scrub
	Crucifixion Thorn Woodland	Southern Maritime Chaparral
	Allthorn Woodland	Valley Needlegrass Grassland
	Arizonan Woodland	Great Basin Grassland
	Southern California Walnut Forest	Mojave Desert Grassland
	Mainland Cherry Forest	Pebble Plains
	Southern Bishop Pine Forest	Southern Sedge Bog
	Torrey Pine Forest	Cismontane AlkaliMarsh
	Desert Mountain White Fir Forest	
S1.2	Southern Foredunes	
	Mono Pumice Flat	
	Southern Interior Basalt Fl. Vernal Pool	
S2.1	Venturan Coastal Sage Scrub	Coastal and Valley Freshwater Marsh
	Diegan Coastal Sage Scrub	S. Arroyo Willow Riparian Forest
	Riversidian Upland Coastal Sage Scrub	Southern Willow Scrub
	Riversidian Desert Sage Scrub	Modoc-G. Bas. Cottonwood Willow Rip.
	Sagebrush Steppe	Modoc-Great Basin Riparian Scrub
	Desert Sink Scrub	Mojave Desert Wash Scrub
	Mafic Southern Mixed Chaparral	Engelmann Oak Woodland
	San Diego Mesa Hardpan Vernal P.	Open Engelmann Oak Woodland
	San Diego Mesa Claypan Vernal P.	Closed Engelmann Oak Woodland
	Alkali Meadow	Island Ironwood Forest
	Southern Coastal Salt Marsh	Island Cherry Forest
	Coastal Brackish Marsh	S. Interior Cypress Forest
	Transmontane Alkali Marsh	Bigcone Spruce-Canyon Oak Forest
S2.2	Active Coastal Dunes	White Mountains Fellfield
	Active Desert Dunes	
	Stab. and Part. Stab. Desert Dunes	
	Stab. and Part. Stab. Desert Sandfield	
	Mojave Mixed Steppe	
	Transmontane Freshwater Marsh	S2.3 Bristlecone Pine Forest
	Coulter Pine Forest	Limber Pine Forest
	S. California Fellfield	

ELEMENT RANKING

GLOBAL RANKING

global rank (G-rank) is a reflection of the overall condition of an element throughout its global range.

SPECIES OR NATURAL COMMUNITY LEVEL

G1 = Less than 6 viable EOs OR less than 1000 individuals OR less than 2000 acres.
G2 = 6-20 EOs OR 1000-3000 individuals OR 2000-10,000 acres.
G3 = 21-100 EOs OR 3000-10,000 individuals OR 10,000-50,000 acres.
G4 = Apparently secure; this rank is clearly lower than G3 but factors exist to cause some concern; i.e. there is some threat, or somewhat narrow habitat.
G5 = Population or stand demonstrably secure to ineradicable due to being commonly found in the world.

SUBSPECIES LEVEL

Subspecies receive a T-rank attached to the G-rank. With the subspecies, the G-rank reflects the condition of the entire species, whereas the T-rank reflects the global situation of just the subspecies or variety.
For example: *Chorizanthe robusta var. hartwegii.*
This plant is ranked G2T1. The G-rank refers to the whole species range i.e. *Chorizanthe robusta.* The T-rank refers only to the global condition of var. *hartwegii.*

STATE RANKING

The *state rank* is assigned much the same way as the global rank, except state ranks in California often also contain a threat designation attached to the S-rank.

S1 = Less than 6 EOs OR less than 1000 individuals OR less than 2000 acres
- S1.1 = very threatened
- S1.2 = threatened
- S1.3 = no current threats known

S2 = 6-20 EOs OR 1000-3000 individuals OR 2000-10,000 acres
- S2.1 = very threatened
- S2.2 = threatened
- S2.3 = no current threats known

S3 = 21-100 EOs or 3000-10,000 individuals OR 10,000-50,000 acres
- S3.1 = very threatened
- S3.2 = threatened
- S3.3 = no current threats known

S4 - Apparently secure within California; this rank is clearly lower than S3 but factors exist to cause some concern; i.e. there is some threat, or somewhat narrow habitat. NO THREAT RANK.

S5 - Demonstrably secure to ineradicable in California. NO THREAT RANK.

Notes:

Other considerations used when ranking a species or natural community include the pattern of distribution of the element on the landscape, fragmentation of the population/stands, and historical extent as compared to its modern range. It is important to take a bird's eye or aerial view when ranking sensitive elements rather than simply counting EOs.

Uncertainty about the rank of an element is expressed in two major ways:

By expressing the rank as a range of values: ex. S2S3 means the rank is somewhere between S2 and S3.

3. Other symbols

- GH — All sites are historical; the element has not been seen for at least 20 years but suitable habitat still exists (SH = All California sites are historical).
- GX — All sites are extirpated; this element is extinct in the wild (SX = All California sites are extirpated).
- GXC — Extinct in the wild; exists in cultivation.
- G1Q — The element is very rare, but there is a taxonomic question associated with it.

Top Priority Rare Natural Communities
From Region Five

Code Number	Location	Few Records	Name
S1.1 Rank			
21330	Cis		Southern Dune Scrub
31200	Cis		Southern Coastal Scrub
32400	Cis		Maritime Succulent Scrub
32720	Cis		Riversidean Alluvial Fan Sage Scrub
37030	Cis	Y	Southern Maritime Chaparral
42110	Cis		Valley Needlegrass Grassland
43000	Des	Y	Great Basin Grassland
43777	Des	Y	Mojave Desert Grassland
47000	Cis		Pebble Plains
51177	Cis	Y	Southern Sedge Bog
52310	Cis		Cismontane Alkali Marsh
61700	Des		Mojave Riparian Forest
61810	Des		Sonoran Cottonwood Willow Riparian
61820	Des		Mesquite Bosque
75100	Des	Y	Elephant Tree Woodland
75200	Des	Y	Crucifixion Thorn Woodland
75300	Des	Y	Allthorn Woodland
75400	Des	Y	Arizonan Woodland
81600	Cis		Southern California Walnut Forest
81820	Cis	Y	Mainland Cherry Forest
83122	Cis	Y	Southern Bishop Pine Forest
83140	Cis		Torrey Pine Forest
85330	Des	Y	Desert Mountain White Fir Forest
S1.2 Rank			
21230	Cis		Southern Foredunes
35410	Des		Mono Pumice Flat
44310	Cis		Southern Interior Basalt Fl. Vernal Pool
S2.1 Rank			
32300	Cis	Y	Venturan Coastal Sage Scrub
32500	Cis		Diegan Coastal Sage Scrub
32710	Cis	Y	Riversidian Upland Coastal Sage Scr.
32730	Cis	Y	Riversidian Desert Sage Scrub
35300	Des	Y	Sagebrush Steppe
35120	Des	Y	Desert Sink Scrub
37122	Cis	Y	Mafic Southern Mixed Chaparral
44321	Cis		San Diego Mesa Hardpan Vernal P.
44322	Cis		San Diego Mesa Claypan Vernal P.
45310	Des		Alkali Meadow
52120	Cis		Southern Coastal Salt Marsh
52320	Cis		Coastal Brackish Marsh
52410	Des		Transmontane Alkali Marsh

Coded as either cis (for cismontane) or des (for desert)

Code Number	Location	Few Records	Name
52410	Cis		Coastal and Valley Freshwater Marsh
61320	Cis		S. Arroyo Willow Riparian Forest
63320	Cis		Southern Willow Scrub
61610	Des		Modoc-G Bas Cottonwood Willow Rip.
63600	Des	Y	Modoc-Great Basin Riparian Scrub
63700	Des	Y	Mojave Desert Wash Scrub
71180	Cis	Y	Engelmann Oak Wood
71181	Cis	Y	Open Engelmann Oak Wood
71182	Cis	Y	Closed Engelmann Oak Woodland
71190	Cis	Y	Island Oak Woodland
71210	Cis		California Walnut Woodland
81700	Cis	Y	Island Ironwood Forest
81810	Cis		Island Cherry Forest
83230	Cis		S. Interior Cypress Forest
84150	Cis	Y	Bigcone Spruce-Canyon Oak Forest
S2.2 Rank:			
21100	Cis	Y	Active Coastal Dunes
22100	Des		Active Desert Dunes
22200	Des		Stab. and Part Stab. Desert Dunes
22300	Des	Y	Stab. and Part Stab. Desert Sandfield
34220	Des	Y	Mojave Mixed Steppe
52420	Des	Y	Transmontane Freshwater Marsh
84140	Cis	Y	Coulter Pine Forest
81130	Cis	Y	S. California Fellfield
81140	Des	Y	White Mountains Fellfield
S2.3 Rank:			
86400	Des		Bristlecone Pine Forest
86700	Des	Y	Limber Pine Forest

San Bernardino Valley Municipal Water District

1350 SOUTH "E" STREET - P. O. BOX 5906 - SAN BERNARDINO, CALIFORNIA 92412-5906 -(909) 387-9200
FAX (909) 387-9247

November 12, 1999

Kathleen Dale
Principal Environmental Specialist
Albert A. Webb Associates
3788 McCray Street
Riverside, CA 92506

Subject: **Response to City of San Bernardino Notice of Preparation for the Proposed Sale of Reclaimed Water from the RIX Facility**

Dear Ms Dale;

The San Bernardino Valley Municipal Water District (SBVMWD) appreciates the opportunity to comment on the Notice of Preparation (NOP) and Initial Study (IS) prepared by your company regarding subject project. SBVMWD has long supported the concept of reusing the water from the RIX project for the benefit of the people in the region that generates it, rather than discharging it to the river for delivery to the Orange County Water District.

Since the NOP and IS relate to a draft Program level Environmental Impact Report (EIR) for which specific projects are undefined, it is assumed that there will be subsequent opportunities to consider the environmental implications of any specific project proposed to be implemented by the private party that contracts for the purchase of the water. Indeed, it is the details of the proposed contractual arrangement under consideration by the City of San Bernardino that is our greatest concern. It would be appropriate to make the details of the contract public in the course of preparation of the EIR, because it is difficult to evaluate the potential environmental impacts of a contractual arrangement that is invisible. In order to assure that a maximum quantity of water is reused at the earliest possible time, it is assumed that the contract will contain guarantees on quantities of water to be recycled in accordance with an appropriate time line. To provide incentives to comply with that requirement, the contractor will presumably pay for the water whether or not he has found uses for it. The most negative environmental impact would occur if the private contractor obtained rights to the water but was not diligent in getting the water into use. In such case, the City should have the right to void the contract with respect to the unused portion of the supply and sell to alternative public or private interests ready and willing to use the water. We request that the contract provisions be made public or that these issues be addressed in the EIR.

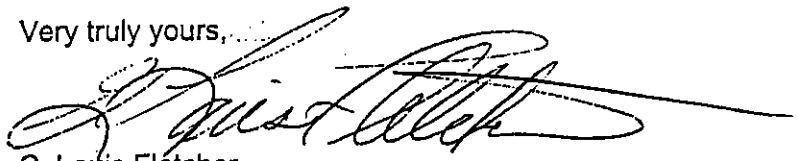
The potential uses discussed in the NOP and IS are all viable and supported by SBVMWD. None of the issues identified in the IS to be addressed in the draft EIR are expected to be of significance. However, we are concerned that the City not enter into a contract which could

Directors and Officers

EDWARD B. KILLGORE, Division I | GEORGE A. AGUILAR, Division II | PAT MILLIGAN, Division III | MARK BULOT, Division IV | STEVE COPELAN, Division V | G. LOUIS FLETCHER, General Manager and Chief Engineer

transfer its rights to the water without achieving the goal of maximum levels of reuse.

Very truly yours,



G. Louis Fletcher
General Manager

99-0

DEPARTMENT OF FISH AND GAME
Eastern Sierra - Inland Deserts Region
4775 Bird Farm Road
Chino Hills, California 91709
(909) 393-0635

RECEIVED
NOV 18 1999
SBMWD
DEPUTY GENERAL MANAGER

November 15, 1999

Stacey R. Aldstadt
City of San Bernardino Municipal Water Dept.
300 North "D" Street
San Bernardino, CA 92418

Re: Sale of Reclaimed Water from the RIX Facility
SCH# 99101088

Dear Mr. Aldstadt:

The California Department of Fish and Game (Department) thanks you for the opportunity to comment on the proposed project. The project consists of the sale of 18,000 acre-feet of reclaimed water per year. The reclaimed water currently is discharged to the Santa Ana River. According to a 1969 court judgement the Santa Ana River is divided into an Upper Area and a Lower Area separated by Prado Dam. The judgement established water rights for water users in each area. The minimum flow obligation at Riverside Narrows is 12,240 acre feet and the minimum flow obligation at Prado Dam is 34,000 acre-feet.

The notice of preparation of an Environmental Impact Report states that there are existing mitigation measures which were adopted with the establishment of the RIX facility to document effects on riparian resources in the Santa Ana River. These measures require monitoring of groundwater levels and biological resources within the river reach between the City of San Bernardino water reclamation plant and the RIX facility.

The Department concurs with the City's decision to prepare an Environmental Impact Report. The Department is responding as a Trustee Agency regarding state and wildlife resources and as a Responsible Agency regarding any future 1601-1603 Streambed Alteration Agreements and/or endangered species 2081 permits.

The biological resources section of the Initial Study states that the proposed project

may impact biological resources in two ways: 1) directly through the diversion of water now discharged into the Santa Ana River, and 2) potential impacts from the construction of infrastructure to carry the diverted water. The Initial Study states that: "The forthcoming DEIR will include a programmatic treatment of potential biological resources impacts, developing a framework of performance criteria and mitigation measures to avoid, minimize, and mitigate potential impacts of future improvements and operations."

The sensitive species which might be affected by the project include: the San Bernardino kangaroo rat, Western yellow-billed cuckoo, Southwestern willow flycatcher, least Bell's vireo, yellow-breasted chat, Santa Ana sucker, arroyo chub, slender-horned spineflower and Santa Ana River woollystar. Specific impacts to these species need to be enumerated. In addition, avoidance measures, alternative measures and mitigation measures need to be analyzed. In addition, the same process applies to potential impacts on riparian vegetation.

The Department is particularly concerned with the direct impacts of diverting a substantial amount of water from the Santa Ana River. Specifically, will the diversion result in any of the following conditions: 1) a reduction in riparian vegetation; 2) lowering of the groundwater table;3) reduction in the existing geographic pattern of riparian vegetation4) an increase in terrestrial plant species and 5;) any resulting impacts on state and federal endangered flora and fauna species.

The second area which the Department is concerned about are the future impacts from infrastructure used to transport the diverted water. It does not appear that the specific alignments of infrastructure is known at this time nor will they be specified in the DEIR. The Department requests that future alignments associated with this project be analyzed in detail for impacts to sensitive flora and fauna.

The Department is a Responsible Agency regarding the issuance of 1601-1603 Lake and Streambed Alteration Agreements (Agreements). Potential impacts to waters of the United States, wetlands or jurisdictional streambeds should be determined during the CEQA process, not following it. The lead agency can consult with the Department on project impacts and mitigation and incorporate a discussion of recommended mitigation measures in the EIR.

The Department is implementing new procedures for processing Agreements. In this regard, the Department is notifying lead agencies that projects that will result in impacts to lakes or jurisdictional streambeds must include the supporting biological studies and CEQA-required analysis in the text of CEQA-certified documents. Any information necessary to the issuance of an Agreement must be processed via CEQA. If the information necessary for the issuance of an Agreement is included with the CEQA documents and has been subject to CEQA and public review, the Agreement can be

processed per Department procedures. Information which the Department requires for its issuance of an Agreement which has not been CEQA-certified must be again subject to the CEQA process for public review. In this scenario, the Department has several options: 1) the lead agency can initiate a subsequent CEQA document and forward it to the Department following completion of the CEQA process, and 2) the Department can become lead agency. This same process applies to other discretionary actions, such as CESA Incidental Take Permits.

The Department prefers that the applicant submit an Agreement application with information approved during the CEQA process. The Department is available for consultation on projects prior to submission of an Agreement application. Ordinarily, the information required includes: a description of the direct and indirect impacts of the project on the lake or stream; a biological survey of the lake or stream and identification of the absence or presence of riparian resources (flora and fauna); a discussion of environmental alternatives; a discussion of avoidance measures to reduce project impacts; and a discussion of potential mitigation measures required to reduce the project impacts to a level of insignificance. The applicant and lead agency should keep in mind that the State also has a policy of no net loss of wetlands.

The Department understands that this Agreement process is new to most applicants and lead agencies. The Department also understands that this is not the way Agreements have been processed in the past and that delays in Agreement processing may result. In order to avoid delays or repetition of the CEQA process, the lead agency should consult with the Department to discuss potential project impacts and avoidance and mitigation measures. This change in Agreement procedure is a result of litigation. The Department is under a writ of mandate from a State of California Superior Court regarding the processing of Agreements (*Mendocino Environmental Center vs California Department of Fish and Game, Respondents, Bruce Choder, River Rat Salvage et al, Real Parties*). The write of mandate states in part:

> A writ of mandate shall issue ordering the California Department of Fish and Game on or before May 1, 1999, to prepare and implement a program or process that will incorporate a CEQA review into the Fish and Game Section 1603 process. The writ of mandate shall further order the California Department of Fish and Game to cease and desist entering into Section 1603 agreements after May 1, 1999, unless such agreements have been subject to a CEQA review.

Therefore, the Department is advising the lead agency that all potential impacts to biological resources and sensitive habitat areas will need to be analyzed in the DEIR document, along with specific measures and alternatives to avoid or mitigate for the loss of sensitive biological resources. A 1989 statute requires that public agencies adopt reporting or monitoring programs to ensure that mitigation measures are

implemented. In this connection, mitigation measures have to be specific, have to be capable of being implemented and must be capable of being monitored. This is not the case with the mitigation measures in the Draft Supplement.

The following sections of this letter detail the types and content of studies necessary to evaluate the biological resources which may be present on the project site. Section 15021 of the CEQA Guidelines states:

> CEQA establishes a duty for public agencies to avoid or minimize environmental damage where feasible.
>
> (1) In regulating public or private activities, agencies are required to give major consideration to preventing environmental damage.
>
> (2) A public agency should not approve a project as proposed if there are feasible alternatives or mitigation measures available that would substantially lessen any significant effects that the project would have on the environment.

This particular project has the potential to have significant environmental impacts on sensitive flora and fauna resources, including Federally listed endangered species. Therefore, critical aspects of the DEIR should include an alternatives analysis which focuses on environmental resources and in-kind mitigation measures for impacts identified as significant. To enable Department staff to adequately review and comment on the proposed project, we suggest that updated biological studies be conducted prior to any environmental or discretionary approvals. The following information should be included in any focused biological report or supplemental environmental report:

1. A complete assessment of the flora and fauna within and adjacent to the project area, with particular emphasis upon identifying endangered, threatened, and locally unique species and sensitive habitats.

   a. A thorough assessment of rare plants and rare natural communities, following the Department's May 1984 Guidelines for Assessing Impacts to Rare Plants and Rare Natural Communities (Attachment 1).

   b. A complete assessment of sensitive fish, wildlife, reptile, and amphibian species. Seasonal variations in use of the project area should also be addressed. Focused species-specific surveys, conducted at the appropriate time of year and time of day when the sensitive species are active or otherwise identifiable, are required. Acceptable species-specific survey procedures should be developed in consultation with the

Department and the U.S. Fish and Wildlife Service.

c. Rare, threatened, and endangered species to be addressed should include all those which meet the California Environmental Quality Act (CEQA) definition (See CEQA Guidelines, 15380)

d. The Department's California Natural Diversity Data Base in Sacramento should be contacted at (916) 327-5960 to obtain current information on any previously reported sensitive species and habitat, including Significant Natural Areas identified under Chapter 12 of the Fish and Game Code.

2. A thorough discussion of direct, indirect, and cumulative impacts expected to adversely affect biological resources, with specific measures to offset such impacts.

a. CEQA Guidelines, 15125(a), direct that knowledge of the regional setting is critical to an assessment of environmental impacts and that special emphasis should be placed on resources that are rare or unique to the region.

b. Project impacts should be analyzed relative to their effects on off-site habitats. Specifically, this should include nearby public lands, open space, adjacent natural habitats, and riparian ecosystems. Impacts to and maintenance of wildlife corridor/movement areas, including access to undisturbed habitat in adjacent areas, should be fully evaluated and provided.

c. The zoning of areas for development projects or other uses that are nearby or adjacent to natural areas may inadvertently contribute to wildlife-human interactions. A discussion of possible conflicts and mitigation measures to reduce these conflicts should be included in the environmental document.

d. A cumulative effects analysis should be developed as described under CEQA Guidelines, 15130. General and specific plans, as well as past, present, and anticipated future projects, should be analyzed relative to their impacts on similar plant communities and wildlife habitats.

e. The document should include an analysis of the effect that the project may have on completion and implementation of regional and/or subregional conservation programs. Under 2800-2840 of the Fish and Game Code, the Department, through the Natural Communities

Conservation Planning (NCCP) program is coordinating with local jurisdictions, landowners, and the Federal Government to preserve local and regional biological diversity. Coastal sage scrub is the first natural community to be planned for under the NCCP program. The Department recommends that the lead agency ensure that the development of this and other proposed projects does not preclude long-term preserve planning options and that projects conform with other requirements of the NCCP program. Jurisdictions participating in the NCCP should assess specific projects for consistency with the NCCP Conservation Guidelines.

3. A range of alternatives should be analyzed to ensure that alternatives to the proposed project are fully considered and evaluated. A range of alternatives which avoid or otherwise minimize impacts to sensitive biological resources should be included. Specific alternative locations should also be evaluated in areas with lower resource sensitivity where appropriate.

   a. Mitigation measures for project impacts to sensitive plants, animals, and habitats should emphasize evaluation and selection of alternatives which avoid or otherwise minimize project impacts. Off-site compensation for unavoidable impacts through acquisition and protection of high-quality habitat elsewhere should be addressed.

   b. The Department considers Rare Natural Communities as threatened habitats having both regional and local significance. Thus, these communities should be fully avoided and otherwise protected from project-related impacts (Attachment 2).

   c. The Department generally does not support the use of relocation, salvage, and/or transplantation as mitigation for impacts to rare, threatened, or endangered species. Department studies have shown that these efforts are experimental in nature and largely unsuccessful.

4. A California Endangered Species Act (CESA) Permit must be obtained, if the project has the potential to result in "take" of species of plants or animals listed under CESA, either during construction or over the life of the project. CESA Permits are issued to conserve, protect, enhance, and restore State-listed threatened or endangered species and their habitats. Early consultation is encouraged, as significant modification to the proposed project and mitigation measures may be required in order to obtain a CESA Permit. Revisions to the Fish and Game Code, effective January 1998, require that the Department issue a separate CEQA document for the issuance of a CESA permit unless the project CEQA document addresses all project impacts to listed species and specifies a mitigation monitoring and reporting program that will meet the

requirements of a CESA permit. For these reasons, the following information is requested:

a. Biological mitigation monitoring and reporting proposals should be of sufficient detail and resolution to satisfy the requirements for a CESA Permit.

b. A Department-approved Mitigation Agreement and Mitigation Plan are required for plants listed as rare under the Native Plant Protection Act.

5. The Department opposes the elimination of watercourses and/or their channelization or conversion to subsurface drains. All wetlands and watercourses, whether intermittent or perennial, must be retained and provided with substantial setbacks which preserve the riparian and aquatic values and maintain their value to on-site and off-site wildlife populations.

a. The Department has direct authority under Fish and Game Code 1600 set seq. In regard to any proposed activity which would divert, obstruct, or affect the natural flow or change the bed, channel, or bank of any river, stream, or lake. Early consultation is recommended, since modification of the proposed project may be required to avoid or reduce impacts to fish and wildlife resources.

b. A discussion of potential adverse impacts from any increased runoff, sedimentation, soil erosion, and/or urban pollutants on streams and watercourses on or near the project site, with mitigation measures proposed to alleviate such impacts must be included.

Thank you for this opportunity to comment. Questions regarding this letter and further coordination on these issues should be directed to Robin Maloney-Rames, Environmental Specialist III, Chino Hills, (714) 817-0585.

Sincerely,

Glenn Black

Glenn Black
Supervisor
Habitat Conservation - South
Region 6

cc: Jeff Newman, USFWS, Carlsbad

Western Riverside Council of Governments

County of Riverside, City of Banning, City of Beaumont, City of Calimesa, City of Canyon Lake, City of Corona, City of Hemet, City of Lake Elsinore, City of Moreno Valley, City of Murrieta, City of Norco, City of Perris, City of Riverside, City of San Jacinto, City of Temecula

November 16, 1999

Ms. Kathleen Dale
Principal Environmental Specialist
Albert A. Webb Associates
3788 McCray Street
Riverside, CA 92506-2927

RE: Notice of Preparation of a Draft EIR for the Sale of Reclaimed Water from the RIX Facility; SCAG IGR NO. I19990496

Dear Ms. Dale:

Thank you for the opportunity to review and comment on the above-referenced project. The proposed project is considered to be "regionally significant" (CEQA §15206), and as such, subject to Intergovernmental Review (IGR). IGR is the review of regionally significant projects for their consistency with adopted regional plans. Western Riverside Council of Governments (WRCOG) is assisting Southern California Association of Governments (SCAG) in reviewing on their behalf, regionally significant projects located within the western Riverside County subregion. SCAG staff, or the Community, Economic and Human Development Committee as appropriate, concurs in these review comments.

The role of IGR can best be understood in the terms expressed by CEQA Guidelines, § 15125, under *Discussion* as follows:

> "...A number of agencies have been required to spend large amounts of public funds to develop regional plans as a way of dealing with large-scale environmental problems involving air and water pollution, solid waste, and transportation. Where individual projects would run counter to the efforts identified as desirable or approved by agencies in the regional plans, the Lead Agency should address the inconsistency between the project plans and the regional plans. As a result of this analysis, lead agencies may be able to find ways to modify the project to reduce the inconsistency..."

The NOP includes a list of issues to be discussed in the EIR. WRCOG recommends addition of a Regional Element, to include analysis of the consistency of the proposed plan with various regional plans including the *Regional Comprehensive Plan and Guide (RCPG)*, the *Regional Transportation*

Plan (RTP), the *Air Quality Management Plan (AQMP)*, the most recently adopted appropriate *Urban Water Management Plan*, the *Congestion Management Plan (CMP)* and the WRCOG *Comprehensive Subregional Plan.*

In response to your request for comments, we are attaching a list of subregional policies from the WRCOG *Subregional Comprehensive Plan.* These policies are being provided to assist your agency's efforts in reviewing the proposed project in the context of its consistency with the WRCOG Subregional Plan. This plan has been determined to be consistent with the *RCPG.* It is also provided to assist your agency's efforts toward attaining subregional goals through plan development and decision-making.

Please note that these policies and any accompanying comments are advisory in nature only. The lead agency is still responsible for making the final decision of whether a project or plan should be approved.

If you have any questions regarding this letter or the attached policies, do not hesitate to contact me or Sandra Paulsen, Staff Analyst at (909) 787-7985. We look forward to a positive and productive working relationship with your agency.

Sincerely,

Steve Ruddick
Director of Planning

COMMENTS ON THE NOTICE OF PREPARATION OF A DRAFT EIR FOR THE SALE OF RECLAIMED WATER FROM THE RIX FACILITY IGR NO. I19990496

PROJECT DESCRIPTION

The proposed project is the sale of 18,000 acre feet per year of tertiary treated water to a private party. Installation of necessary related facilities may or may not be built in the future. If built, the locations and types of related facilities are not known at this time. This program EIR however, will address any future expansion of the wastewater treatment plant that may be necessary for the conveyance of the water to the buyer. The water is effluent from the RIX treatment facility in San Bernardino County, but will affect the Santa Ana watershed in western Riverside County.

SRCP POLICIES RELATED TO GROWTH FORECASTS

WRCOG prepares growth projections for western Riverside County in the areas of population, housing and employment. Projections are developed with the assistance of local jurisdictions, and through modeling programs such as the *Disaggregate Residential Allocation Model* and the *Employment Allocation Model.* SCAG adopts regional growth projections based on subregional figures to be used in modeling efforts for transportation, air quality, and other regional programs.

WATER RESOURCES ELEMENT:

SCAG 3.03

- ☐ *Ensure that future growth and development is supported by adequate infrastructure.*
- ☐ *Establish stable, reliable and secure water supplies of adequate and quality to meet the needs of the existing population and projected growth.*
- ☐ *Cooperate and coordinate with local responsible wastewater authorities to plan and construct new wastewater treatment and collection facilities on the basis of projected growth forecasts, which are consistent with the protection of public health and water quality*
- ☐ *Schedule future development at a pace consistent with the provision of public infrastructure facilities and available funding.*

SRCP POLICIES RELATED TO STANDARD OF LIVING

The policies addressing Standard of Living promote the regional strategic goal to stimulate the economy. The listed goals are aimed at developing urban environments that enable individuals to spend less income on housing, minimize public and private development costs, and enable firms to be more competitive.

GROWTH MANAGEMENT ELEMENT:

SCAG 3.03

- ☐ *Manage growth to ensure the ability to provide the public services and facilities needed to maintain the quality of life for current and future residents of Western Riverside County.*

SCAG 3.05

- ☐ *Develop a stable and equitable financing structure which will enable government and the private sector to provide the services and facilities necessary to accommodate growth and*

maintain the quality of life in the subregion.

- ☐ *Financing for growth-related infrastructure and services should be based on the "fair share" principle and should include consideration of economic feasibility and fair-share contributions by developers, taxes or land-based assessments on all property owners, and pricing mechanisms to capture users' share of the total costs. Costs should also be apportioned at the countywide, subregional, Area Planning District, and local levels to support the differing costs of the infrastructure and services needed to support growth at those levels.*

SCAG 3.09

- ☐ *Provide adequate services and facilities to maintain and improve the quality of life as the subregion's population increases.*

WATER RESOURCES ELEMENT:

SCAG 3.05

- ☐ *Manage a timely, orderly and efficient arrangement of public infrastructure facilities and distribution/collection systems to serve as the framework for development that best supports existing and proposed land uses.*

SRCP POLICIES RELATED TO QUALITY OF LIFE

Quality of life policies are intended to enhance and preserve the quality of the physical and social living environment. The underlying goals of the policies include creating urban environments that preserve open space and natural resources, are aesthetically pleasing, preserve the character of the community, and offer a variety of lifestyles. Issues regarding mobility and clean air are also included in this category.

OPEN SPACE and HABITAT CONSERVATION ELEMENT:

SCAG 3.18

- ☐ *Support sustainable development that will reduce the loss and fragmentation of native species and habitats.*
- ☐ *Establish development policies and standards which support the retention of open space lands and values.*
- ☐ *Maintain, protect and preserve as permanent open space those natural areas and habitats with sensitive biotic species*

SCAG 3.18

- ☐ *Support sustainable development which avoids or reduces adverse environmental effects on natural and sensitive resources.*

SCAG 3.19

- ☐ *Conserve natural resources and habitats in areas targeted for open space.*

SCAG 3.22

- ☐ *Protect residents and structures from man-made and natural hazards.*
- ☐ *Support local government implementation of existing federal and state laws and regulations governing all types of hazards present in the subregion: fires, flooding, seismic and geologic, noise, etc.*

SCAG 3.23

☐ *Preserve and protect scenic and visual resources.*

WATER RESOURCES ELEMENT:

SCAG 3.20

☐ *Optimize the use of existing water resources through conservation programs and efficient ground and surface water management programs.*

SRCP POLICIES RELATED TO QUALITY OF LIFE

Quality of life policies are intended to enhance and preserve the quality of the physical and social living environment. The underlying goals of the policies include creating urban environments that preserve open space and natural resources, are aesthetically pleasing, preserve the character of the community, and offer a variety of lifestyles. Issues regarding mobility and clean air are also included in this category.

WATER RESOURCES ELEMENT:

SCAG 3.20

☐ *Optimize the use of existing water resources through conservation programs and efficient ground and surface water management programs.*

SRCP POLICIES RELATED TO WATER QUALITY

Water Quality policies are based on two underlying goals: to restore and maintain the chemical, physical and biological integrity of the nation's water supply, and to achieve and maintain water quality objectives necessary to protect all beneficial uses of all waters.

SCAG 11.02

☐ *Protect surface and groundwater from degradation.*

☐ *Implement an environmentally and economically responsible system of public infrastructure.*

SCAG 11.03

☐ *Integrate new data on water supplies, wastewater treatment capacities, flood hazards, and other infrastructure facilities and systems into the Western Riverside Information Network (WRIN).*

SCAG 11.06

☐ *Encourage maximum reuse of reclaimed wastewater and other non-potable waters.*

SCAG 11.07

☐ *Support the retention (reclamation) and reuse of wastewater.*

☐ *Support optimum retention of available water resources*

CONCLUSIONS AND RECOMMENDATIONS:

All feasible measures needed to mitigate any potentially negative subregional impacts associated with the proposed project should be implemented and monitored, as required by CEQA.

STATE OF CALIFORNIA - THE RESOURCES AGENC
GRAY DAVIS, *Governor*

DEPARTMENT OF WATER RESOURCES
SOUTHERN DISTRICT
770 FAIRMONT AVENUE, SUITE 102
GLENDALE, CA 91203-1035

NOV 17 1999

Ms. Kathleen Dale
Principal Environmental Specialist
Albert A. Webb Associates
3788 McCray Street
Riverside, California 92506

Dear Ms. Dale:

Thank you for the opportunity to review the recent Notice of Preparation of a draft Program Environmental Impact Report regarding the proposed sale of reclaimed water by the City of San Bernardino Municipal Water Department to a private water wholesaler.

As proposed, the project would entail the sale of up to 18,000 acre-feet of reclaimed water per year, with a maximum of 360,000 acre-feet over a 20-year period. We understand that the RIX plant will be the source of the reclaimed water intended for distribution.

The Department of Water Resources supports water reclamation efforts throughout the State and encourages the beneficial use of reclaimed water whenever possible. As a cost-sharing partner in the U.S. Bureau of Reclamation's Southern California Comprehensive Water Reclamation and Reuse Study, the Department has an intimate knowledge of the current and forecast water recycling and reuse that is likely to take place in the study area.

As you may know, SCCWRRS has identified the RIX plant as a source of supply for one of its Short-Term Implementation Plans for the Inland Empire area. Our most recent information shows that for 2010 about 18,000 acre-feet of reclaimed water from the RIX plant will be used for groundwater recharge in connection with the Riverside-Colton Conjunctive Use Project. Does the proposed project change this assumption? If so, please identify the specific wholesale agency that will be receiving RIX plant water and indicate the purpose and ultimate use of the water.

As you correctly state, if the use of State Water Project facilities will be directly or indirectly involved in the conveyance or storage of reclaimed water, approval of the Department, as well as affected State Water Contractors, would be required.

We look forward to reviewing the draft Program EIR when it becomes available and request that we be added to the mailing list for any information relative to this project.

Thank you for the opportunity to review this NOP. If you have any questions, please call me at (818)-543-4610 or Michael Maisner of my staff at (818) 543-4600 ext. 282.

Sincerely,

for Charles R. White, Chief
Southern District

TRANSPORTATION/FLOOD CONTROL
DEPARTMENT - SURVEYOR

COUNTY OF SAN BERNARDINO
PUBLIC SERVICES GROUP

East Third Street • San Bernardino, CA 92415-0835 • (909) 387-2800
Fax (909) 387-2667

KEN A. MILLER
Director

November 16, 1999

Albert A. Webb
Attn.: Kathleen Dale, Principal Environmental Specialist
3788 McCray Street
Riverside, CA 92506

File #10(ENV)-4.01

RE: DEPARTMENT COMMENTS FOR DRAFT EIR FOR PROPOSED SALE OF RECLAIMED WATER FROM RIX FACILITY, CITY OF SAN BERNARDINO MUNICIPAL WATER DEPARTMENT

Dear Ms. Dale:

Thank you for giving the San Bernardino County Transportation/Flood Control Department the opportunity to comment on the above-referenced project. After reviewing the submitted document, the proposed project has raised some drainage issues concerning the Santa Ana River and Rialto Channel.

The site is generally located southeast of Agua Mansa Road, in the City of Colton, and is in the historic overflow of two Flood Control District Facilities, i.e. Rialto Channel and the Santa Ana River. Rialto Channel is an interim facility that is not capable of containing the flows from a 100-year storm event. Regarding the Santa Ana River, the construction of the Seven Oaks Dan will considerably reduce the floodplain in many areas along the Santa Ana River. However, according to the **Upper Santa Ana River 100-year With Project Floodway and Floodplain Delineation Plan View**, prepared by the Corps of Engineers, it appears that several hundred feet beyond the River's northerly boundary (at this location) will continue to be within the 100-year overflow area upon completion of the dame.

Figure No. 2 of the submittal does not show in any detail the location of any proposed structures. Therefore, the comments made here are general in nature and subject to change when more detailed plans are available. Our comments are as follows:

1. The EIR should address the potential flood hazards from the Santa Ana River and Rialto Channel including overflow, erosion and debris deposition.

2. The EIR should address the adequacy of the Santa Ana River's levee at the site and upstream of Rialto Channel and the levee along the west bank of Rialto Channel.

3. The EIR should also address any effects the proposed construction will have on adjacent or downstream property.

4. It is assumed that the City of Colton will enforce the current FEMA floodproofing requirements.

WILLIAM H. RANDOLPH
County Transportation/Flood Control Director
TOM KELLY
Assistant County Administrative Officer
Public Services Group

Board of Supervisors
KATHY A. DAVIS ..... First District
JON D. MIKELS ..... Second District
JERRY EAVES ..... Fifth District
DENNIS HANSBERGER ..... Third District
FRED AGUIAR ..... Fourth District

5. We will recommend adequate building setback lines from District facilities if any habitable structures are proposed.

6. Prior to any activity on Flood Control District right-of-way, a permit will be required from the District. This permit may be subject to review and approval by the U.S. Army Corps of Engineers. Other improvements may be required which cannot be determined at this time.

Should you or your staff wish to further discuss this project, please contact my office at (909) 387-2799.

Sincerely,

Frank Molina

FRANK MOLINA, Senior Associate Planner
Environmental Management Division

FM:fm/SBMWDRIXFacility.DOC

cc: Jim Borcuk
Frank Molina
KAM/PJM Reading File

CHINO BASIN WATERMASTER

8632 Archibald Ave., Suite 109, Rancho Cucamonga, CA 91730
TEL: (909) 484-3888 • FAX: (909) 484-3890

TRACI STEWART
Chief of Watermaster Services

November 18, 1999

Ms. Kathleen Dale
Principal Environmental Specialist
Albert A. Webb Associates
3788 McCray Street
Riverside, CA 92506

Subject: Notice of Preparation of a Draft Program Environmental Impact Report
Proposed Sale of Reclaimed Water from the RIX Facility
City of San Bernardino Municipal Water Department

Dear Ms. Dale:

Chino Basin Watermaster (Watermaster) received the aforementioned notice of preparation (NOP) and associated Initial Study on October 19, 1999. The proposed project is to provide 18,000 acre-feet per year of recycled water to a private water wholesaler. Currently, the water is directly discharged into the Santa Ana River (SAR) from the RIX facility.

Since 1978, the Watermaster is the entity charged with administering adjudicated water rights and managing groundwater resources within the watershed and groundwater basin known as the Chino Groundwater Basin (Basin). One of our key responsibilities is to manage and to control the replenishment of water supplies in the Basin.

On behalf of the Watermaster, I am writing to request clarification and remedial action as appropriate to the following concerns:

1. The California Regional Water Quality Control Board, Santa Ana Region (CRWQCB) plans to lower the basin objectives in the SAR Watershed. How does the proposed project meet with the reduced basin objectives in the Basin?

2. The California Department of Health Services (DHS) promulgated the Drinking Water Source Assessment and Protection Program in 1998. The Watermaster supplies groundwater to over 20 appropriators. How does the proposed project impact the Watermaster appropriators?

3. The proposed agreement includes an initial term of three years for market development, followed by a term of 20 years, renewable in ten-year increments. Do the downstream users, such as Watermaster, have an opportunity to comment prior to the contract being renewed?

Thank you for your assistance in resolving our concerns. If you have any questions about this letter, please feel free to contact Owen Lu, P.E., Senior Engineer, at (909) 484-3888.

Sincerely,

Traci Stewart
Chief of Watermaster Services

United States Department of the Interior
Fish and Wildlife Service
Ecological Services
Carlsbad Fish and Wildlife Office
2730 Loker Avenue West
Carlsbad, California 92008

NOV 2 3 1999

Kathleen Dale
Principal Environmental Specialist
Albert A. Webb Associates
3788 McCray Street
Riverside, California 92506

Re: Notice of Preparation of a Draft Environmental Impact Report for City of San Bernardino, Municipal Water Department Proposed Sale of Reclaimed Water from the RIX Facility, San Bernardino County, California

Dear Ms. Dale:

We received the notice of preparation (NOP) of a draft environmental impact report and associated initial study for the City of San Bernardino, Municipal Water Department Proposed Sale of Reclaimed Water from the RIX Facility, San Bernardino County, California, on October 20, 1999. The proposed project apparently involves the diversion and reclamation of a portion of the RIX plant effluent that is now discharged in to the Santa Ana River in the vicinity of Colton in San Bernardino County. According to page 3 of the initial study and per the terms of the proposed project, approximately 18,000 acre-feet of reclaimed water would be diverted each year from the Santa Ana River.

We provide the following comments in keeping with our agency's mission to work "with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people." In addition, we provide comments on public notices issued for a Federal permit or license affecting the Nation's waters pursuant to the Clean Water Act. Moreover, the National Environmental Policy Act (Title I, Section 102G) requires that "all agencies of the Federal Government shall . . . make available to States, counties, municipalities . . . advice and information useful in restoring, maintaining, and enhancing the quality of the environment." Finally, we administer the Endangered Species Act of 1973, as amended (Act). Section 7 of the Act requires Federal agencies to consult with us, the U.S. Fish and Wildlife Service (Service), should it be determined that their actions may affect federally listed threatened or endangered species. Section 9 of the Act prohibits the "take" (e.g., harm, harassment, pursuit, injury, kill) of federally listed wildlife. "Harm" is further defined to include habitat modification or degradation where it kills or injures wildlife by impairing essential behavioral patterns including breeding, feeding, or sheltering. Take incidental to otherwise lawful activities can be authorized under sections 7 (Federal consultations) and 10 (habitat conservation plans) of the Act.

In general, we believe that the two documents properly identify some of the real and potential environmental impacts of the proposed project. For instance, we concur with the disclosure in the initial study (page 22) that the project may affect sensitive habitats and a large number of sensitive species, including five federally endangered species, the San Bernardino kangaroo rat (*Dipodomys merriami parvus*, "SBKR"), least Bell's vireo (*Vireo bellii pusillus*, "vireo"), southwestern willow flycatcher (*Empidonax traillii extimus*, "flycatcher"), slender-horned spineflower (*Dodecahema leptoceras*), and Santa Ana River woolly-star (*Eriastrum densifolium* ssp. *sanctorum*); the Santa Ana sucker (*Catastomus santaanae*), which is proposed for Federal listing as threatened; and the State-listed yellow-billed cuckoo (*Coccyzus americanus*). To ensure the conservation of these and other sensitive and federally listed species and habitats within the project area and downstream reaches of the Santa Ana River in San Bernardino and Riverside Counties, we offer the following specific information and recommendations for your consideration.

Given our knowledge of the project area and the work being proposed at the present time, we likely will be involved with Federal permit actions affecting the subject project, and that a consultation or incidental take permit pursuant to section 7 or 10, respectively, may be required. To assist us in adequately evaluating the proposed project from the standpoint of fish and wildlife protection and to expedite any necessary Federal permitting processes, we request that the draft environmental impact report contain the following specific information:

1) A complete discussion of the purpose and need for the project.

2) A complete description of the proposed project, including all practicable alternatives that have been considered to reduce project-related, direct or indirect impacts to wetland areas, other sensitive habitat types, aquatic species, and fish and wildlife resources.

3) An analysis of the likelihood and extent of growth-related effects resulting directly or indirectly from the proposed project.

4) A list of all federally listed species and State-listed species that occur within the sphere of influence of the project. A detailed discussion of these species, including information pertaining to their local status and distribution, should be included in this report. The anticipated or real impacts of the project on these species should be addressed fully. We are particularly interested in any and all pertinent information pertaining to potential or real, indirect and direct impacts to federally listed species, including the endangered Delhi Sands flower-loving fly (*Rhaphiomidas terminatus abdominalis*) and the aforementioned, endangered SBKR, vireo, flycatcher, Santa Ana River woolly-star, and slender-horned spineflower. In addition, complete information should be provided pertaining to the potential project-related impacts (direct and indirect) to the Santa Ana sucker and all other sensitive plant and animal species, including California Department of Fish and Game Species of Concern and Species of Special Concern.

5) An assessment of direct, indirect, and cumulative project impacts to sensitive and listed fish and wildlife species and associated wetland, riparian woodland, alluvial fan scrub, oak woodland, chaparral, and grassland habitats. All facets or manifestations of the project (e.g., construction, implementation, operation, growth-inducement) should be included in this assessment. Specific acreages and descriptions of the types of sensitive habitats that will or may be directly or indirectly affected by the proposed project or project alternatives should be included if at all possible. Descriptions of the biological resources associated with each habitat type should also be included. We recommend the use of maps and tables to summarize such information.

6) Specific mitigation or compensation plans and impact minimization or avoidance measures to fully offset project-related impacts, including proposals for mitigating the cumulative impacts of direct and indirect habitat loss, degradation, or modification. Adverse project-related impacts should be avoided if at all possible or mitigated through the recreation or revegetation of impacted habitat types. The objective of each mitigation plan should be to offset the project-induced qualitative and quantitative losses of wildlife habitat values. These mitigation plans should be prepared by persons or firms with specific expertise on southern California wetland and native vegetation ecosystems and state-of-the-art native plant revegetation techniques. Each plan should include, at a minimum: a) the location of the mitigation site, b) the species, actual number, and size of the plants to be used, c) a schematic layout depicting the arrangement of the plants within the compensation area, d) time of year that planting will occur, e) identification of the irrigation methodology to be employed, f) measures to be taken to control exotic vegetation on-site, g) a detailed monitoring program that includes provisions for replanting areas where planted materials have not survived, and h) identification of the agency that will guarantee the successful creation the mitigation habitat and provide for the protection and perpetual conservation of the restoration site. In this regard, measures should be proposed (and subsequently implemented) to control access to the site, to curtail illegal dumping, to restrict nearby lighting, and, to manage for sensitive species in the mitigation area.

7) An analysis of the effects of the project on the hydrology of any and all riparian, wetland, or alluvial scrub communities within the sphere of influence of the project. In this regard, we would appreciate a discussion of the findings and methodology associated with the study that resulted in the stated conclusion that "[m]onitoring of the river habitat between the City of San Bernardino Water Reclamation Plant and the RIX site, since the relocation of the point of discharge to the downstream RIX site in April 1996, indicates that the diversion of effluent from the affected reach of the stream has not adversely affected the habitat" (initial study, page 22).

8) A list of Federal and State agencies actually or potentially involved in the funding or discretionary approval of the proposed project.

We thank you for the opportunity to comment on the referenced NOP and initial study. We look forward to receiving a copy of the draft Environmental Impact Report when it is available. In the interim, we are available to assist you to design project alternatives that minimize or avoid impacts to listed or sensitive species and their habitats. If you should have any questions or comments regarding this letter, please call Loren Hays of my staff at (760) 431-9440.

Sincerely,

Jim A. Bartel
Assistant Field Supervisor

1-6-00-NFTA-72

cc: California Department of Fish and Game (Attn: Glenn Black)
U.S. Army Corps of Engineers, Los Angeles District (Attn: Antal Sjizz, Regulatory Branch)

99-0013 13

ORANGE
COUNTY
WATER
DISTRICT

December 10, 1999

Kathleen Dale
Principal Environmental Specialist
Albert A. Webb Associates
3788 McCray Street
Riverside, CA 92506

SUBJECT: Proposed Sale of Reclaimed Water to South Orange County from the RIX Facility.

Dear Ms. Dale:

On December 8, 1999 the Orange County Water District (OCWD) learned that the City has specific plans to export treated wastewater from the RIX facility to South Orange County, which is outside of the Santa Ana Watershed. This information was not revealed in the City's recently distributed Notice of Preparation (NOP) of a Draft Program Environmental Impact Report to sell reclaimed water.

We have reviewed the NOP document and offer the following comments:

1. The selling of native water to areas outside of the Santa Ana River Watershed would constitute an illegal export of water and is also precluded by the 1969 Santa Ana River Judgment.
2. The NOP discusses the broad market for reclaimed water, which was taken from a recently completed U.S. Bureau of Reclamation study, but does not clearly indicate that the City plans to sell water outside of the Santa Ana Watershed to South Orange County.
3. The document does not acknowledge that the recycled water the City desires to sell is currently being reused to annually replenish the OCWD groundwater basin. This existing reuse is reducing Southern California's need to import water supplies and already fulfills project objectives 1,4,5 and 6 listed on page 4 of the NOP.
4. Pages 4 and 5 reference past studies by the Metropolitan Water District (MWD) and Santa Ana Watershed Project Authority (SAWPA) that estimate future water supply shortfalls and suggest that this project could enhance future water reliability. We have provided future water supply projections to MWD and SAWPA and the water that the City is considering to sell has already been accounted for in their projections of available local supplies.

WILLIAM R. MILLS JR.
GENERAL MANAGER

MAILING ADDRESS:
P.O. BOX 8300
FOUNTAIN VALLEY
CA 92728-8300

10500 ELLIS AVENUE
FOUNTAIN VALLEY
CA 92708

TELEPHONE (714) 378-3200
FAX (714) 378-3371
wmills@ocwd.com

5. Page 34 item 16 (b) indicates that the project will not result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects. If the City sells this water and it no longer travels to the OCWD, the District will need to replace the water by possibly constructing additional facilities.

Please call me, Clark Ide, or our Advanced Planning Director Mr. John Kennedy at (714) 378-3304 if you have any questions or comments.

Sincerely,

William R. Mills Jr.
General Manager

WRM/JCK:je

h:\document\RIX Facility\Kathleen Dale

ALBERT A. WEBB ASSOCIATES
Consulting Engineers

Ref. W.O. 99-13C

MEMORANDUM

TO: File

FROM: Kathleen Dale

SUBJECT: Record of Telephone Conversation – Sheryl Muñoz, San Diego County Water Authority

DATE: July 3, 2000

San Diego County Water Authority received a copy of the NOP, as a forward from the County. They have reviewed the document and offer the following comments:

1. They feel the suggestion of San Diego County as a possible market is not realistic. She indicated they cannot find users for the recycled sources they have available locally. She also indicated they have plans to utilize available groundwater recharge capacity in the county.

2. Regarding surface storage – she indicated that Department of Health Services dilution/retention criteria do not apply to tertiary treated, disinfected sources. Suggested Cesar Lopez of their organization for further information (619.682.4263). They feel the reservoirs in San Diego County are too far away to be a feasible option for reuse of RIX effluent.

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APPENDIX 8.2

SAR AVERAGE MONTHLY FLOWS AND COMPARISONS

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Santa Month & Year	Ana River RIX (mgd)	Monthly RIX (cfs)	Average USGS 11059300 (cfs)	Flows USGS 11066460 (cfs)	RIX % of 11066460	USGS 11074000 (cfs)	RIX % of 11074000
2002							
Jan-02	38.66	59.84	1.57	90.9	65.8	278.45	21.5
Feb-02	38.62	59.78	0.71	90.2	66.3	286.6	20.9
Mar-02	39.01	60.38	4.32	102	59.2	264.39	22.8
2001							
Jan-01	46.04	71.26	31.5	175	26.3	375.9	18.96
Feb-01	49.73	76.98	51.35	218	35.3	741.7	10.4
Mar-01	44.47	68.83	20.75	126	54.6	440.2	15.6
Apr-01	44.5	68.88	8.88	115	59.9	318.5	21.6
May-01	37.24	57.64	0.14	76.5	75.3	236.06	24.4
Jun-01	37.74	58.42	0.17	76.3	76.6	200.2	29.2
Jul-01	38.27	59.24	0.38	72.7	81.5	188.13	31.5
Aug-01	40.16	62.16	0.24	72.9	85.3	180.06	34.5
Sep-01	42.24	65.38	0.15	75	87.2	198.5	32.9
Oct-01	42.79	66.23	0.37	78.9	83.9	214.93	30.8
Nov-01	43.85	67.88	8.61	119	57	249.8	27.2
Dec-01	39.84	61.67	1.45	97.5	63.3	296.58	20.8
2000							
Jan-00	41.64	64.46	14.1	97.4	66.2	329	19.6
Feb-00	39.81	61.63	93.8	222	27.8	618	9.97
Mar-00	39.51	61.16	48.2	164	37.3	431	14.2
Apr-00	39.62	61.33	25.7	135	45.4	333	18.4
May-00	38.6	61.3	2.59	84.8	72.3	230	26.7
Jun-00	38.35	59.36	1.6	81.8	72.6	205	28.96
Jul-00	38.63	59.8	0.82	73	81.9	187	31.97
Aug-00	39.88	61.73	1.32	71	86.9	182	33.9
Sep-00	39.2	60.68	0.27	77.5	78.3	181	33.5
Oct-00	48.2	74.61	2.35	95.1	78.5	281	26.6
Nov-00	49.36	76.41	0.67	99.7	76.6	313	24.4
Dec-00	51.57	79.83	1.16	101	79	251	31.8
1999							
Jan-99	40.35	62.47	22.2	119	52.5	328	19
Feb-99	42.59	65.93	23.6	119	55.4	309	21.3

Santa Month & Year	Ana River RIX (mgd)	Monthly RIX (cfs)	Average USGS 11059300 (cfs)	Flows USGS 11066460 (cfs)	RIX % of 11066460	USGS 11074000 (cfs)	RIX % of 11074000
Mar-99	41.16	63.72	6.63	107	59.6	268	23.8
Apr-99	40.28	62.36	31.1	125	49.9	268	23.3
May-99	45.89	71.04	9.54	97.9	72.6	309	23
Jun-99	41.83	64.75	8.48	111	58.3	220	29.4
Jul-99	45.93	71.1	20.9	101	70.4	220	32.3
Aug-99	43.54	67.4	7.27	93.6	72	195	34.6
Sep-99	47.43	73.42	7.72	92.2	79.6	203	36.2
Oct-99	44.02	68.14	7.11	82	83.1	279	24.4
Nov-99	41.23	63.82	8.96	81.5	78.3	203	31.4
Dec-99	40.33	62.43	14.6	85.9	72.7	271	23
1998							
Jan-98	46.27	71.62	80.69	197	36.4	451.48	15.86
Feb-98	46.27	71.62	728.9	1330	5.4	2733.18	2.62
Mar-98	48.98	75.82	114.45	270.2	28.1	750.52	10.1
Apr-98	44.73	69.24	190.43	332.3	20.8	577.8	11.98
May-98	49.51	76.64	429.68	564.9	13.6	915.1	8.37
Jun-98	43.09	66.7	116.4	213.1	31.3	510.87	13.1
Jul-98	39.36	60.9	15.64	95.3	63.9	446.29	13.65
Aug-98	39.87	61.72	66.14	124.6	49.5	250.71	24.6
Sep-98	39.52	61.18	75.83	119	51.4	235.1	26
Oct-98	39.78	61.58	19.4	94.8	64.96	229.67	26.8
Nov-98	40.45	62.61	17.8	103	60.8	248.77	25.2
Dec-98	40.57	62.8	16.5	104	60.4	475.9	13.2
1997							
Jan-97	41.35	63.99	230	603	10.6	761	8.4
Feb-97	42.25	65.4	7.57	119	54.96	395	16.6
Mar-97	36.11	55.89	0.1	98.4	56.8	255	21.9
Apr-97	36.96	57.2	0	100	57.2	240	23.8
May-97	35.76	55.35	0	83.1	66.6	290	19.1
Jun-97	37.49	58.03	0	81.7	71	287	20.2
Jul-97	38.06	58.92	0	74.8	78.8	262	22.5
Aug-97	38.62	59.78	0	69.9	85.5	333	17.95
Sep-97	42.63	65.99	7.04	86.4	76.4	372	17.7

Santa Ana River Monthly Average Flows							
Month & Year	**RIX (mgd)**	**RIX (cfs)**	**USGS 11059300 (cfs)**	**USGS 11066460 (cfs)**	**RIX % of 11066460**	**USGS 11074000 (cfs)**	**RIX % of 11074000**
Oct-97	46.08	71.33	4.97	89.3	79.9	229.67	31.1
Nov-97	41.38	64.06	10.95	111.97	57.2	248.77	25.6
Dec-97	43.63	67.54	42.61	192	35.2	475.9	14.2
1996							
Jan-96	pre-RIX ops						
Feb-96	pre-RIX ops						
Mar-96	pre-RIX ops						
Apr-96	36	55.72	0.39	99.5	56	367.4	15.2
May-96	35.78	55.39	0	95	58.3	308.3	17.97
Jun-96	41.96	64.95	0	91.3	71.1	281.2	23.1
Jul-96	37.63	58.25	0	80.1	72.7	235.3	24.8
Aug-96	35.08	54.3	0	70.3	77.2	167.4	32.4
Sep-96	35.44	54.87	0	78.6	69.8	152.3	36
Oct-96	36.21	56.05	7.64	105	53.4	196.6	28.5
Nov-96	36.03	55.77	56.2	197	28.3	321.9	17.3
Dec-96	37.4	57.89	27.7	153	37.8	425	13.6

Santa Month & Year	Ana River SBWRP (mgd)	Monthly SBWRP (cfs)	Average Flows USGS 11059300 (cfs)	USGS 11066460 (cfs)	SBWRP % of 11066460	USGS 11074000 (cfs)	SBWRP % of 11074000
1996							
Jan-96	23.32	36.1	70	129	27.9	255.3	14.1
Feb-96	23.28	36	251	384	9.38	830.9	4.33
Mar-96	23.7	36.68	70.6	184	19.9	447	8.2
1995							
Jan-95	24.23	37.5	400.2	823	4.56	1618	2.3
Feb-95	23.3	36.07	263.7	362	9.97	508	7.1
Mar-95	24.45	37.85	1094.5	1806	2.1	2029	1.87
Apr-95	23.32	36.1	230	284	12.7	825	4.38
May-95	22.49	34.8	196	223	15.6	446	7.8
Jun-95	23.25	35.99	123.1	144	25	457	7.87
Jul-95	23.05	35.68	43.5	58.4	61.1	393	9.1
Aug-95	23.71	36.7	35.7	50.1	73.25	140	26.2
Sep-95	24.86	38.48	37	45.1	85.3	146	26.36
Oct-95	24.01	37.17	38.1	56.8	65.44	158.7	23.42
Nov-95	23.04	35.67	39.9	59.5	59.9	181.9	19.6
Dec-95	23.08	35.73	32.4	61.6	58	223.6	15.98
1994							
Jan-94	19.3	29.88	43.9	61.7	48.4	219	13.6
Feb-94	20.27	31.38	135	165	19	514	6.1
Mar-94	20.42	31.61	91.6	146	21.65	352	8.98
Apr-94	20.24	31.33	44	633	4.9	215	14.6
May-94	20.46	31.67	34.9	53.7	58.98	175	18.1
Jun-94	21.86	33.84	32.6	37.2	90.97	156	21.7
Jul-94	22.24	34.43	31.1	35.9	95.9	188	18.3
Aug-94	23.34	36.13	32.6	34.7	104	116	31.1
Sep-94	24	37.15	32.6	34.1	108.9	129	28.8
Oct-94	24.17	37.41	36.1	62.1	60	178	21
Nov-94	23.74	36.75	38.1	89.3	41.2	225	16.33
Dec-94	23.4	36.22	47.7	102	35.5	222	16.3
1993							
Jan-93	24.21	37.48	1327	1839	2	3543	1.06
Feb-93	23.37	36.18	669	835	4.33	2662	1.36

Santa Ana River Monthly Average Flows							
Month & Year	SBWRP (mgd)	SBWRP (cfs)	USGS 11059300 (cfs)	USGS 11066460 (cfs)	SBWRP % of 11066460	USGS 11074000 (cfs)	SBWRP % of 11074000
Mar-93	22.89	35.43	507	558	6.3	874	4.05
Apr-93	22.4	34.67	352	407	8.5	538	6.4
May-93	21.86	33.84	217	248	13.6	405	8.36
Jun-93	22.64	35.05	110	110	31.9	292	12
Jul-93	22.61	35	47.9	44.3	79	204	17.2
Aug-93	23.52	36.41	49.3	32.4	112.3	142	25.6
Sep-93	20.67	32	45.3	36	88.9	110	29.1
Oct-93	20.68	32	36.6	39.1	81.8	157	20.4
Nov-93	20.52	31.76	42.8	35.8	88.7	192	16.5
Dec-93	20.24	31.33	43.9	54.5	57.5	243	12.9
1992							
Jan-92	22.19	34.35	63.97	102.5	33.5	335.5	10.2
Feb-92	23.84	36.9	207.8	372	9.9	800.4	4.6
Mar-92	22.35	34.6	208.3	236.8	14.6	455.5	7.6
Apr-92	21.9	33.9	43.8	70.5	48.1	430.3	7.88
May-92	22.36	34.6	40.8	59.9	57.8	2155.8	1.6
Jun-92	22.35	34.6	40.3	50.1	69.1	139.6	24.8
Jul-92	21.24	32.88	37.74	50.5	65.1	138.5	23.7
Aug-92	23.7	36.69	35.94	41.3	88.8	129.7	28.3
Sep-92	23.07	35.7	35.1	40.5	88.1	134.7	26.5
Oct-92	23.24	35.98	45.5	51.1	70.4	160	22.5
Nov-92	22.64	35.05	33.3	51.9	67.5	204	17.2
Dec-92	22.89	35.43	127	236	15	449	7.9
1991							
Jan-91	25.2	39	47.8	93.6	41.7	278.6	14
Feb-91	23.82	36.87	119.6	199.7	18.46	229.9	12.3
Mar-91	23.5	36.38	316	435.1	8.36	1014.8	35.8
Apr-91	22.98	35.57	44.1	87.5	40.65	462.8	7.69
May-91	22.06	34.15	33.7	54.9	62.2	180.2	18.95
Jun-91	22.06	34.15	33.97	63.6	53.7	168.2	20.3
Jul-91	22.06	34.15	33.55	43.2	79.1	144.2	23.7
Aug-91	22.23	34.41	34.9	39.1	88	127	27.1
Sep-91	21.6	33.44	35.27	38.97	85.8	122.4	27.3

Santa Month & Year	Ana River SBWRP (mgd)	Monthly SBWRP (cfs)	Average USGS 11059300 (cfs)	Flows USGS 11066460 (cfs)	SBWRP % of 11066460	USGS 11074000 (cfs)	SBWRP % of 11074000
Oct-91	19.79	30.63	35.16	46.1	66.4	129.1	23.7
Nov-91	19.53	30.23	35.23	53.1	56.9	170.3	17.8
Dec-91	20.44	31.64	49.13	77.1	41	230.8	13.7
1990							
Jan-90	25.5	39.47	54.9	115.9	34.1	268.5	14.7
Feb-90	25.5	39.47	66.4	138	28.6	360.5	10.9
Mar-90	25.5	39.47	46	87.5	45.1	261.3	15.1
Apr-90	25.5	39.47	46.7	92.6	42.6	238.6	16.5
May-90	25.5	39.47	39.1	80.4	49.1	197.7	19.96
Jun-90	25.5	39.47	36.8	66.5	59.4	147.1	26.8
Jul-90	25.5	39.47	35.2	51.6	76.5	126.6	31.2
Aug-90	25.5	39.47	35.3	57	69.2	135.1	29.2
Sep-90	23.19	35.9	36.4	53.1	67.6	129.3	27.8
Oct-90	23	35.6	36.3	54.8	64.96	147.4	24.2
Nov-90	22.55	34.9	37.5	55.9	62.4	172.5	20.23
Dec-90	24.7	38.24	33.6	73.1	52.3	183.9	20.8

Santa Month & Year	Ana River COLTON (mgd)	Monthly COLTON (cfs)	Average USGS 11059300 (cfs)	Flows USGS 11066460 (cfs)	COLTON % of 11066460	USGS 11074000 (cfs)	COLTON % of 11074000
1996							
Jan-96	4.8	7.5	70	129	5.8	255.3	2.9
Feb-96	4.9	7.6	251	384	1.98	830.9	0.9
Mar-96	4.8	7.5	70.6	184	4.1	447	1.7
1995							
Jan-95	4.9	7.6	400.2	823	0.92	1618	0.5
Feb-95	4.8	7.5	263.7	362	2.1	508	1.5
Mar-95	5	7.8	1094.5	1806	0.43	2029	0.4
Apr-95	4.9	7.6	230	284	2.7	825	0.9
May-95	4.8	7.4	196	223	3.3	446	1.66
Jun-95	4.9	7.6	123.1	144	5.3	457	1.66
Jul-95	4.98	7.7	43.5	58.4	13.2	393	1.96
Aug-95	5.2	8.1	35.7	50.1	16.2	140	5.8
Sep-95	5.1	7.9	37	45.1	17.5	146	5.4
Oct-95	5	7.8	38.1	56.8	13.7	158.7	4.9
Nov-95	4.98	7.7	39.9	59.5	12.9	181.9	4.2
Dec-95	4.9	7.6	32.4	61.6	12.3	223.6	3.4
1994							
Jan-94	5.4	8.4	43.9	61.7	13.6	219	3.8
Feb-94	5.55	8.6	135	165	5.2	514	1.67
Mar-94	5.55	8.6	91.6	146	5.9	352	2.4
Apr-94	4.9	7.6	44	633	1.2	215	3.5
May-94	4.8	7.4	34.9	53.7	13.8	175	4.2
Jun-94	4.9	7.6	32.6	37.2	20.4	156	4.9
Jul-94	4.9	7.6	31.1	35.9	21.2	188	4
Aug-94	4.98	7.7	32.6	34.7	22.2	116	6.6
Sep-94	4.9	7.6	32.6	34.1	22.3	129	5.9
Oct-94	4.8	7.5	36.1	62.1	12.1	178	4.2
Nov-94	4.9	7.6	38.1	89.3	8.5	225	3.4
Dec-94	4.84	7.5	47.7	102	7.4	222	3.4
1993							
Jan-93	4.59	7.1	1327	1839	0.4	3543	0.2
Feb-93	4.5	6.96	669	835	0.83	2662	0.3

Santa Month & Year	Ana River COLTON (mgd)	Monthly COLTON (cfs)	Average Flows USGS 11059300 (cfs)	USGS 11066460 (cfs)	COLTON % of 11066460	USGS 11074000 (cfs)	COLTON % of 11074000
Mar-93	4.46	6.9	507	558	1.2	874	0.8
Apr-93	4.5	7	352	407	1.7	538	1.3
May-93	4.65	7.2	217	248	2.9	405	1.8
Jun-93	4.7	7.3	110	110	6.6	292	2.5
Jul-93	4.8	7.4	47.9	44.3	16.7	204	3.6
Aug-93	5	7.8	49.3	32.4	24	142	5.5
Sep-93	5.6	8.7	45.3	36	24.2	110	7.9
Oct-93	5.55	8.6	36.6	39.1	22	157	5.5
Nov-93	5.5	8.5	42.8	35.8	23.7	192	4.4
Dec-93	5.4	8.3	43.9	54.5	15.2	243	3.4
1992							
Jan-92	4.59	7.1	63.97	102.5	6.9	335.5	2.1
Feb-92	4.1	6.3	207.8	372	1.7	800.4	0.79
Mar-92	4.3	6.66	208.3	236.8	2.8	455.5	1.5
Apr-92	4.46	6.9	43.8	70.5	9.8	430.3	1.6
May-92	4.65	7.2	40.8	59.9	12	2155.8	0.33
Jun-92	4.7	7.3	40.3	50.1	14.6	139.6	5.2
Jul-92	4.8	7.4	37.74	50.5	14.7	138.5	5.3
Aug-92	4.85	7.5	35.94	41.3	18.2	129.7	5.7
Sep-92	4.85	7.5	35.1	40.5	18.5	134.7	5.6
Oct-92	4.7	7.3	45.5	51.1	14.3	160	4.6
Nov-92	4.4	6.8	33.3	51.9	13.1	204	3.33
Dec-92	4.3	6.7	127	236	2.8	449	1.5
1991							
Jan-91	5.2	8.1	47.8	93.6	8.65	278.6	2.9
Feb-91	5.3	8.2	119.6	199.7	4.1	229.9	3.6
Mar-91	5	7.8	316	435.1	1.8	1014.8	0.8
Apr-91	5.1	7.9	44.1	87.5	9	462.8	1.7
May-91	4.3	6.65	33.7	54.9	12.1	180.2	3.7
Jun-91	4.4	6.8	33.97	63.6	10.7	168.2	4
Jul-91	4.46	6.9	33.55	43.2	15.97	144.2	4.8
Aug-91	4.3	6.7	34.9	39.1	17.1	127	5.3
Sep-91	4.4	6.8	35.27	38.97	17.44	122.4	5.6

Santa Month & Year	Ana River COLTON (mgd)	Monthly COLTON (cfs)	Average USGS 11059300 (cfs)	Flows USGS 11066460 (cfs)	COLTON % of 11066460	USGS 11074000 (cfs)	COLTON % of 11074000
Oct-91	4.46	6.9	35.16	46.1	14.97	129.1	5.3
Nov-91	4.6	7.1	35.23	53.1	13.4	170.3	4.2
Dec-91	4.7	7.33	49.13	77.1	9.5	230.8	3.2
1990							
Jan-90	5.8	8.95	54.9	115.9	7.7	268.5	3.33
Feb-90	5.6	8.65	66.4	138	6.3	360.5	2.4
Mar-90	5.5	8.5	46	87.5	9.7	261.3	3.3
Apr-90	5	7.8	46.7	92.6	8.4	238.6	3.3
May-90	5.2	7.66	39.1	80.4	9.5	197.7	3.9
Jun-90	5	7.8	36.8	66.5	11.7	147.1	5.3
Jul-90	5.2	8	35.2	51.6	15.5	126.6	6.3
Aug-90	5.1	7.9	35.3	57	13.8	135.1	5.8
Sep-90	5.3	8.2	36.4	53.1	15.4	129.3	6.3
Oct-90	5.2	8.1	36.3	54.8	14.8	147.4	5.5
Nov-90	5	7.8	37.5	55.9	13.95	172.5	4.5
Dec-90	5	7.8	33.6	73.1	10.7	183.9	4.2

Santa Month & Year	Ana River SBWRP (cfs)	Monthly COLTON (cfs)	Average USGS 11059300 (cfs)	Flows USGS 11066460 (cfs)	SBWRP % of 11066460	COLTON % of 11066460	SB + COL % of 11066460	USGS 11074000 (cfs)	SBWRP % of 11074000	COLTON % of 11074000	SB + COL % of 11074000
1996											
Jan-96	36.1	7.5	70	129	27.9	5.8	33.7	255.3	14.1	2.9	17
Feb-96	36	7.6	251	384	9.38	1.98	11.36	830.9	4.33	0.9	6
Mar-96	36.68	7.5	70.6	184	19.9	4.1	24	447	8.2	1.7	9.9
1995											
Jan-95	37.5	7.6	400.2	823	4.56	0.92	5.48	1618	2.3	0.5	2.8
Feb-95	36.07	7.5	263.7	362	9.97	2.1	12.07	508	7.1	1.5	8.6
Mar-95	37.85	7.8	1094.5	1806	2.1	0.43	2.53	2029	1.87	0.4	2.3
Apr-95	36.1	7.6	230	284	12.7	2.7	15.4	825	4.38	0.9	5.3
May-95	34.8	7.4	196	223	15.6	3.3	18.9	446	7.8	1.66	9.5
Jun-95	35.99	7.6	123.1	144	25	5.3	30.3	457	7.87	1.66	9.53
Jul-95	35.68	7.7	43.5	58.4	61.1	13.2	74.3	393	9.1	1.96	11.1
Aug-95	36.7	8.1	35.7	50.1	73.25	16.2	89.5	140	26.2	5.8	32
Sep-95	38.48	7.9	37	45.1	85.3	17.5	102.8	146	26.36	5.4	31.8
Oct-95	37.17	7.8	38.1	56.8	65.44	13.7	79.1	158.7	23.42	4.9	28.3
Nov-95	35.67	7.7	39.9	59.5	59.9	12.9	72.8	181.9	19.6	4.2	23.8
Dec-95	35.73	7.6	32.4	61.6	58	12.3	70.3	223.6	15.98	3.4	19.4
1994											
Jan-94	29.88	8.4	43.9	61.7	48.4	13.6	62	219	13.6	3.8	17.4
Feb-94	31.38	8.6	135	165	19	5.2	24.2	514	6.1	1.67	7.8
Mar-94	31.61	8.6	91.6	146	21.65	5.9	27.6	352	8.98	2.4	11.4
Apr-94	31.33	7.6	44	633	4.9	1.2	6.1	215	14.6	3.5	18.1
May-94	31.67	7.4	34.9	53.7	58.98	13.8	72.8	175	18.1	4.2	22.3
Jun-94	33.84	7.6	32.6	37.2	90.97	20.4	111.37	156	21.7	4.9	26.6
Jul-94	34.43	7.6	31.1	35.9	95.9	21.2	138.3	188	18.3	4	22.3
Aug-94	36.13	7.7	32.6	34.7	104	22.2	126.2	116	31.1	6.6	37.7
Sep-94	37.15	7.6	32.6	34.1	108.9	22.3	131.2	129	28.8	5.9	34.7
Oct-94	37.41	7.5	36.1	62.1	60	12.1	72.1	178	21	4.2	25.2
Nov-94	36.75	7.6	38.1	89.3	41.2	8.5	49.7	225	16.33	3.4	19.7
Dec-94	36.22	7.5	47.7	102	35.5	7.4	42.9	222	16.3	3.4	19.7
1993											
Jan-93	37.48	7.1	1327	1839	2	0.4	2.4	3543	1.06	0.2	1.26
Feb-93	36.18	6.96	669	835	4.33	0.83	5.2	2662	1.36	0.3	1.66
Mar-93	35.43	6.9	507	558	6.3	1.2	7.5	874	4.05	0.8	4.85
Apr-93	34.67	7	352	407	8.5	1.7	10.2	538	6.4	1.3	7.7

Santa Ana River Monthly Average Flows											
Month & Year	SBWRP (cfs)	COLTON (cfs)	USGS 11059300 (cfs)	USGS 11066460 (cfs)	SBWRP % of 11066460	COLTON % of 11066460	SB + COL % of 11066460	USGS 11074000 (cfs)	SBWRP % of 11074000	COLTON % of 11074000	SB + COL % of 11074000
May-93	33.84	7.2	217	248	13.6	2.9	16.5	405	8.36	1.8	10.2
Jun-93	35.05	7.3	110	110	31.9	6.6	38.5	292	12	2.5	14.5
Jul-93	35	7.4	47.9	44.3	79	16.7	95.7	204	17.2	3.6	20.8
Aug-93	36.41	7.8	49.3	32.4	112.3	24	136.3	142	25.6	5.5	31.1
Sep-93	32	8.7	45.3	36	88.9	24.2	113.1	110	29.1	7.9	37
Oct-93	32	8.6	36.6	39.1	81.8	22	103.8	157	20.4	5.5	25.9
Nov-93	31.76	8.5	42.8	35.8	88.7	23.7	112.4	192	16.5	4.4	20.9
Dec-93	31.33	8.3	43.9	54.5	57.5	15.2	72.7	243	12.9	3.4	16.3
1992											
Jan-92	34.35	7.1	63.97	102.5	33.5	6.9	40.4	335.5	10.2	2.1	12.3
Feb-92	36.9	6.3	207.8	372	9.9	1.7	11.6	800.4	4.6	0.79	5.4
Mar-92	34.6	6.66	208.3	236.8	14.6	2.8	17.4	455.5	7.6	1.5	9.1
Apr-92	33.9	6.9	43.8	70.5	48.1	9.8	57.9	430.3	7.88	1.6	9.5
May-92	34.6	7.2	40.8	59.9	57.8	12	69.8	2155.8	1.6	0.33	1.93
Jun-92	34.6	7.3	40.3	50.1	69.1	14.6	83.7	139.6	24.8	5.2	30
Jul-92	32.88	7.4	37.74	50.5	65.1	14.7	79.8	138.5	23.7	5.3	29
Aug-92	36.69	7.5	35.94	41.3	88.8	18.2	107	129.7	28.3	5.7	34
Sep-92	35.7	7.5	35.1	40.5	88.1	18.5	106.7	134.7	26.5	5.6	32.1
Oct-92	35.98	7.3	45.5	51.1	70.4	14.3	84.7	160	22.5	4.6	27.1
Nov-92	35.05	6.8	33.3	51.9	67.5	13.1	80.6	204	17.2	3.33	20.5
Dec-92	35.43	6.7	127	236	15	2.8	17.8	449	7.9	1.5	9.4
1991											
Jan-91	39	8.1	47.8	93.6	41.7	8.65	50.35	278.6	14	2.9	16.9
Feb-91	36.87	8.2	119.6	199.7	18.46	4.1	22.6	229.9	12.3	3.6	15.9
Mar-91	36.38	7.8	316	435.1	8.36	1.8	10.2	1014.8	35.8	0.8	36.6
Apr-91	35.57	7.9	44.1	87.5	40.65	9	49.65	462.8	7.69	1.7	9.4
May-91	34.15	6.65	33.7	54.9	62.2	12.1	74.3	180.2	18.95	3.7	22.65
Jun-91	34.15	6.8	33.97	63.6	53.7	10.7	64.4	168.2	20.3	4	24.3
Jul-91	34.15	6.9	33.55	43.2	79.1	15.97	95	144.2	23.7	4.8	28.5
Aug-91	34.41	6.7	34.9	39.1	88	17.1	105.1	127	27.1	5.3	32.4
Sep-91	33.44	6.8	35.27	38.97	85.8	17.44	103.2	122.4	27.3	5.6	32.9
Oct-91	30.63	6.9	35.16	46.1	66.4	14.97	81.4	129.1	23.7	5.3	29
Nov-91	30.23	7.1	35.23	53.1	56.9	13.4	70.3	170.3	17.8	4.2	22
Dec-91	31.64	7.33	49.13	77.1	41	9.5	50.5	230.8	13.7	3.2	16.9
1990											

Santa Month & Year	Ana River SBWRP (cfs)	Monthly COLTON (cfs)	Average USGS 11059300 (cfs)	Flows USGS 11066460 (cfs)	SBWRP % of 11066460	COLTON % of 11066460	SB + COL % of 11066460	USGS 11074000 (cfs)	SBWRP % of 11074000	COLTON % of 11074000	SB + COL % of 11074000
Jan-90	39.47	8.95	54.9	115.9	34.1	7.7	41.8	268.5	14.7	3.33	18
Feb-90	39.47	8.65	66.4	138	28.6	6.3	34.9	360.5	10.9	2.4	13.3
Mar-90	39.47	8.5	46	87.5	45.1	9.7	54.8	261.3	15.1	3.3	18.4
Apr-90	39.47	7.8	46.7	92.6	42.6	8.4	51	238.6	16.5	3.3	19.8
May-90	39.47	7.66	39.1	80.4	49.1	9.5	58.6	197.7	19.96	3.9	23.9
Jun-90	39.47	7.8	36.8	66.5	59.4	11.7	71.1	147.1	26.8	5.3	32.1
Jul-90	39.47	8	35.2	51.6	76.5	15.5	92	126.6	31.2	6.3	37.5
Aug-90	39.47	7.9	35.3	57	69.2	13.8	83	135.1	29.2	5.8	35
Sep-90	35.9	8.2	36.4	53.1	67.6	15.4	83	129.3	27.8	6.3	34.1
Oct-90	35.6	8.1	36.3	54.8	64.96	14.8	79.76	147.4	24.2	5.5	29.7
Nov-90	34.9	7.8	37.5	55.9	62.4	13.95	76.4	172.5	20.23	4.5	24.7
Dec-90	38.24	7.8	33.6	73.1	52.3	10.7	63	183.9	20.8	4.2	25

Santa Month & Year	Ana River RIALTO (mgd)	Monthly RIALTO (cfs)	Average USGS 11059300 (cfs)	Flows USGS 11066460 (cfs)	RIALTO % of 11066460	USGS 11074000 (cfs)	RIALTO % of 11074000
2002							
Jan-02	6.99	10.8	1.57	90.9	11.88	278.45	3.88
Feb-02	6.95	10.76	0.71	90.2	11.93	286.6	3.75
Mar-02	6.98	10.8	4.32	102	10.59	264.39	4.08
2001							
Jan-01	6.69	10.36	31.5	175	5.92	375.9	2.76
Feb-01	6.71	10.39	51.35	218	4.77	741.7	1.4
Mar-01	6.58	10.19	20.75	126	8.09	440.2	2.31
Apr-01	6.69	10.36	8.88	115	9	318.5	3.25
May-01	6.6	10.22	0.14	76.5	13.36	236.06	4.33
Jun-01	6.55	10.14	0.17	76.3	13.29	200.2	5.06
Jul-01	7	10.84	0.38	72.7	14.9	188.13	5.76
Aug-01	7.19	11.13	0.24	72.9	15.27	180.06	6.18
Sep-01	7.28	11.27	0.15	75	15.03	198.5	5.68
Oct-01	7.22	11.18	0.37	78.9	14.17	214.93	5.2
Nov-01	7.16	11.08	8.61	119	9.3	249.8	4.44
Dec-01	7.03	10.88	1.45	97.5	11.16	296.58	3.67
2000							
Jan-00	6.79	10.5	14.1	97.4	10.78	329	3.19
Feb-00	6.87	10.63	93.8	222	4.79	618	1.72
Mar-00	6.56	10.15	48.2	164	6.19	431	2.35
Apr-00	6.56	10.15	25.7	135	7.5	333	3.05
May-00	6.53	10.12	2.59	84.8	11.9	230	4.4
Jun-00	6.55	10.14	1.6	81.8	12.4	205	4.95
Jul-00	6.62	10.25	0.82	73	14.04	187	5.48
Aug-00	6.82	10.56	1.32	71	14.87	182	5.8
Sep-00	6.86	10.62	0.27	77.5	13.7	181	5.87
Oct-00	6.78	10.5	2.35	95.1	11.04	281	3.74
Nov-00	6.67	10.33	0.67	99.7	10.36	313	3.3
Dec-00	6.7	10.37	1.16	101	10.27	251	4.13
1999							
Jan-99	5.82	9.01	22.2	119	7.57	328	2.75
Feb-99	5.82	9.01	23.6	119	7.57	309	2.9

Santa Ana River Monthly Average Flows							
Month & Year	RIALTO (mgd)	RIALTO (cfs)	USGS 11059300 (cfs)	USGS 11066460 (cfs)	RIALTO % of 11066460	USGS 11074000 (cfs)	RIALTO % of 11074000
Mar-99	5.82	9.01	6.63	107	8.4	268	3.36
Apr-99	5.82	9.01	31.1	125	7.2	268	3.36
May-99	5.82	9.01	9.54	97.9	9.2	309	2.9
Jun-99	5.82	9.01	8.48	111	8.1	220	4.1
Jul-99	5.82	9.01	20.9	101	8.9	220	4.1
Aug-99	5.82	9.01	7.27	93.6	9.6	195	4.6
Sep-99	5.82	9.01	7.72	92.2	9.77	203	4.4
Oct-99	5.93	9.12	7.11	82	12.06	279	3.27
Nov-99	6.03	9.33	8.96	81.5	11.45	203	4.59
Dec-99	6.39	9.89	14.6	85.9	11.5	271	3.65
1998							
Jan-98	6.3	9.76	80.69	197	4.95	451.48	2.2
Feb-98	6.3	9.76	728.9	1330	0.73	2733.18	0.35
Mar-98	6.3	9.76	114.45	270.2	3.6	750.52	1.3
Apr-98	6.3	9.76	190.43	332.3	2.94	577.8	1.69
May-98	6.3	9.76	429.68	564.9	1.73	915.1	1.1
Jun-98	6.3	9.76	116.4	213.1	4.58	510.87	1.9
Jul-98	6.3	9.76	15.64	95.3	10.24	446.29	2.2
Aug-98	6.3	9.76	66.14	124.6	7.8	250.71	3.9
Sep-98	6.3	9.76	75.83	119	8.2	235.1	4.15
Oct-98	5.82	9.01	19.4	94.8	9.5	229.67	3.9
Nov-98	5.82	9.01	17.8	103	8.74	248.77	3.6
Dec-98	5.82	9.01	16.5	104	8.66	475.9	1.9
1997							
Jan-97	6.39	9.89	230	603	1.64	761	1.3
Feb-97	6.39	9.89	7.57	119	8.3	395	2.5
Mar-97	6.39	9.89	0.1	98.4	10.1	255	3.8
Apr-97	6.39	9.89	0	100	9.89	240	4.1
May-97	6.39	9.89	0	83.1	11.9	290	3.4
Jun-97	6.39	9.89	0	81.7	12.1	287	3.4
Jul-97	6.39	9.89	0	74.8	13.22	262	3.8
Aug-97	6.39	9.89	0	69.9	14.1	333	2.97
Sep-97	6.39	9.89	7.04	86.4	11.45	372	2.66

Santa Ana River Monthly Average Flows							
Month & Year	RIALTO (mgd)	RIALTO (cfs)	USGS 11059300 (cfs)	USGS 11066460 (cfs)	RIALTO % of 11066460	USGS 11074000 (cfs)	RIALTO % of 11074000
Oct-97	6.3	9.76	4.97	89.3	10.9	229.67	4.2
Nov-97	6.3	9.76	10.95	111.97	8.7	248.77	3.9
Dec-97	6.3	9.76	42.61	192	5.08	475.9	2.1
1996							
Jan-96	6.13	9.49	70	129	7.36	255.3	3.7
Feb-96	6.13	9.49	251	384	2.47	830.9	1.1
Mar-96	6.13	9.49	70.6	184	5.16	447	2.1
Apr-96	6.13	9.49	0.39	99.5	9.54	367.4	2.6
May-96	6.13	9.49	0	95	9.99	308.3	3.08
Jun-96	6.13	9.49	0	91.3	10.4	281.2	3.37
Jul-96	6.13	9.49	0	80.1	11.85	235.3	4
Aug-96	6.13	9.49	0	70.3	13.5	167.4	5.7
Sep-96	6.13	9.49	0	78.6	12.1	152.3	6.23
Oct-96	6.39	9.89	7.64	105	9.4	196.6	5
Nov-96	6.39	9.89	56.2	197	5.02	321.9	3.1
Dec-96	6.39	9.89	27.7	153	6.46	425	2.3
1995							
Jan-95	6.09	9.42	400.2	823	1.14	1618	0.58
Feb-95	6.09	9.42	263.7	362	2.6	508	1.85
Mar-95	6.09	9.42	1094.5	1806	0.52	2029	0.46
Apr-95	6.09	9.42	230	284	3.3	825	1.14
May-95	6.09	9.42	196	223	4.22	446	2.1
Jun-95	6.09	9.42	123.1	144	6.54	457	2.06
Jul-95	6.09	9.42	43.5	58.4	16.1	393	2.4
Aug-95	6.09	9.42	35.7	50.1	18.8	140	6.7
Sep-95	6.09	9.42	37	45.1	20.9	146	6.45
Oct-95	6.13	9.49	38.1	56.8	16.7	158.7	5.98
Nov-95	6.13	9.49	39.9	59.5	15.9	181.9	5.2
Dec-95	6.13	9.49	32.4	61.6	15.4	223.6	4.2
1994							
Jan-94	5.8	8.99	43.9	61.7	14.6	219	4.1
Feb-94	5.89	9.13	135	165	5.5	514	1.8
Mar-94	5.92	9.17	91.6	146	6.3	352	2.6

Santa Ana River Monthly Average Flows							
Month & Year	RIALTO (mgd)	RIALTO (cfs)	USGS 11059300 (cfs)	USGS 11066460 (cfs)	RIALTO % of 11066460	USGS 11074000 (cfs)	RIALTO % of 11074000
Apr-94	5.75	8.9	44	633	1.41	215	4.14
May-94	5.66	8.76	34.9	53.7	16.3	175	5
Jun-94	5.69	8.81	32.6	37.2	23.7	156	5.6
Jul-94	5.82	9.01	31.1	35.9	25.1	188	4.8
Aug-94	5.97	9.24	32.6	34.7	26.6	116	7.97
Sep-94	5.9	9.15	32.6	34.1	26.8	129	7.1
Oct-94	5.898	9.13	36.1	62.1	14.7	178	5.13
Nov-94	6.03	9.33	38.1	89.3	10.45	225	4.15
Dec-94	6.05	9.36	47.7	102	9.18	222	4.2
1993							
Jan-93	6.1	9.44	1327	1839	0.5	3543	0.3
Feb-93	5.8	8.99	669	835	1.08	2662	0.34
Mar-93	5.64	8.73	507	558	1.56	874	0.999
Apr-93	5.68	8.8	352	407	2.16	538	1.6
May-93	5.76	8.92	217	248	3.6	405	2.2
Jun-93	5.698	8.82	110	110	8.02	292	3
Jul-93	5.898	9.13	47.9	44.3	2.06	204	4.48
Aug-93	5.94	9.2	49.3	32.4	28.4	142	6.5
Sep-93	5.78	8.95	45.3	36	24.9	110	8.14
Oct-93	5.83	9.02	36.6	39.1	23.1	157	5.7
Nov-93	5.87	9.08	42.8	35.8	25.4	192	4.7
Dec-93	5.86	9.07	43.9	54.5	16.6	243	3.7
1992							
Jan-92	5.68	8.8	63.97	102.5	8.6	335.5	2.6
Feb-92	5.6	8.7	207.8	372	2.34	800.4	1.09
Mar-92	5.79	8.97	208.3	236.8	3.78	455.5	1.97
Apr-92	5.54	8.57	43.8	70.5	12.2	430.3	1.99
May-92	5.6	8.67	40.8	59.9	14.5	2155.8	0.4
Jun-92	5.68	8.8	40.3	50.1	17.56	139.6	6.35
Jul-92	5.73	8.87	37.74	50.5	17.56	138.5	6.4
Aug-92	5.8	9.02	35.94	41.3	21.84	129.7	6.95
Sep-92	5.7	8.9	35.1	40.5	21.96	134.7	6.6
Oct-92	5.8	9.03	45.5	51.1	17.67	160	5.6

Santa Ana River Monthly Average Flows							
Month & Year	RIALTO (mgd)	RIALTO (cfs)	USGS 11059300 (cfs)	USGS 11066460 (cfs)	RIALTO % of 11066460	USGS 11074000 (cfs)	RIALTO % of 11074000
Nov-92	5.96	9.23	33.3	51.9	17.78	204	4.5
Dec-92	6.03	9.33	127	236	3.95	449	2.08
1991							
Jan-91	5.6	8.69	47.8	93.6	9.3	278.6	3.12
Feb-91	5.6	8.69	119.6	199.7	4.35	229.9	3.78
Mar-91	5.6	8.69	316	435.1	2	1014.8	0.86
Apr-91	5.6	8.69	44.1	87.5	9.9	462.8	1.88
May-91	5.6	8.69	33.7	54.9	15.8	180.2	4.8
Jun-91	5.6	8.69	33.97	63.6	13.7	168.2	5.17
Jul-91	5.6	8.69	33.55	43.2	20.1	144.2	6.03
Aug-91	5.6	8.69	34.9	39.1	22.2	127	6.8
Sep-91	5.6	8.69	35.27	38.97	22.3	122.4	7.1
Oct-91	5.66	8.76	35.16	46.1	19	129.1	6.8
Nov-91	5.66	8.76	35.23	53.1	16.5	170.3	5.14
Dec-91	5.66	8.76	49.13	77.1	11.36	230.8	3.8
1990							
Jan-90	5.6	8.65	54.9	115.9	7.5	268.5	3.22
Feb-90	5.6	8.65	66.4	138	6.2	360.5	2.4
Mar-90	5.6	8.65	46	87.5	9.9	261.3	3.3
Apr-90	5.6	8.65	46.7	92.6	9.3	238.6	3.6
May-90	5.6	8.65	39.1	80.4	10.76	197.7	4.4
Jun-90	5.6	8.65	36.8	66.5	13	147.1	5.88
Jul-90	5.6	8.65	35.2	51.6	16.76	126.6	6.8
Aug-90	5.6	8.65	35.3	57	15.2	135.1	6.4
Sep-90	5.6	8.65	36.4	53.1	16.3	129.3	6.69
Oct-90	5.6	8.69	36.3	54.8	15.86	147.4	5.9
Nov-90	5.6	8.69	37.5	55.9	15.5	172.5	5
Dec-90	5.6	8.69	33.6	73.1	11.9	183.9	4.7

Santa Month & Year	Ana River RIVERSIDE (mgd)	Monthly RIVERSIDE (cfs)	Average USGS 11059300 (cfs)	Flows USGS 11066460 (cfs)	USGS 11074000 (cfs)	RIVERSIDE % of 11074000
2002						
Jan-02	32.03	49.6	1.57	90.9	278.45	17.8
Feb-02	31.65	48.99	0.71	90.2	286.6	17.1
Mar-02	31.43	48.65	4.32	102	264.39	18.4
2001						
Jan-01	32.11	49.7	31.5	175	375.9	13.22
Feb-01	32.84	50.84	51.35	218	741.7	6.85
Mar-01	32.6	50.46	20.75	126	440.2	11.46
Apr-01	31.78	49.2	8.88	115	318.5	15.44
May-01	32.24	48.36	0.14	76.5	236.06	20.49
Jun-01	31.21	48.3	0.17	76.3	200.2	24.13
Jul-01	31.17	48.25	0.38	72.7	188.13	25.65
Aug-01	31.05	48.07	0.24	72.9	180.06	26.69
Sep-01	31.83	49.27	0.15	75	198.5	24.82
Oct-01	32.46	50.25	0.37	78.9	214.93	23.38
Nov-01	32.45	50.23	8.61	119	249.8	20.11
Dec-01	31.6	48.92	1.45	97.5	296.58	16.49
2000						
Jan-00	31.28	48.42	14.1	97.4	329	14.7
Feb-00	32.03	49.58	93.8	222	618	8.02
Mar-00	32.42	50.19	48.2	164	431	11.64
Apr-00	31.32	48.48	25.7	135	333	14.56
May-00	31.37	48.56	2.59	84.8	230	21.11
Jun-00	31.34	48.51	1.6	81.8	205	23.66
Jul-00	31.03	48.03	0.82	73	187	25.69
Aug-00	31.48	48.73	1.32	71	182	26.78
Sep-00	31.91	49.4	0.27	77.5	181	27.29
Oct-00	32.68	50.59	2.35	95.1	281	18
Nov-00	32.17	49.8	0.67	99.7	313	15.9
Dec-00	31.46	48.7	1.16	101	251	19.4
1999						
Jan-99	31.4	48.6	22.2	119	328	14.8
Feb-99	31.1	48.14	23.6	119	309	15.6

Santa Month & Year	Ana River RIVERSIDE (mgd)	Monthly RIVERSIDE (cfs)	Average USGS 11059300 (cfs)	Flows USGS 11066460 (cfs)	USGS 11074000 (cfs)	RIVERSIDE % of 11074000
Mar-99	31.24	48.36	6.63	107	268	18
Apr-99	31.2	48.27	31.1	125	268	18
May-99	30.79	47.67	9.54	97.9	309	15.43
Jun-99	31.12	48.17	8.48	111	220	21.9
Jul-99	30.84	47.74	20.9	101	220	21.7
Aug-99	30.74	47.58	7.27	93.6	195	24.4
Sep-99	31.28	48.42	7.72	92.2	203	23.85
Oct-99	31.4	48.6	7.11	82	279	17.42
Nov-99	31.53	48.8	8.96	81.5	203	24.04
Dec-99	31.11	48.16	14.6	85.9	271	17.77
1998						
Jan-98	31.4	48.6	80.69	197	451.48	10.76
Feb-98	35.8	55.4	728.9	1330	2733.18	2.03
Mar-98	32.87	50.9	114.45	270.2	750.52	6.78
Apr-98	31.73	49.1	190.43	332.3	577.8	8.5
May-98	31.43	48.65	429.68	564.9	915.1	5.3
Jun-98	30.76	47.6	116.4	213.1	510.87	9.3
Jul-98	30.66	47.5	15.64	95.3	446.29	10.64
Aug-98	30.46	47.2	66.14	124.6	250.71	18.83
Sep-98	31.15	48.2	75.83	119	235.1	20.5
Oct-98	31.23	48.3	19.4	94.8	229.67	13.6
Nov-98	31.27	48.4	17.8	103	248.77	19.5
Dec-98	30.88	47.8	16.5	104	475.9	10.04
1997						
Jan-97	34.89	49.37	230	603	761	6.49
Feb-97	31.17	48.3	7.57	119	395	12.23
Mar-97	30.6	47.4	0.1	98.4	255	18.6
Apr-97	30.23	46.8	0	100	240	19.5
May-97	30.17	46.7	0	83.1	290	16.1
Jun-97	30.31	46.9	0	81.7	287	16.3
Jul-97	29.97	46.4	0	74.8	262	17.7
Aug-97	29.9	46.3	0	69.9	333	13.9
Sep-97	30.87	47.8	7.04	86.4	372	12.85

Santa Ana River Monthly Average Flows						
Month & Year	RIVERSIDE (mgd)	RIVERSIDE (cfs)	USGS 11059300 (cfs)	USGS 11066460 (cfs)	USGS 11074000 (cfs)	RIVERSIDE % of 11074000
Oct-97	30.89	47.8	4.97	89.3	229.67	20.8
Nov-97	31.13	48.2	10.95	111.97	248.77	19.38
Dec-97	31.41	48.6	42.61	192	475.9	10.2
1996						
Jan-96	30.17	46.7	70	129	255.3	18.3
Feb-96	30.74	47.6	251	384	830.9	5.79
Mar-96	30.84	47.7	70.6	184	447	10.67
Apr-96	30.16	46.7	0.39	99.5	367.4	12.7
May-96	30.06	46.5	0	95	308.3	15.1
Jun-96	30.28	46.9	0	91.3	281.2	16.68
Jul-96	29.6	45.8	0	80.1	235.3	19.46
Aug-96	30.25	46.8	0	70.3	167.4	27.96
Sep-96	30.52	47.2	0	78.6	152.3	30.99
Oct-96	30.55	47.3	7.64	105	196.6	24.1
Nov-96	30.61	47.3	56.2	197	321.9	14.7
Dec-96	30.53	47.3	27.7	153	425	11.13
1995						
Jan-95	32.33	50	400.2	823	1618	3.09
Feb-95	30.61	47.4	263.7	362	508	9.33
Mar-95	31.94	49.4	1094.5	1806	2029	2.43
Apr-95	29.86	46.2	230	284	825	5.6
May-95	29.89	46.3	196	223	446	10.38
Jun-95	30.31	46.9	123.1	144	457	10.26
Jul-95	30.18	46.7	43.5	58.4	393	11.88
Aug-95	29.84	46.2	35.7	50.1	140	33
Sep-95	30.18	46.7	37	45.1	146	31.99
Oct-95	30.46	47.2	38.1	56.8	158.7	29.74
Nov-95	30.47	47.2	39.9	59.5	181.9	25.9
Dec-95	30.27	46.9	32.4	61.6	223.6	20.97
1994						
Jan-94	28.66	44.4	43.9	61.7	219	2.03
Feb-94	29.42	45.5	135	165	514	8.85
Mar-94	29.55	45.7	91.6	146	352	12.98

Santa Ana River Monthly Average Flows						
Month & Year	RIVERSIDE (mgd)	RIVERSIDE (cfs)	USGS 11059300 (cfs)	USGS 11066460 (cfs)	USGS 11074000 (cfs)	RIVERSIDE % of 11074000
Apr-94	29.34	45.4	44	633	215	21.12
May-94	28.9	44.7	34.9	53.7	175	25.54
Jun-94	28.89	44.7	32.6	37.2	156	28.65
Jul-94	29.31	45.37	31.1	35.9	188	24.13
Aug-94	29.25	45.3	32.6	34.7	116	39.05
Sep-94	29.78	46.1	32.6	34.1	129	35.74
Oct-94	29.9	46.3	36.1	62.1	178	26
Nov-94	29.5	45.7	38.1	89.3	225	20.3
Dec-94	29.1	45	47.7	102	222	20.3
1993						
Jan-93	33.4	51.7	1327	1839	3543	1.46
Feb-93	32.17	49.8	669	835	2662	1.87
Mar-93	31.34	48.5	507	558	874	5.55
Apr-93	29.7	46	352	407	538	8.55
May-93	29.26	45.3	217	248	405	11.2
Jun-93	29.9	46.3	110	110	292	15.86
Jul-93	30.45	47	47.9	44.3	204	23
Aug-93	29.5	45.7	49.3	32.4	142	32.2
Sep-93	29.5	45.7	45.3	36	110	41.55
Oct-93	28.56	44.2	36.6	39.1	157	28.2
Nov-93	28.98	44.86	42.8	35.8	192	23.36
Dec-93	29	44.89	43.9	54.5	243	18.47
1992						
Jan-92	28.85	44.65	63.97	102.5	335.5	13.3
Feb-92	29.55	45.74	207.8	372	800.4	5.7
Mar-92	29.59	45.8	208.3	236.8	455.5	10.05
Apr-92	29.28	45.33	43.8	70.5	430.3	10.53
May-92	28.9	44.7	40.8	59.9	2155.8	2.07
Jun-92	28.98	44.86	40.3	50.1	139.6	32.13
Jul-92	29.1	45	37.74	50.5	138.5	32.5
Aug-92	29.46	45.6	35.94	41.3	129.7	35.2
Sep-92	29.7	45.97	35.1	40.5	134.7	34.13
Oct-92	30.05	46.5	45.5	51.1	160	29.1

Santa Ana River Monthly Average Flows						
Month & Year	RIVERSIDE (mgd)	RIVERSIDE (cfs)	USGS 11059300 (cfs)	USGS 11066460 (cfs)	USGS 11074000 (cfs)	RIVERSIDE % of 11074000
Nov-92	30	46.4	33.3	51.9	204	22.7
Dec-92	30	46.4	127	236	449	10.33
1991						
Jan-91	29.3	45.35	47.8	93.6	278.6	16.28
Feb-91	28.9	44.8	119.6	199.7	229.9	19.5
Mar-91	29	44.9	316	435.1	1014.8	4.42
Apr-91	27.7	42.9	44.1	87.5	462.8	9.27
May-91	28.1	43.5	33.7	54.9	180.2	24.14
Jun-91	27.5	42.5	33.97	63.6	168.2	25.27
Jul-91	28	43.4	33.55	43.2	144.2	30.1
Aug-91	27.6	42.8	34.9	39.1	127	33.7
Sep-91	28.2	43.6	35.27	38.97	122.4	35.6
Oct-91	28.7	44.5	35.16	46.1	129.1	22.2
Nov-91	28.3	43.8	35.23	53.1	170.3	25.7
Dec-91	28.5	44.1	49.13	77.1	230.8	19.1
1990						
Jan-90	29.02	44.9	54.9	115.9	268.5	16.7
Feb-90	29.4	45.5	66.4	138	360.5	8.16
Mar-90	29.2	45.2	46	87.5	261.3	17.3
Apr-90	30.2	46.7	46.7	92.6	238.6	19.57
May-90	29.7	45.98	39.1	80.4	197.7	23.26
Jun-90	30.2	46.7	36.8	66.5	147.1	31.75
Jul-90	29.2	45.2	35.2	51.6	126.6	35.7
Aug-90	27.9	43.2	35.3	57	135.1	31.98
Sep-90	29.8	46.1	36.4	53.1	129.3	35.65
Oct-90	30.2	46.75	36.3	54.8	147.4	31.7
Nov-90	30.2	46.75	37.5	55.9	172.5	27.1
Dec-90	29	44.9	33.6	73.1	183.9	24.4

Notes on Santa Ana River Monthly Average Flows Tables

1. RIX, SBWRP and some Riverside effluent flow data taken directly from Discharge Monitoring Reports
2. Colton, Riverside and Rialto effluent flow data taken from Wildermuth Env. Inc. spreadsheets
3. Effluent flow data originally in mgd; converted to cfs (mgd divided by 0.646)
4. Conversion factor is 1 cfs equals 646,000 gallons per day
5. USGS 11059300 gauging station is E. St. at San Bernardino, which is shown as the closest upstream station reference point
6. USGS 11066460 gauging station is MWD Crossing (or Riverside Narrows), downstream of Rialto, RIX, Colton and SBWRP
7. USGS 1174000 gauging station is below Prado Dam, downstream of Rialto, RIX, Colton, Riverside and SBWRP
8. RIX operations started in March of 1996; RIX takes flows from SBWRP and Colton and also includes groundwater extraction
9. 1990 through March 1996 Colton plus SBWRP flows are generally equivalent to RIX for the purposes of this analysis

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APPENDIX 8.3

AERIAL PHOTOGRAPHS OF THE SANTA ANA RIVER

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Aerial Photo #1 – Prado Basin from the Dam to River Road / Archibald Avenue

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Aerial Photo #2 – More detailed view of Prado Basin immediately upstream of Prado Dam

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Aerial Photo #3 – Detail of Prado Basin Riparian Habitat Downstream of the River Road Crossing

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Aerial Photo #4 – Santa Ana River Channel centered on River Road crossing of the River

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Aerial Photo #5 – Santa Ana River Channel between River Road bridge and Hamner Avenue bridge

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Aerial Photo #6 – Santa Ana Channel at the narrows where the Hamner Avenue and Interstate 15 bridges cross the channel

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Aerial Photo #7 – Santa Ana River Channel upstream of the Interstate 15 bridges

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Aerial Photo #8 – Santa Ana River Channel adjacent to Limonite Avenue

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Aerial Photo #9 – Santa Ana River Channel downstream of the Van Buren Boulevard bridge, adjacent to Paradise Knolls Golf Course

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Aerial Photo #10 – Santa Ana River Channel at the Riverside Narrows, Van Buren Boulevard crossing, and Riverside Wastewater Reclamation Plan

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Aerial Photo #11 – Santa Ana River Channel, Riverside Narrows, MWD Crossing, Jurupa Hills Golf Course, and Union Pacific Railroad Bridge

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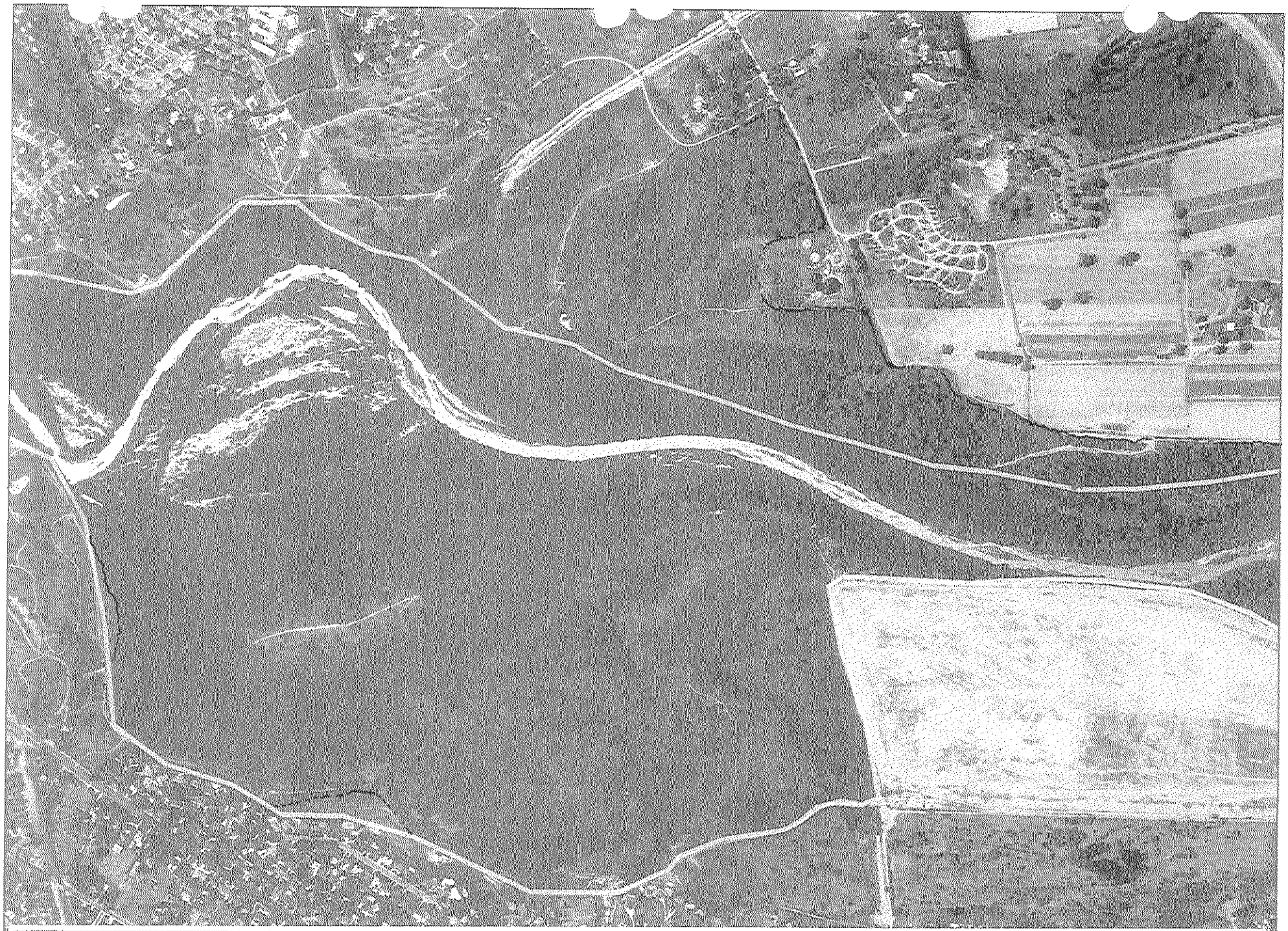

Aerial Photo #12 – Santa Ana River Channel, downstream of Mission Boulevard bridge adjacent to Martha McClean Anza Narrows Park

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Aerial Photo #13 – Santa Ana River Channel in the vicinity of the Mission Boulevard bridge

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Aerial Photo #14 – Santa Ana River Channel between the Mission Boulevard / Buena Vista Avenue and Highway 60 bridges

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Aerial Photo #15 – Santa Ana River Channel upstream of the Market Street bridge

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Aerial Photo #16 – Santa Ana River Channel centered on the Riverside Avenue / Main Street bridge where the channel enters San Bernardino County and exists Riverside County

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Aerial Photo #17 – Santa Ana River Channel at the RIX Facility discharge location

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Aerial Photo #19 – Santa Ana River Channel upstream of La Cadena Drive bridge and railroad bridges

APPENDIX 8.4

NATURAL DIVERSITY DATABASE RECORDS REVIEWED

List of Elements and Status by Scientific Name
RIX DEIR

Scientific/Common Name	Federal/ State Status	Global/ State Rank	CNPS/ R-E-D	CDFG Status
ABRONIA VILLOSA VAR AURITA *CHAPARRAL SAND-VERBENA*	None/ None	G5T3/ S3.1	1B/ 2-3-3	
AGELAIUS TRICOLOR *TRICOLORED BLACKBIRD*	None/ None	G3/ S3		SC
AMBROSIA PUMILA *SAN DIEGO AMBROSIA*	Proposed Endangered/ None	G1/ S1.1	1B/ 3-3-2	
AQUILA CHRYSAETOS *GOLDEN EAGLE*	None/ None	G5/ S3		SC
ARENARIA PALUDICOLA *MARSH SANDWORT*	Endangered/ Endangered	G1/ S1.1	1B/ 3-3-2	
ASIO OTUS *LONG-EARED OWL*	None/ None	G5/ S3		SC
ATHENE CUNICULARIA *BURROWING OWL*	None/ None	G4/ S2		SC
ATRIPLEX COULTERI *COULTER'S SALTBUSH*	None/ None	G2/ S2.2	1B/ 2-2-2	
BUFO CALIFORNICUS *ARROYO TOAD*	Endangered/ None	G2G3/ S2S3		SC
CALIFORNIA WALNUT WOODLAND	None/ None	G2/ S2.1		
CALOCHORTUS PLUMMERAE *PLUMMER'S MARIPOSA LILY*	None/ None	G3/ S3.2	1B/ 2-2-3	
CALOCHORTUS WEEDII VAR INTERMEDIUS *INTERMEDIATE MARIPOSA LILY*	None/ None	G3?T2/ S2.2	1B/ 2-2-3	
CAREX COMOSA *BRISTLY SEDGE*	None/ None	G5/ S2?	2/ 3-3-1	

List of Elements and Status by Scientific Name
RIX DEIR

Scientific/Common Name	Federal/ State Status	Global/ State Rank	CNPS/ R-E-D	CDFG Status
CATOSTOMUS SANTAANAE *SANTA ANA SUCKER*	Threatened/ None	G1/ S1		SC
CENTROMADIA PUNGENS SSP LAEVIS *SMOOTH TARPLANT*	None/ None	G3G4T2 / S2.1	1B/ 2-3-3	
CHORIZANTHE PARRYI VAR PARRYI *PARRY'S SPINEFLOWER*	None/ None	G2T2/ S2.1	3/ ?-2-3	
CLEMMYS MARMORATA PALLIDA *SOUTHWESTERN POND TURTLE*	None/ None	G4T2T3 / S2		SC
CNEMIDOPHORUS HYPERYTHRUS *ORANGE-THROATED WHIPTAIL*	None/ None	G5/ S2		SC
COCCYZUS AMERICANUS OCCIDENTALIS *WESTERN YELLOW-BILLED CUCKOO*	None/ Endangered	G5T3/ S1		
CORDYLANTHUS MARITIMUS SSP MARITIMUS *SALT MARSH BIRD'S-BEAK*	Endangered/ Endangered	G4?T2/ S2.1	1B/ 2-2-2	
CROTALUS RUBER RUBER *NORTHERN RED-DIAMOND RATTLESNAKE*	None/ None	G4T3T4 / S2?		SC
CUPRESSUS FORBESII *TECATE CYPRESS*	None/ None	G2/ S1.1	1B/ 3-3-2	
DENDROICA PETECHIA BREWSTERI *YELLOW WARBLER*	None/ None	G5T3?/ S2		SC
DIPODOMYS MERRIAMI PARVUS *SAN BERNARDINO KANGAROO RAT*	Endangered/ None	G5T1/ S1		SC
DIPODOMYS STEPHENSI *STEPHENS' KANGAROO RAT*	Endangered/ Threatened	G2/ S2		
DODECAHEMA LEPTOCERAS *SLENDER-HORNED SPINEFLOWER*	Endangered/ Endangered	G1/ S1.1	1B/ 3-3-3	

List of Elements and Status by Scientific Name
RIX DEIR

Scientific/Common Name	Federal/ State Status	Global/ State Rank	CNPS/ R-E-D	CDFG Status
DUDLEYA MULTICAULIS *MANY-STEMMED DUDLEYA*	None/ None	G2/ S2.1	1B/ 1-2-3	
EMPIDONAX TRAILLII *WILLOW FLYCATCHER*	None/ Endangered	G5/ S1S2		
ERIASTRUM DENSIFOLIUM SSP SANCTORUM *SANTA ANA RIVER WOOLLYSTAR*	Endangered/ Endangered	G4T1/ S1.1	1B/ 3-3-3	
EUMOPS PEROTIS CALIFORNICUS *CALIFORNIA MASTIFF BAT*	None/ None	G5T4?/ S3?		SC
GALIUM CALIFORNICUM SSP PRIMUM *CALIFORNIA BEDSTRAW*	None/ None	G5T1/ S1.1	1B/ 3-2-3	
GILA ORCUTTI *ARROYO CHUB*	None/ None	G2/ S2		SC
ICTERIA VIRENS *YELLOW-BREASTED CHAT*	None/ None	G5/ S3		SC
LAMPROPELTIS ZONATA PULCHRA *SAN DIEGO MOUNTAIN KINGSNAKE*	None/ None	G4T1T2 / S1S2		SC
LASTHENIA GLABRATA SSP COULTERI *COULTER'S GOLDFIELDS*	None/ None	G4T3/ S2.1	1B/ 2-3-2	
LEPECHINIA CARDIOPHYLLA *HEART-LEAVED PITCHER SAGE*	None/ None	G2/ S2.2	1B/ 3-2-2	
LYCIUM PARISHII *PARISH'S DESERT-THORN*	None/ None	G3?/ S2S3	2/ 2-1-1	
MONARDELLA PRINGLEI *PRINGLE'S MONARDELLA*	None/ None	GX/ SX	1A/ *	
PEROGNATHUS LONGIMEMBRIS BREVINASUS *LOS ANGELES POCKET MOUSE*	None/ None	G5T1?/ S1?		SC

List of Elements and Status by Scientific Name
RIX DEIR

Scientific/Common Name	Federal/ State Status	Global/ State Rank	CNPS/ R-E-D	CDFG Status
PHACELIA SUAVEOLENS SSP KECKII *SANTIAGO PEAK PHACELIA*	None/ None	G4T1/ S1.3	1B/ 3-1-3	
PHRYNOSOMA CORONATUM BLAINVILLEI *SAN DIEGO HORNED LIZARD*	None/ None	G4T3T4 / S2S3		SC
POLIOPTILA CALIFORNICA *CALIFORNIA GNATCATCHER*	Threatened/ None	G3/ S2		SC
RHAPHIOMIDAS TERMINATUS ABDOMINALIS *DELHI SANDS FLOWER-LOVING FLY*	Endangered/ None	G1T1/ S1		
RHINICHTHYS OSCULUS SSP 3 *SANTA ANA SPECKLED DACE*	None/ None	G5T1/ S1		SC
RIBES DIVARICATUM VAR PARISHII *PARISH'S GOOSEBERRY*	None/ None	G4T1/ S1.1	1B/ 3-3-3	
RIVERSIDIAN ALLUVIAL FAN SAGE SCRUB	None/ None	G1/ S1.1		
RORIPPA GAMBELII *GAMBEL'S WATER CRESS*	Endangered/ Threatened	G1/ S1.1	1B/ 3-3-2	
SIDALCEA NEOMEXICANA *SALT SPRING CHECKERBLOOM*	None/ None	G4?/ S2S3	2/ 2-2-1	
SOUTHERN CALIFORNIA ARROYO CHUB/SANTA ANA SUCKER STREAM	None/ None	G?/ S?		
SOUTHERN COAST LIVE OAK RIPARIAN FOREST	None/ None	G4/ S4		
SOUTHERN COTTONWOOD WILLOW RIPARIAN FOREST	None/ None	G3/ S3.2		
SOUTHERN INTERIOR CYPRESS FOREST	None/ None	G2/ S2.1		

List of Elements and Status by Scientific Name
RIX DEIR

Scientific/Common Name	Federal/ State Status	Global/ State Rank	CNPS/ R-E-D	CDFG Status
SOUTHERN RIPARIAN FOREST	None/ None	G4/ S4		
SOUTHERN RIPARIAN SCRUB	None/ None	G3/ S3.2		
SOUTHERN SYCAMORE ALDER RIPARIAN WOODLAND	None/ None	G4/ S4		
SOUTHERN WILLOW SCRUB	None/ None	G3/ S2.1		
VIREO BELLII PUSILLUS *LEAST BELL'S VIREO*	Endangered/ Endangered	G5T2/ S2		

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APPENDIX 8.5

CULTURAL RESOURCES IMPACT STUDY

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Cultural Resource Impacts:
Sale of Reclaimed Water by the City of San Bernardino
RIX Facility

For:
Ms. Kathy Dale
Albert A Webb Associates
3788 McCray Street
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By:
Christopher E. Drover Ph.D.
125 Abalone Ave.
Newport Beach, California 92662

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Introduction

The sale of processed water to various clients across Riverside County has the potential to invoke various environmental resource concerns. The sale of water may require the construction of pipelines, roads and facilities which may result in impacts to Cultural Resources. Cultural Resources include both historic (older than 50 years, back to European contact) and prehistoric (Native American) resources [both "historic" and "prehistoric" resources are collectively referred to as 'Historic Resources' in California regulations]. Prehistoric resources are quite common in Riverside County and uniformly dispersed from the Colorado River west to the border of Orange and Los Angeles Counties. The number and diversity of prehistoric resources is often underestimated by the public due to the lack of obvious, physical remains such as standing architecture common to the Southwestern United States. The majority of the prehistory of Riverside County consists of relatively small population groups deriving subsistence from hunting and gathering activities limited to available natural resources. Such subsistence activities require groups to be highly mobile which relates to the lack of substantial residential architecture. While these prehistoric sites may not be obvious, six to seven thousand prehistoric sites have been registered for the County of Riverside alone at the Eastern Information Center, University of California, Riverside, the State of California regional clearing house. Historic resources such as houses, commercial buildings and churches tend to be much more obvious in a community, however, some historic resource can consist of ancient trail alignment or locations where historic occurrences happened and are not visible today. California State law (the California Environmental Quality Act, CERA) requires the protection and avoidance of impact to Cultural Resources. If potential related development or land alteration should effect both Cultural Resources and riparian, wetlands areas, Federal law (the National Historic Preservation Act--NAPA) is invoked for the protection and preservation of Cultural Resources.

Cultural Resource legislation is designed to recognize, evaluate and preserved our National, State and local heritage. In the United States such legislation began with the 1906 Antiquities Act to protect resources on Federal Land. In the 1960's similar legislation organized around environmental impact laws and developed for the Federal Government, specifically Section 106 of the National Historic Preservation Act--(NAPA). This Federal legislation influenced similar legislation in many

states such as the California Environmental Quality Act--CEQA). Many similar policies or laws are now also reflected at the County or City level of government.

Regional Prehistory

Initial human occupation of southern California is believed to have begun around 10,000 BC. Theories of earlier occupation exist but have yet to be substantiated. It is known that prior to the Luiseno other Native Americans, perhaps Hokan language speakers, occupied the region employing different artifact assemblages and exploiting different resources. These groups are primarily recognized now as archaeological traditions.

Several different cultural chronologies have been proposed by researchers [Wallace (1955) Treganza and Bierman (1958) Warren (1968) and Kowta (1969)]. These chronologies are based upon changes in the archaeological traditions as reflected either in the artifact assemblage pattern or subsistence pattern. At the present time archaeologists have divided the prehistory of the region into four main stages.

The Early Man (Wallace 1955)/ San Dieguito Tradition (Warren 1968). This tradition dates between 9000-12000 B.P. Warren (1968) describes it as a hunting tradition with a tool kit consisting of scrapers, scraper planes, choppers, crescentics, and large blades and points.

The San Dieguito/Early Man tradition is followed by the La Jolla (Wallace 1955) or Encinitas Tradition (Warren 1968). This period began around 8000 B.P.-9000 B.P. and lasted to about 1000 B.C. This tradition reflected a shift in the economy from one based primarily on hunting to one of seed and shellfish collecting. The assemblage is characterized by the use of millingstones, flaked cobble tools, retouch flakes and flexed burials.

The Pauma Complex, which was first identified by Delbert L. True (1958), was primarily restricted to the areas east of Escondido in the peninsular ranges of northern San Diego County (Morrato 1984). It appears to have been a millingstone complex based more on a hunting and seed gathering

economy than shellfish gathering. This Complex, is dated to around 8000 B.P., is characterized by an assemblage of San Dieguito-like crescents, leaf-shaped points, La Jollan millingstone artifacts, core scrapers and stone discoidals. It is not known whether the Pauma Complex was an inland variant of the La Jolla Complex or represents seasonal inland encampments and adaptations of the main coastal groups (Morrato 1984). While chronology is yet unclear, the southern coast and intermontane valleys may have lacked Wallace's Intermediate Horizon characterized in Los Angeles and Ventura costal settings.

The Late Prehistoric period began around the latter part of the ninth century and continued until historic contact. The period is characterized by three basic shifts in the economy: (a) a more land-based collecting economy, (b) collection of specifically-targeted shellfish resource areas and © the development of a quasi-maritime economy (True 1966). Archaeologically the period is characterized by the introduction of the mortar and pestle, finer projectile points, cremations, and the introduction of pottery around 1000 A.D. Within the Luisenó territory the late period is represented by the San Luis Rey Complex, which is divided into stages I (A.D. 1400-1750) and II (A.D. 1750-1850). The complex was first proposed by Meighan (1954) based upon his work at SD-132 and later redefined by True et al. in 1974.

Archaeologically the San Luis Rey Complex represents a termination of most of the millingstone practices in favor of greater reliance on acorn exploitation and establishment of semi-permanent villages in centralized resource locations (True 1966). San Luis Rey I assemblages are characterized by millingstones, bedrock mortars, cremations and small triangular points. San Luis Rey II contains all those plus pottery, cremation urns and, after contact, glass beads and metal knives (True et al 1974) and is also seen as an intrusive period of "desert" traits/people from the northeast, possibly related to the desiccation of Lake Cahuilla. Researchers believe that this cultural pattern can be linked to Shoshonean expansion into the region and is probably the direct ancestor of the Luiseno culture (True 1966; True et al 1974; White 1963; Bean and Shipek 1978).

The Late Prehistoric period can be said to have ended with the Spanish colonization and

establishment of the missions. Disease and forced relocation, which reduced the populations considerably among the coastal settlements, did much to destroy the cultural pattern established at that period (Bean and Shipek 1978).

The Late Prehistoric culture pattern appears to have lasted longer among the inland groups since it was the policy of Mission San Luis Rey to maintain traditional settlement patterns and economic practices. Even after the missions were secularized in 1834 the inland groups were able to maintain most of their traditional orientation until the arrival of the Anglos from 1859-1879, when most of the Luisenos were displaced and dispersed (Bean and Shipek 1978:558). The name, of Spanish origin and derived from the Mission San Luis Rey de Francia located at present day Oceanside, is applied to the people inhabiting the area of southern Riverside, northern San Diego and eastern Orange counties.

The Luiseño culture may also include the Indians of Mission San Juan Capistrano. Although Kroeber and Harrington had distinguished the Luiseño from the Indians at the Mission San Juan Capistrano based upon linguistic differences, later work by R.C. White (1963) had shown both groups to be one ethnic nationality (Bean and Shipek 1978).

The Luiseño territory covered 1500 square miles. It included most of the San Luis Rey and Santa Margarita river drainages and was bordered along the coast by Aliso Creek to the north and Agua Hedionda Creek to the south. Inland it ran from Santiago Peak on the northeast down the east side of the Elsinore fault valley to the east side of Palomar Mountain and the southern slope of the San Jose Valley (Bean and Shipek 1978, White 1963).

Linguistically, the Luiseño belonged to the Cupan group of the Takic subfamily of the more widespread Uto-Aztecan family. This was earlier called the Southern Californian Shoshonean and includes the languages of the Gabrielino, Serrano, Cahuilla, and Cupeno (Bean and Shipek 1978).

A number of researchers, [Sparkman (1908) Kroeber (1925) White (1963), Bean and Shipek (1978)] have attempted to reconstruct past Luiseño lifeways. Based upon their work the following conclusions are suggested. The Luiseño were intensive hunters and gatherers that utilized both coastal and inland resources. They lived in large sedentary villages that were typically located along valley bottoms, streams, coastal strands, and mountain ranges. These villages were usually in good defensive locations near perennial water sources with every village having access to a number of well defined and well defended resource areas that were usually within a days travel from the village. These resource areas were owned either individually, by a family, or by the village as a whole and it was only with permission that one could exploit another's territory (Bean and Shipek 1978).

Typically the village contained specialized activity areas that included residence houses, sweathouses and special ceremonial enclosures (True 1966).

Each village was a politically independent clan triblet of patrilineally related people which was headed by a hereditary chief whose powers included religious, economic and warfare duties. The headman was assisted by a council of ritualist specialists and shamans whose positions were also hereditary (Sparkman 1908; Bean and Shipek 1978).

Although most of the villages were sedentary or semi- permanently located, full time occupation of the village was not always the case. Small working parties would move to temporary camps to hunt, harvest seeds, or conduct special ceremonies. At least once a year most of the village would move and establish temporary camps either on the coast to collect shellfish or in the mountains to harvest acorns or other resources not available near the main village. Therefore, within the Luiseño region several different temporary site types can occur such as hunting camps, fishing camps, or acorn gathering camps.

Today, the Luiseno recognize their heritage and are attempting to maintain and relearn much of it (Bean and Shipek 1978). They have no central tribal organization but are loosely organized into a

number of groups or bands enrolled on the reservations at La Jolla, Rankine, Pauma, Pechanga, Pala and Soboba.

Time BP	Newport Coast	Los Angeles	San Diego	W. Riverside County	Deserts		N. America	
	Peterson et al. 1991	Wallace 1955	Warren 1968	Meighan 1954-True 1958, 1974	M. Rogers	Wallace 1962	Willey + Phillips	Climate
500	ILP 2	Historic	Yuman-Shoshonean	Diegueno II	Diegueno-Luiseno	Prehistoric Yuman-Shoshonean	**Post Classic**	Meditherma l
1000	LP 1	Horizon IV--Late Prehistoric		San Luis Rey II	Prehistoric Yuman-Shoshonean		**Classic-urban**	
2000	Intermediate Period	Horizon III--Intermediate		San Luis Rey I		Amargosa	**Formative-food production**	
3000				Intermediate? ?	La Jollan	Pinto		Little Pluvial
4000	MS 3	Horizon II-Millingstone	Campbell				**Archaic** broad-based hunting, collecting	
5000	MS 2			Pauma Complex				
6000		Horizon I-Early Man				*HIATUS*		Altithermal
7000	MS 1		Encinitas					
8000						Lake Mojave	**Lithic** hunting-collecting	
9000	Paleo-Coastal Period				*HIATUS*			Anathermal
10,000					San Dieguito III			
20,000								

Table 1

Historic Resource Management

Phase I: Archaeological Inventory

Cultural Resource management unlike most other environmental management issues requires a three-phase process. The first phase of management is one of Inventory--an existing records search and survey, in which the subject property, subject for development, is studied so that potential historic resources can be initially located. An archaeological records search (conducted by mail or in person) and a physical survey of the subject property are accomplished in this phase. In some cases, a review of the Archaeological Records will indicate that the property or portions thereof, has already been surveyed and the locations of previously recorded historical/archaeological sites. According to the California Environmental Quality Act:

> (a) For purposes of this section, the term "historical resources" shall include the following:
> (1) A resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the California Register of Historical Resources (Pub. Res. Code SS5024.1, Title 14 CCR, Section 4850 et seq.).
> (2) A resource included in a local register of historical resources, as defined in section 5020.1(k) of the Public Resources Code or identified as significant in an historical resource survey meeting the requirements section 5024.1(g) of the Public Resources Code, shall be presumed to be historically or culturally significant. Public agencies must treat any such resource as significant unless the preponderance of evidence demonstrates that it is not historically or culturally significant.
> (3) Any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California may be considered to be an historical resource, provided the lead agency's determination is supported by substantial evidence in light of the whole record.

At this point (unlike some other environmental resources) it is still frequently impossible to ascertain impacts for a given site as it's significance often cannot be readily determined due to its unknown third dimension--depth.

Phase II: Test Excavation/ Determination of Eligibility

The following step is often test excavation or determination of eligibility for prehistoric sites. This step is

designed to determine the eligibility of the site for listing in the California Register of Historic Resources (for CEQA).

> Generally, a resource shall be considered by the lead agency to be "historically significant" if the resource meets the criteria for listing on the California Register of Historical Resources (Pub. Res. Code SS5024.1, Title 14 CCR, Section 4852) including the following:
> (A) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
> (B) Is associated with the lives of persons important in our past;
> (C) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
> (D) Has yielded, or may be likely to yield, information important in prehistory or history.
> (4) The fact that a resource is not listed in, or determined to be eligible for listing in the California Register of Historical Resources, not included in a local register of historical resources (pursuant to section 5020.1(k) of the Public Resources Code), or identified in an historical resources survey (meeting the criteria in section 5024.1(g) of the Public Resources Code) does not preclude a lead agency from determining that the resource may be an historical resource as defined in Public Resources Code sections 5020.1(j) or 5024.1.
> (b) A project with an effect that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment.
> (1) Substantial adverse change in the significance of an historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired.
> (2) The significance of an historical resource is materially impaired when a project:
> (A) Demolishes or materially alters in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its inclusion in, or eligibility for, inclusion in the California Register of Historical Resources;or
> (B) Demolishes or materially alters in an adverse manner those physical characteristics that account for its inclusion in a local register of historical resources pursuant to section 5020.1(k) of the Public Resources Code or its identification in an historical resources survey meeting the requirements of section 5024.1(g) of the Public Resources Code, unless the public agency reviewing the effects of the project establishes by a preponderance of evidence that the resource is not historically or culturally significant; or
> (C) Demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its eligibility for inclusion in the California Register of Historical Resources as determined by a lead agency for purposes of CEQA.

Typically this requires the identification of the depth, spatial extent and general "significance" of the resource based on several criteria frequently envolving Criterion D "Has yeilded or may be likely to yeild, information

important in prehistory or history". This step is necessary in theevaluation of cultural resources mainly due to the fact that archaeological sites possess subsurface deposits. The archaeological test is necessary for many, subsurface deposits to determine if further mitigation (a larger sample) is needed and what it would cost. In some cases, the accomplishment of the test itself might achieve the full mitigation of a smaller deposit which lacked depth or significance.

Phase III: Mitigation of Impacts/ Data Recovery/ Preservation

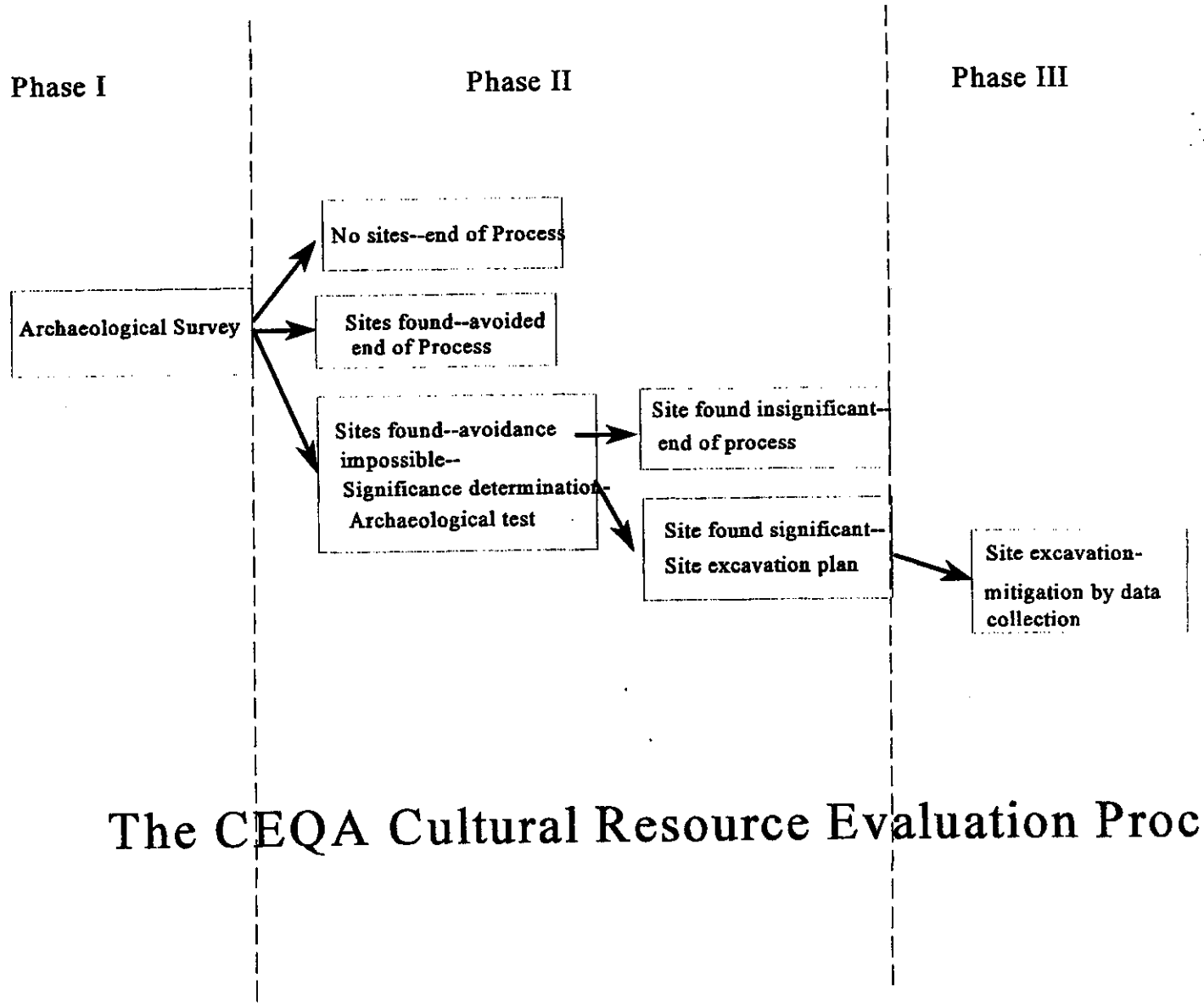
The third and final step in cultural resource management is final mitigation of the said resource. Final mitigation might, most favorably to all concerned, consist of further avoidance/preservation of the site. Often however, development plans or the often unforeseen difficulties associated with the hidden costs of "preservation" may result in site mitigation through data recovery. Data recovery consists of further subsurface excavation to the extent that an adequate sample is determined to exist from the site (from excavation) to warrant its destruction. In some cases, mitigation can consist of a combination of preservation AND data recovery.

> (c) CEQA applies to effects on archaeological sites.
> (1) When a project will impact an archaeological site, a lead agency shall first determine whether the site is an historical resource, as defined in subsection (a).
> (2) If a lead agency determines that the archaeological site is an historical resource, it shall refer to the provisions of Section 21084.1 of the Public Resources Code, and this section, Section 15126.4 of the Guidelines, and the limits contained in Section 21083.2 of the Public Resources Code do not apply.
> (3) If an archaeological site does not meet the criteria defined in subsection (a), but does meet the definition of a unique archeological resource in Section 21083.2 of the Public Resources Code, the site shall be treated in accordance with the provisions of section 21083.2. The time and cost limitations described in Public Resources Code Section 21083.2 (c-f) do not apply to surveys and site evaluation activities intended to determine whether the project location contains unique archaeological resources.
> (4) If an archaeological resource is neither a unique archaeological nor an historical resource, the effects of the project on those resources shall not be considered a significant effect on the environment. It shall be sufficient that both the resource and the effect on it are noted in the Initial Study or EIR, if one is prepared to address impacts on other resources, but they need not be considered further in the CEQA process.

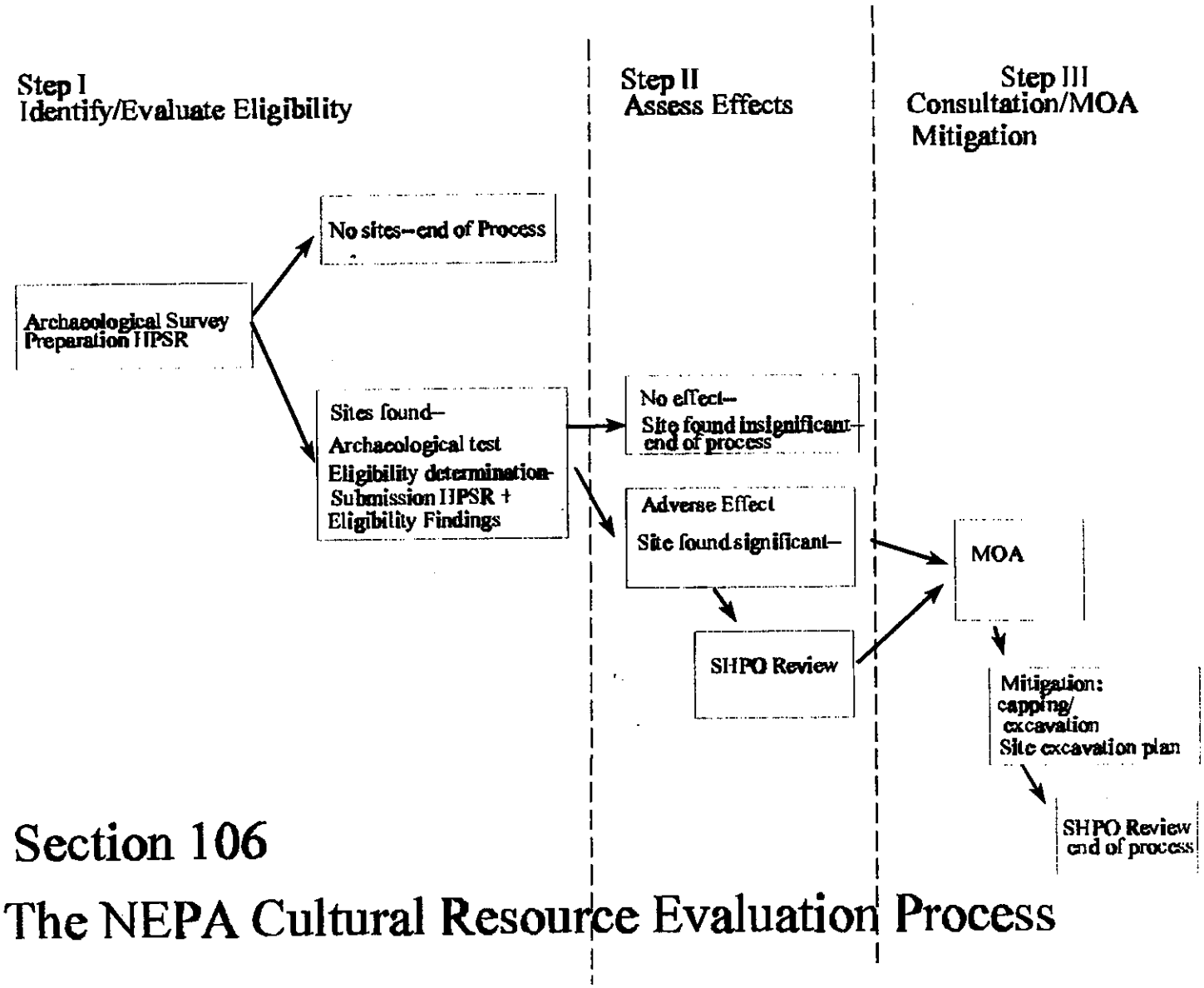
Measures Beyond Mitigation: Grading Monitoring

Grading observation (monitoring) should occur for any earth moving activities in proximity of any known

archaeological or historic site. It is recommended that grading observation be attached as a condition to any grading permits issued for properties containing or likely to contain cultural resources. A pre-grading conference should be held to clarify monitoring specifications with the grading contractor and County/City Grading Inspector. Monitoring would also include observation of sites at which Phase II testing or Phase III data collection activities have already been conducted. Archaeological observation then, should consist of a qualified archaeologist present during all grading activities within 200' of known cultural resources to identify or ascertain significance of any potential artifacts or to aid in the avoidance of sensitive areas. If monitoring were to reveal a previously undiscovered archaeological site, the observer would be empowered to stop (or relocate) excavation activities for a period of time to conduct further, controlled excavation for evaluation of CEQA eligibility. Observation would not be necessary during grading of "non-cultural" deposits (as determined by the archaeologist), only those soils in which cultural materials are likely to be present. If monitoring is being conducted near previously known archaeological sites it is further recommended that a Native American Observer be contacted for participation during grading activities.



The CEQA Cultural Resource Evaluation Process



Section 106

The NEPA Cultural Resource Evaluation Process

Native American Issues

Ocaisionally during the process of archaeological test investigations (Phase II) or in data recovery (Phase III), human remains may be encountered. Procedures are in place for the archaeologist to address such circumstances beginning with contact with the County Coroner's Office (item # 1 below).

> (d) When an initial study identifies the existence of, or the probable likelihood, of Native American human remains within the project, a lead agency shall work with the appropriate native americans as identified by the Native American Heritage Commission as provided in Public Resources Code SS5097.98. The applicant may develop an agreement for treating or disposing of, with appropriate dignity, the human remains and any items associated with Native American burials with the appropriate Native Americans as identified by the Native American Heritage Commission. Action implementing such an agreement is exempt from:
> (1) The general prohibition on disinterring, disturbing, or removing human remains from any location other than a dedicated cemetery (Health and Safety Code Section 7050.5).
> (2) The requirements of CEQA and the Coastal Act.
> (e) In the event of the accidental discovery or recognition of any human remains in any location other than a dedicated cemetery, the following steps should be taken:
> (1) There shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains until:
> (A) The coroner of the county in which the remains are discovered must be contacted to determine that no investigation of the cause of death is required, and
> (B) If the coroner determines the remains to be Native American:
> 1. The coroner shall contact the Native American Heritage Commission within 24 hours.
> 2. The Native American Heritage Commission shall identify the person or persons it believes to be the most likely descended from the deceased native american.
> 3. The most likely descendent may make recommendations to the landowner or the person responsible for the excavation work, for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods as provided in Public Resources Code Section 5097.98, or
> (2) Where the following conditions occur, the landowner or his authorized representative shall rebury the Native American human remains and associated grave goods with appropriate dignity on the property in a location not subject to further subsurface disturbance.

(A) The Native American Heritage Commission is unable to identify a most likely descendent or the most likely descendent failed to make a recommendation within 24 hours after being notified by the commission.
(B) The descendant identified fails to make a recommendation; or
© The landowner or his authorized representative rejects the recommendation of the descendant, and the mediation by the Native American Heritage Commission fails to provide measures acceptable to the landowner.
(f) As part of the objectives, criteria, and procedures required by Section 21082 of the Public Resources Code, a lead agency should make provisions for historical or unique archaeological resources accidentally discovered during construction. These provisions should include an immediate evaluation of the find by a qualified archaeologist. If the find is determined to be an historical or unique archaeological resource, contingency funding and a time allotment sufficient to allow for implementation of avoidance measures or appropriate mitigation should be available. Work could continue on other parts of the building site while historical or unique archaeological resource mitigation takes place.

It is not uncommon that Native American participants are included as part of the general archaeological crew. Effort is also made to include Native American participation during the excavation of Historic Period sites where possible ethnohistoric interest or relationships exist.

Cultural Resource Grading Observation[1]

Specifications:

A pre-grading conference should be held to clarify monitoring specifications with the grading contractor and County/City Grading Inspector. Grading observation (monitoring) should occur for any earth moving activities conducted within 200' of any known or suspected archaeological or historic site or area of concern, to a depth not to exceed 3' in sterile soil, regardless of whether Phase II or Phase III mitigation activities have already

[1] The term "grading" as used herein refers to both soil cutting and filling in the proximity of known or suspected cultural resources. "Proximity" to cultural resources is defined as being with 200 spatial feet and not to exceed 3 vertical feet if soil proves to be sterile of cultural materials. Since the surface of archaeological sites are fragile, filling activities must be proceeded by the use of rubber-tire, front loaders which move onto the site by rolling a pad of fill soil before them as they encroach onto the site.

been conducted. It is recommended that grading observation be attached as a condition to any grading permits issued for the larger Copper Canyon Project Area. Archaeological observation then, should consist of a qualified archaeologist present during all grading activities to identify and/or ascertain significance of any subsurface cultural resources or to aid in the avoidance of sensitive areas. Given the nature and sensitivity of these archaeological sites it is further recommended that representatives of the Native American community (Pechanga Reservation in this case), be retained for participation during grading activities. While it is unlikely, the observer(s) would be empowered to stop (or relocate) excavation activities for short periods of time to conduct further, controlled excavation for evaluation of significance. Surface or subsurface artifacts of significance are also collected and mapped during this operation. Given the spatial and vertical parameters mentioned above, grading observation will not be necessary for the entire project area such as the grading of "non-cultural" deposits, only soils in which cultural materials are likely to be present (at the discretion of the monitoring archaeologist). For purposes of determining crew sizes, a written grading schedule will be submitted in writing one day in advance.

Often grading monitoring may include paleontological resources hence, the monitoring activity may be arranged for the full-time presence of a monitoring during a grading job. Archaeological or paleontological monitoring crew size would be met by the presence of one monitor for each grading activity locus.

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Volume 2 – Technical Appendices

RIX FACILITY RECYCLED

WATER SALES PROGRAM

PROGRAM ENVIRONMENTAL IMPACT REPORT

Prepared for:

City of San Bernardino
Municipal Water Department
300 North "D" Street, 5th Floor
San Bernardino, California 92418

Prepared by:

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San Bernardino, California 92405

March 2003

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APPENDIX A

ESTIMATE OF TDS AND TIN IMPACTS

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WE INC.

Wildermuth Environmental, Inc.
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Fax. 949/498-1712
Email mjw@wildh2o.com

RECEIVED
MAR 21 2001
SBMWD
DEPUTY GENERAL MANAGER

December 28, 2000
Revised March 19, 2001

San Bernardino Municipal Water Department
Attention: Bernard C. Kersey, General Manager
300 North "D" Street
San Bernardino CA 92418

Subject: Estimate of the TDS and TIN Impacts from the Diversion of San Bernardino Portion of RIX Effluent out of the Santa Ana River Watershed Upstream of Prado

Dear Mr. Kersey:

Per your request, we conducted an analysis to estimate the impacts on discharge, total dissolved solids (TDS) and total inorganic nitrogen (hereafter TIN, consisting of the sum of ammonia, nitrite and nitrate, and expressed as nitrogen) from the diversion and export of San Bernardino tertiary-treated effluent out of the Santa Ana River Watershed (Project). This analysis was done to provide information that will be considered in the Project formulation and subsequently incorporated into an environmental impact report that is being prepared for the Project. This letter report summarizes the planning problem, the numerical strategy used to estimate the Project impacts, and the estimated impacts.

THE PLANNING PROBLEM

Figure 1 is a map that shows the location of RIX and other publicly owned treatment works (POTW's) in relation to the Santa Ana River. In this analysis, we are focusing on discharge and water quality impacts, specifically TDS and TIN, in the river at two USGS gaging stations: *MWD Crossing* (11066460) and *below Prado Dam* (11074000). The locations for these stations are shown on Figure 1. Reach 2 of the Santa Ana River runs from 17th Street in Santa Ana to Prado dam. Reach 3 runs from Prado dam to Mission Boulevard Bridge in Riverside. The TDS and TIN objectives for these reaches of the Santa Ana River are:

Reach	TDS	TIN
2	650[1]	---
3[2]	700	10

[1] – five-year moving average
[2] – August-only

Figure 2 is a time history plot of the monthly average of TDS and TIN concentrations in RIX effluent for the period March 1996 through September 1999. The TDS concentration of RIX effluent has historically been lower than the objective in both reaches. The TIN concentration of RIX effluent has varied from slightly higher to substantially lower than the reach objectives. The TDS concentration in RIX effluent is

consistent at about 500 mg/L. The TIN concentration in RIX effluent has varied from an occasional high near 11 mg/L to as low as 4 mg/L. Note that the current wasteload allocation for the Santa Ana River assumes that the TDS and TIN in RIX effluent will be less than or equal to 550 mg/L and 10 mg/L, respectively (RWQCB, 1995).

Estimates of future recycled water production for the year 2010 and 2040 and were obtained from the *Southern California Comprehensive Water Reclamation and Reuse Study* (CH2M-Hill, 1998). Table 1 summarizes the Colton and San Bernardino inflow contributions to RIX, assumed overproduction at RIX, total discharge at RIX, and the assumed TDS and TIN of RIX effluent. Table 1 also shows the estimated discharge to the Santa Ana River and export for a maximum and moderate export scenarios. San Bernardino is contractually obligated to San Bernardino Valley Municipal Water District (SBVMWD) to discharge 16,000 acre-ft/yr of effluent to the Santa Ana River. San Bernardino may use some of its effluent for groundwater replenishment in the Bunker Hill Basin. Based on conversations with the City of San Bernardino, it was assumed that 5.4 mgd (6,000 acre-ft/yr) would be diverted from the San Bernardino Reclamation Plant for groundwater replenishment in 2010. In a maximum export scenario, it was assumed that San Bernardino would export 40 mgd (45,000 acre-ft/yr) by the year 2040. In the moderate export scenario, it was assumed that San Bernardino would export half of the maximum amount, or 20 mgd (23,000 acre-ft/yr).

A baseline and eight export-recycling alternatives were developed to analyze the individual and cumulative impacts of future San Bernardino recycled water export and other recycling plans. Table 2a summarizes the baseline and alternatives. The baseline and each alternative contain columns that show the amount of recycling and river discharge for each recycling facility.

Table 2b illustrates the computation of maximum volumes of annual recycling at all river-discharging facilities. WMWD and IEUA each have an obligation to provide 17,000 acre-ft/yr of base flow discharge at Prado (1969 Judgment OCWD vs. City of Chino et.al., 117628). Base flow is defined to be the difference between the total discharge and storm water discharge; and consists of rising groundwater and recycled water. Estimates of the theoretical maximum volumes of recycling in the WMWD and IEUA service area were made by assuming that their base flow obligation would be satisfied with recycled water. This means that the maximum theoretical recycled water usage is numerically equal to the recycled water produced in their service areas minus their obligation in the Judgment (17,000 acre-ft/year). The theoretical maximum reuse based on Judgment limitations are shown in Table 2b and in the year 2040 are projected to reach about 101,000 acre-ft/yr and 157,000 acre-ft/yr for WMWD and IEUA, respectively. These projections seemed unreasonably large and it was assumed that the maximum annual recycled water reuse in the WMWD and IEUA service areas would be half or 50 percent of the theoretical maximum described above. For Rialto we assumed that half of their recycled water would be reused.

The baseline and alternatives include:

> Baseline – assumes that all recycling plants that discharge to the Santa Ana River will discharge quantities as described in *Southern California Comprehensive Water Reclamation and Reuse Study* (CH2M-Hill, 1998); with the exception that San Bernardino will divert 5.4 mgd to percolation ponds in the Bunker Hill groundwater basin.
>
> Alternative 1 – same as Baseline except that San Bernardino will export recycled water at the maximum rate.
>
> Alternative 2 – same as Baseline except that San Bernardino will export recycled water at the moderate rate.

Alternative 3 – San Bernardino exports recycled water at the maximum rate and other river-discharging recycling facilities divert recycled water at their maximum reuse rates.

Alternative 4 – San Bernardino exports recycled water at the moderate rate and other river-discharging recycling facilities divert recycled water at their maximum reuse rates.

Alternative 5 – No export of San Bernardino recycled water and other river-discharging recycling facilities divert recycled water at their maximum reuse rates.

Alternative 6 – No export of San Bernardino recycled water and other river-discharging recycling facilities divert recycled water at half of the maximum reuse rates.

Alternative 7 – San Bernardino exports recycled water at 18,000 acre-ft/yr and other river-discharging recycling facilities divert recycled water at their maximum rates.

Alternative 8 – San Bernardino exports recycled water at 18,000 acre-ft/yr and other river-discharging recycling facilities divert recycled water at half of the maximum reuse rates.

Alternatives 5 and 6 were developed and analyzed to determine the relative impacts of export of San Bernardino recycled water and other recycled water reuse plans. It was also assumed that on average that the Chino Basin Watermaster would divert an additional 17,000 acre-ft per year of urban storm water into recharge basins within the Chino Basin and thus would reduce the storm water discharges from the Chino Basin to the Santa Ana River. This assumption was used in the Chino Basin Watermaster's *Optimum Basin Management Program* which was approved by the Watermaster and the Court in July 2000, and was described in the certified *Chino Basin Optimum Basin Management Program, Final Program Environmental Impact Report* (IEUA, 2000).

Technical Assumptions and Numerical Strategy

The objective of this investigation is to characterize the discharge, TDS and TIN impacts at the *MWD Crossing* and at *below Prado Dam* for the years 2010 and 2040 caused by diverting San Bernardino's recycled water from the river with and without recycled water reuse plans at other POTW's. The characterizations described herein are based on estimating the statistics for average, maximum and minimum discharges and TDS and TIN concentrations for the planning years 2010 and 2040. This was done by holding recycled water discharges and other cultural conditions constant for the baseline and each alternative at each planning year, and simulating the discharge, TDS and TIN concentrations for a ten-year monthly hydrology.

The numerical strategy used to estimate the discharge, TDS and TIN impacts to the river at the *MWD Crossing* and at *below Prado Dam* consisted of solving the equations described below. The flow balance for the Santa Ana River between E Street and the *MWD Crossing* for any time period is given by the following equation:

$$Q_{MWD\ Crossing} = Q_{E\text{-}Street} + Q_{Warm\ Creek} + Q_{Lytle\ Creek} + \sum RW + \sum ONI - Q_{Phreatophytes} - Q_{SB} + \varepsilon \quad (1)$$

Where:

$Q_{MWD\ Crossing}$	the Santa Ana River discharge out of the reach at the *MWD Crossing* (USGS station 11066460)
$Q_{E\text{-}Street}$	the Santa Ana River discharge at the E Street into the reach (USGS station 11059300)
$Q_{Warm\ Creek}$	the Warm Creek Discharge into the reach (USGS station 11060400)
$Q_{Lytle\ Creek}$	the Lytle Creek Discharge into the reach (USGS station 11065000)
RW	recycled water discharge to the Santa Ana River from an individual POTW in the reach
ONI	other non-tributary discharges into the reach
$Q_{Phreatophyte}$	losses to phreatophytes in the reach
Q_{SB}	streambed losses in the reach
ε	residual term to account for unmeasured and or unidentified components of discharge.

Likewise, the mass balance, for either TDS or TIN, is given by:

$$C_{MWD\ Crossing} * Q_{MWD\ Crossing} = C_{E\text{-}Street} * Q_{E\text{-}Street} + C_{Warm\ Creek} * Q_{Warm\ Creek} + C_{Lytle\ Creek} * Q_{Lytle\ Creek} + \sum (C_{RW} * RW) + \sum (C_{ONI} * ONI) - C_{SB} * Q_{SB} + C_{\varepsilon} * \varepsilon \quad (2)$$

Where the concentration terms (C's) are the TDS or TIN concentrations associated with each component. The flow and mass balance in the reach between *below Prado Dam* and the *MWD Crossing* are given by, respectively:

$$Q_{below\ Prado} = Q_{MWD\ Crossing} + \sum Q_{Trib} + \sum RW + \sum ONI - Q_{Phreatophytes} - Q_{SB} + \tau \quad (3)$$

Where:

$Q_{below\ Prado}$	the Santa Ana River discharge out of the reach at *below Prado Dam* (USGS station 11074000)
Q_{Trib}	the discharge into the reach from gaged and ungaged tributaries
RW	recycled water discharge to the Santa Ana River from an individual POTW in the reach
ONI	other non-tributary discharges into the reach
$Q_{Phreatophyte}$	losses to phreatophytes in the reach
Q_{SB}	streambed losses in the reach
τ	residual term to account for unmeasured and or unidentified components of discharge.

And:

$$C_{below\ Prado} * Q_{below\ Prado} = C_{MWD\ Crossing} * Q_{MWD\ Crossing} + \sum C_{Trib} * Q_{Trib} + \sum (C_{RW} * RW) + \sum (C_{ONI} * ONI) - C_{SB} * Q_{SB} + C_{\tau} * \tau \quad (4)$$

To compute the impacts at the *MWD Crossing* and at *below Prado dam*, equations 1 through 4 are solved with historical data to estimate ε and τ. This was done for the 10-year period from October 1989 through September 1999. This period was chosen because: the availability of TIN data for the River and for POTW's was very limited prior to 1989; and the period is somewhat representative of current urban runoff and recycled water discharge conditions. Figure 3 shows the time history of storm flow for the Santa Ana River at *below Prado dam*. Figure 3 also has a plot of the cumulative departure from mean (CDFM) precipitation for the precipitation gage located at the San Bernardino Hospital. The CDFM plot indicates that the period October 1989 through September 1999 is a wet period. Figure 3 also suggests that that the relationship of precipitation to runoff changed significantly around 1977 with much more runoff per unit of precipitation after 1977. To see this, note the positive slope of the CDFM (indicative of a wet period) during the period October 1937 to September 1945. About 64 inches of precipitation occurred above the average of 16.5 inches per year. For the period October 1977 to September 1983, another wet period, there was about 38 inches of precipitation above the mean but there was much more storm water discharge than occurred during the period 1937 to 1945. A similar observation can be made about the October 1991 to September 1998 period.

Period	Period Precipitation Above Normal (inches)	Storm Water Produced for the Period (acre-ft)
10/36 to 9/45	64	570,000
10/77 to 9/83	38	1,098,000
10/92 to 9/98	32	1,186,000

Figure 4 is a double mass curve plot of precipitation at the San Bernardino Hospital versus storm water discharge at *below Prado dam*. Note that the slope of the double mass curve after October 1977 is much steeper than prior to October 1977. The change in curvature means that significant changes occurred in the precipitation – runoff relationship. These changes were caused by an increase in imperviousness in the watershed due to urbanization and attendant improvements in drainage systems. Because the period October 1989 to September 1999 is a wet period the absolute value of any one statistic will have the affect of greater storm water dilution than a longer period that would contain a matching dry period. The impacts of using this period this is offset by other assumptions described below. Also note that in this analysis we are comparing reuse/export alternatives to a baseline, both of which use the same hydrologic period -- the difference is the impact of the project.

Some terms in equations 1 through 4 could not be quantified due to lack of data. When a term could not be quantified, it was lumped into the residual term. For example, there is not much data to describe the TDS and TIN time histories for the Santa Ana River at E Street, Lytle Creek and Warm Creek, nor is there stream flow data to estimate the streambed recharge in the Santa Ana River. Thus, equations 1 and 2 were reduced to equations 5 and 6.

$$Q_{MWD\ Crossing} = \Sigma RW + \Sigma ONI + E \qquad (5)$$

Where E is the new residual incorporating unknown flow terms or known flow terms with corresponding unknown TDS and TIN concentrations. Likewise, the mass balance, for either TDS or TIN, is given by:

$$C_{MWD\ Crossing} * Q_{MWD\ Crossing} = \Sigma\ (C_{RW} * RW) + \Sigma\ (C_{ONI} * ONI) + C_{\varepsilon} * E \qquad (6)$$

Equation 3 was reduced to:

$$Q_{below\ Prado} = Q_{MWD\ Crossing} + \Sigma RW + \Sigma ONI - Q_{Phreatophytes} + T \qquad (7)$$

Where T is the new residual incorporating unknown flow terms or known flow terms with corresponding unknown TDS and TIN concentrations. Likewise, the mass balance, for either TDS or TIN, is given by:

$$C_{below\ Prado} * Q_{below\ Prado} = C_{MWD\ Crossing} * Q_{MWD\ Crossing} + \Sigma\ (C_{RW} * RW) + \Sigma\ (C_{ONI} * ONI) + C_T * T \qquad (8)$$

Having computed the E and T terms for the historical period, the impacts for the river at the *MWD Crossing* and at *below Prado Dam* due to future recycled water discharges and diversions can be estimated by changing the recycled water discharge terms to the river to correspond to the baseline and

reuse/export alternatives listed in Table 2a. To get the average TDS concentration at Prado Dam for year 2010 levels of recycled water discharge to the Santa Ana River, the flow and TDS concentrations are computed at a monthly time step with the hydrology and residuals from the historical period of October 1989 through September 1999. The average TDS concentration is the average of this 120-month period. The maximum, minimum and standard deviation were also estimated. Table 3a is an example of this computation for the Baseline and Alternative 1 for the reach between E Street and the *MWD Crossing*. Table 3a also shows the difference between the Baseline and Alternative 1. The statistics in Table 3a and in subsequent tables are used herein to characterize the magnitude of the impacts from proposed upstream recycled water uses.

There are four other assumptions that are included in this analysis:

- In computing the residual, the OCWD wetlands located in Prado flood control basin were assumed to be in service starting in 1992 with a maximum capacity of 60 cubic feet per second (cfs) and to be expanded in 1996 to 100 cfs. Half of the Santa Ana River discharge tributary to the wetlands up to the above stated hydraulic capacity of the wetlands was assumed to flow through and be treated by the wetlands. The TIN in the wetlands effluent was assumed to be 1 mg/L (Personal communication with Gregg Woodside of OCWD, 2000). For the baseline and reuse/export alternatives the wetlands were assumed in operation at the post 1996 capacity.
- Increases in storm water discharge to the Santa Ana River that will accompany the increase in recycled water production are not included in this analysis. The TDS and TIN concentrations of storm water is generally very low and the new storm water that would occur due to conversion of land use from undeveloped and agricultural uses to urban uses would dilute the TDS and TIN concentration in recycled water discharged to the river. Omission of these increased storm water discharges will amplify the impacts of diverting recycled water from the river, i.e., the TDS and nitrate impacts projections will be somewhat overstated.
- The creation of a new conservation pool in Prado reservoir when Prado reservoir is expanded and the subsequent impounding of water behind Prado by OCWD will have the effect of creating additional nitrogen removal capacity behind Prado dam. The nitrogen loss associated with the future conservation pool has not been included.
- Dilution caused by future non-tributary discharges to the Santa Ana River, including state project water from OC-59, Arlington desalter, groundwater exchanges, or the Bunker Hill high groundwater mitigation program, is not included in this analysis.

ESTIMATED IMPACTS

A series of comprehensive tables and charts were developed to describe the impacts of the proposed projects. These include:

- Tables 3a, b and c contain the monthly time history and related statistics for discharge, TDS concentration and TIN concentration, for the Baseline and Alternative 1 for the planning year 2010.
- Tables 4a, b, and c contain the same information as Tables 3a, b and c for year 2040.
- Tables 5 and 6 are identical to Tables 3 and 4 but contain results for Alternative 2.
- Tables 7 and 8 are identical to Tables 3 and 4 but contain results for Alternative 3.
- Tables 9 and 10 are identical to Tables 3 and 4 but contain results for Alternative 4.
- Tables 11 and 12 are identical to Tables 3 and 4 but contain results for Alternative 5.
- Tables 13 and 14 are identical to Tables 3 and 4 but contain results for Alternative 6.
- Tables 15 and 16 are identical to Tables 3 and 4 but contain results for Alternative 7.
- Tables 17 and 18 are identical to Tables 3 and 4 but contain results for Alternative 8.

- Table 19 summarizes the average discharge impact at the *MWD Crossing* and at *below Prado dam*
- Table 20 summarizes the average TDS impact at the *MWD Crossing* and at *below Prado dam*
- Table 21 summarizes the conformance with the TDS metrics for Reach 2 and 3.
- Figures 5 and 6 show a comparison of the TDS concentration time series for the baseline and discharge alternatives.
- Figures 7 and 8 show a comparison of the Reach 2 TDS metric for the baseline and the discharge alternatives.
- Table 22 summarizes the average TIN concentration change at the *MWD Crossing* and at *below Prado dam*
- Table 23 summarizes the August-only TIN metric at *below Prado dam.*
- Figures 9 and 10 show a comparison of the TIN concentration time series for the baseline and discharge alternatives

For Tables 3 through 18, the "a" table contains discharge, TDS and TIN concentrations at the *MWD Crossing* for the baseline and its respective alternative. The "b" tables contain similar results for at *below Prado dam.* The "b" tables also contain estimates of *August Only* TDS and TIN concentrations *at below Prado dam* that can be compared to the TDS and TIN water quality objectives for Reach 3 of the Santa Ana River. The "c" tables contain estimates of the average annual and five–year volume-weighted average TDS concentrations at *below Prado dam.* The estimated five–year volume-weighted average TDS concentration at *below Prado dam* can be compared to the Reach 2 TDS objective to determine if upstream export and/or reuse of recycled water will cause a violation of the TDS water quality objective in Reach 2 of the Santa Ana River.

Projected Changes in Discharge

Table 19 summarizes the ten-year average discharge for the baseline and alternatives, and the change in discharge at the *MWD Crossing* and at *below Prado dam.* The baseline ten-year average discharge (acre-ft/yr) for 2010 and 2040 are:

	2010	2040
MWD Crossing	150,000	183,000
Below Prado dam	396,000	536,000

For all alternatives the ten-year average discharge at the *MWD Crossing* and at *below Prado dam* is less than the baseline ten-year average by an amount equal to the volume of water either exported and/or reused upstream of the point of interest. At *below Prado dam* the maximum decrease in discharge occurs with *Alternative 3 Maximum Export of San Bernardino Effluent and Maximum Reuse of Recycled Water by Other POTW's* at about 185,000 acre-ft/yr. The 2040 ten-year average discharge at *below Prado dam* for Alternative 3 is about 351,000 acre-ft/yr and is about 70,000 acre-ft/yr greater than the historical ten-year average for the period October 1989 to September 1999 of 281,000 acre-ft. That is, even with the most aggressive reuse and export alternative there will still be more discharge in the River at Prado dam than in the present. The projected export by San Bernardino in Alternative 3 is about 45,200 acre-ft/yr or about 24 percent of the total decrease in discharge.

Projected Changes in TDS Concentration

Table 20 summarizes the ten-year average flow-weighted TDS concentration for the baseline and reuse/export alternatives and the change in TDS concentration at the *MWD Crossing* and at *below Prado dam*. The baseline ten-year average TDS concentration (mg/L) for 2010 and 2040 are:

	2010	2040
MWD Crossing	534	519
Below Prado dam	539	537

Under baseline conditions the TDS concentration is projected to remain about the same in 2010 and 2040. Upstream of the *MWD Crossing* the TDS concentration increases slightly for all reuse/export alternatives. This occurs because the TDS concentration in the city of Rialto and RIX discharge is less than the TDS concentration in the baseline for 2010 and 2040. The less low-TDS effluent in the stream, the less dilution by the effluent. The increase in TDS concentration ranges from a low of 3 mg/L for Alternative 6 (no San Bernardino export and intermediate levels of reuse by Rialto) to a high of about 36 mg/L for Alternative 3 (maximum export of San Bernardino effluent and maximum reuse by Rialto).

At *below Prado dam* the TDS concentration is projected to increase slightly for Alternatives 1 and 2 (respectively the maximum and moderate export levels for San Bernardino, with no other reuse) to decrease slightly for the other reuse/export alternatives. The changes in TDS range from a slight increase of about 4 mg/L (<+1percent) for Alternative 1 to a decrease of about 8 mg/L (less than -2 percent) for Alternative 5 (no export of San Bernardino effluent and intermediate levels of reuse for the other dischargers).

Figures 5 and 6 show a comparison of the TDS concentration time series for the baseline and the reuse/export alternatives at *below Prado dam*. The TDS concentration at *below Prado dam* is generally lower during the winter and higher during the summer. In the year 2010 there are six periods where the TDS concentration exceeds the Reach 3 objective of 700 for some of the reuse/export alternatives (Alternatives3, 4, 5 and 7). By 2040 the TDS concentration is projected to remain below 700 mg/L.

Table 21 summarizes the ten-year average TDS metrics for Reach 2 and Reach 3 at *below Prado dam*. The baseline ten-year average TDS metrics for Reach 2 and Reach 3 at below Prado are:

	2010	2040	Objective
Reach 3 – August Only	628	598	700
Reach 2 – Five-year Average	516	524	650

The TDS metric for Reach 2 ranges from 499 to 517 mg/L, a decrease ranging from -7 to -18 mg/L (1 to 3 percent). The TDS metric for Reach 2 remains about the same for the baseline, and Alternatives 1 and 2, because the TDS concentration of San Bernardino effluent diverted at RIX is 510 mg/L, which is slightly lower than the baseline TDS Reach 2 metric. Figures 7 and 8 illustrate the time series of the Reach 2 metric for each alternative. For all alternatives, the estimated Reach 2 metric is substantially lower (130 to 150 mg/L) than the Reach 2 TDS objective of 650 mg/L.

The TDS metric for Reach 3 is always higher than the baseline because the TDS concentration in the effluent for all recycling plants except for Corona is less than the baseline concentration in 2010, and all recycling plants except Riverside Regional, Western Riverside, Carbon Canyon and Corona, are less than the baseline metric in 2040. For the reuse/export alternatives, the TDS metric for Reach 3 ranges from 635 mg/L to 682 mg/L, an increase in the Reach 3 TDS metric from 6 mg/L to 54 mg/L (1 to 9 percent).

Projected Changes in TIN Concentration

Table 22 summarizes the flow-weighted, ten-year average TDS concentration for the baseline and the reuse/export alternatives, and the change in TIN concentration at the *MWD Crossing* and at *below Prado dam*. The baseline flow-weighted, ten-year average TIN concentration (mg/L) for 2010 and 2040 are:

	2010	2040
MWD Crossing	7.5	8.0
Below Prado dam	7.3	8.1

Figures 9 and 10 show a comparison of the TIN concentration time series for the baseline and reuse/export alternatives for the *MWD Crossing* and at *below Prado dam*, for years 2010 and 2040, respectively. For all alternatives the TIN concentration estimate at the *MWD Crossing* and at *below Prado dam* were slightly lower (<1 mg/L-N) than the baseline. This occurs because the TIN in recycled water discharged to the River was projected to be at least 10 mg/L for all POTW's. The fraction of low TIN concentration storm water in the Santa Ana River discharge increases with the reuse and export of recycled water. Table 23 summarizes the average TIN August-only metric used for Reach 3. For all alternatives, the estimated Reach 3 metric is lower (<2 mg/L) than the Reach 3 TIN objective of 10 mg/L.

We appreciate the opportunity to complete this investigation for the City. Please call me if you have any questions regarding this analysis.

Sincerely,

Wildermuth Environmental, Inc.

Mark J. Wildermuth, MS, PE
President, Principle Engineer

Jeffrey Hwang, PhD
Principal Scientist

Encl
Cc: Stacey Aldstadt/ San Bernardino
Kath Dale/Webb

Table 1
San Bernardino Export Scenarios

Year	Rialto			Colton	RIX									San Bernardino Export Scenarios								
					San Bernardino									Baseline			– Max San Bernardino Export –			– Min San Bernardino Export –		
	Disc.	TDS (mg/L)	TIN (mg/L)		Total WRP	Recycled	To RIX	Total Inflow	Over Production		Total Disc.	TDS (mg/L)	TIN (mg/L)	SB River Discharge	Export	RIX Discharge	SB River Discharge	Export	RIX Discharge	SB River Discharge	Export	RIX Discharge
Discharge Expressed in Millions of Gallons per Day (mgd)																						
2000	5.8	400	10	5.0	26.0	0.0	26.0	31.0	10%	3.1	34.1	550	10	26.0	0.0	34.1	26.0	0.0	34.1	26.0	0.0	34.1
2010	12.0	400	10	10.0	40.5	5.4	35.1	45.1	10%	4.5	49.7	550	10	35.1	0.0	49.7	14.3	20.9	28.8	24.7	10.4	39.2
2040	20.0	400	10	10.0	60.0	5.4	54.6	64.6	10%	6.5	71.1	550	10	54.6	0.0	71.1	14.3	40.4	30.7	34.5	20.2	50.9
Discharge Expressed in Cubic Feet per Second (cfs)																						
2000	9.0	400	10	7.7	40.2	0.0	40.2	48.0	10%	4.8	52.8	550	10	40.2	0.0	52.8	40.2	0.0	52.8	40.2	0.0	52.8
2010	18.6	400	10	15.5	62.7	8.3	54.4	69.9	10%	7.0	76.9	550	10	54.4	0.0	76.9	22.1	32.3	44.6	38.3	16.2	60.7
2040	31.0	400	10	15.5	92.9	8.3	84.6	100.1	10%	10.0	110.1	550	10	84.6	0.0	110.1	22.1	62.5	47.6	53.3	31.2	78.8
Discharge Expressed in Acre-Feet per Year (acre-ft/yr)																						
2000	6,499	400	10	5,603	29,134	0	29,134	34,737	10%	3,474	38,211	550	10	29,134	0	38,211	29,134	0	38,211	29,134	0	38,211
2010	13,447	400	10	11,206	45,382	6,000	39,382	50,588	10%	5,059	55,647	550	10	39,382	0	55,647	16,000	23,382	32,264	27,691	11,691	43,955
2040	22,411	400	10	11,206	67,233	6,000	61,233	72,439	10%	7,244	79,682	550	10	61,233	0	79,682	16,000	45,233	34,449	38,617	22,617	57,066

Table 2a
Future Estimates of Recycled Water Production and Reuse Alternatives

Name of Facility	Operator	Projected Recycled Water Production[1]		Projected Concentrations[1]		Baseline		Alternative 1 Maximum Export of San Bernardino Effluent and No Recycling at other POTW's		Alternative 2 Intermediate Export of San Bernardino Effluent and No Recycling at other POTW's		Proposed Discharge to the Santa Ana River for Each Alternative (mgd)																			
												Alternative 3 – Maximum Export of San Bernardino Effluent and Maximum Recycling by Other POTW's				Alternative 4 – Intermediate Export of San Bernardino Effluent and Maximum Recycling by Other POTW's				Alternative 5 – No Export of San Bernardino Effluent and Maximum Recycling by Other POTW's				Alternative 6 – No Export of San Bernardino Effluent and Intermediate Recycling by Other POTW's				Alternative 7 – 18,810 acre-ft/yr Export of San Bernardino Effluent and Maximum Recycling by Other POTW's				Alternative 8 – 18,810 acre-ft/yr Export of San Bernardino Effluent and Intermediate Recycling by Other POTW's			
												2010		2040		2010		2040		2010		2040		2010		2040		2010		2040	
		2010	2040	TDS	TIN	2010	2040	2010	2040	2010	2040	Recycled	Discharged	Recycled	Discharged	Recycled	Discharged	Recycled	Discharged	Recycled	Discharged	Recycled	Discharged	Recycled	Discharged	Recycled	Discharged	Recycled	Discharged	Recycled	Discharged
Rialto	City of Rialto	12.0	20.0	390	10.0	12.0	20.0	12.0	20.0	12.0	20.0	6.0	6.0	10.0	10.0	6.0	6.0	10.0	10.0	6.0	6.0	10.0	10.0	3.0	9.0	5.0	15.0	6.0	6.0	10.0	10.0	3.0	9.0	5.0	15.0
RIX	RIX JPA	49.3	71.1	530	10.0	49.7	71.1	28.8	30.7	39.2	56.9	20.9	28.8	40.4	30.7	18.5	39.2	20.2	50.9	0.0	49.7	0.0	71.1	0.0	49.2	0.0	71.1	16.1	33.6	16.1	55.0	16.1	33.6	16.1	55.0
Riverside Regional WQCF	City of Riverside	55.0	66.0	650	[illegible]	55.0	66.0	55.0	66.0	55.0	66.0	22.2	32.8	25.7	34.3	22.2	32.8	25.7	34.3	22.2	32.8	25.7	34.3	11.1	43.9	12.8	47.2	22.2	32.8	25.7	34.3	11.1	43.9	12.8	47.2
Western Riverside Co WWTP	Western Riverside County JPA	12.0	32.0	625	10.0	12.0	32.0	12.0	32.0	12.0	32.0	4.8	7.2	13.7	18.3	4.8	7.2	13.7	18.3	4.8	7.2	13.7	18.3	2.4	9.6	6.8	25.2	4.8	7.2	13.7	18.3	2.4	9.6	6.8	25.2
Carbon Canyon WRP	Inland Empire Utilities Agency	10.2	20.2	610	10.0	10.2	20.2	10.2	20.2	10.2	20.2	4.2	6.0	9.1	11.1	4.2	6.0	9.1	11.1	4.2	6.0	9.1	11.1	2.1	8.1	4.6	15.0	4.2	6.0	9.1	11.1	2.1	8.1	4.6	15.0
Chino Basin Regional Plant #1	Inland Empire Utilities Agency	44.0	64.0	515	[illegible]	44.0	64.0	44.0	64.0	44.0	64.0	18.2	25.8	30.7	37.3	18.2	25.8	30.7	37.3	18.2	25.8	30.7	37.3	9.1	34.9	15.3	52.7	18.2	25.8	30.7	37.3	9.1	34.9	15.3	52.7
Chino Basin Regional Plant #2	Inland Empire Utilities Agency	0.0	0.0	610	n/a	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chino Basin Regional Plant #3	Inland Empire Utilities Agency	8.0	16.0	505	10.0	8.0	16.0	8.0	16.0	8.0	16.0	3.3	4.7	7.2	8.8	3.3	4.7	7.2	8.8	3.3	4.7	7.2	8.8	1.7	6.3	3.6	12.4	3.3	4.7	7.2	8.8	1.7	6.3	3.6	12.4
Chino Basin Regional Plant #4	Inland Empire Utilities Agency	7.0	21.0	505	10.0	7.0	21.0	7.0	21.0	7.0	21.0	2.9	4.1	9.5	11.5	2.9	4.1	9.5	11.5	2.9	4.1	9.5	11.5	1.4	5.6	4.7	16.3	2.9	4.1	9.5	11.5	1.4	5.6	4.7	16.3
Chino Basin Regional Plant #5	Inland Empire Utilities Agency	18.0	30.0	390	10.0	18.0	30.0	18.0	30.0	18.0	30.0	7.4	10.6	13.5	16.5	7.4	10.6	13.5	16.5	7.4	10.6	13.5	16.5	3.7	14.3	6.8	23.2	7.4	10.6	13.5	16.5	3.7	14.3	6.8	23.2
Corona WWTP #1	City of Corona	12.0	13.0	703	10.0	12.0	13.0	12.0	13.0	12.0	13.0	4.8	7.2	5.6	7.4	4.8	7.2	5.6	7.4	4.8	7.2	5.6	7.4	2.4	9.6	2.8	10.2	4.8	7.2	5.6	7.4	2.4	9.6	2.8	10.2
Totals (mgd)		229	351			228	351	202	311	217	331	95	133	165	188	84	143	145	206	74	134	125	206	37	191	62	289	98	138	141	210	53	175	79	237
Totals (acre-ft/yr)		255,248	393,456			255,248	393,456	231,840	348,216	243,408	370,832	106,202	149,046	185,162	208,294	94,554	160,694	162,538	230,918	82,794	172,454	139,914	235,542	41,397	213,851	69,957	323,499	109,791	154,457	157,911	235,345	59,394	195,954	87,954	265,502
Changes from Baseline (mgd)								-21	-40	-11	-20		-95		-165		-84		-145		-74		-125		-37		-62		-100		-151		-95		-76
Changes from Baseline (acre-ft/yr)								-23,408	-45,240	-11,760	-22,624		-106,202		-185,162		-94,554		-162,538		-82,794		-139,914		-41,397		-69,957		-109,791		-157,911		-59,394		-87,954

Note: [1] Recycled water production estimates based on Table 5.3-1, *Draft Southern California Comprehensive Water Reclamation and Reuse Study* (Oct 26th Draft, 1998). From 1995 Basin Plan, Chapter 5, Tables 5-4 and 5-5

Table 2b
Estimation of the Maximum Amount of Recycled Water Reuse

Producer	2010					2040				
	--- Recycled Water Production ---			-------- Reused --------		--- Recycled Water Production ---			-------- Reused --------	
	(mgd)	(acre-ft/yr)	% of Total	(acre-ft/yr)	(mgd)	(mgd)	(acre-ft/yr)	% of Total	(acre-ft/yr)	(mgd)
---------- *Western Municipal Water District Service Area* ----------										
Western Riverside Co. WWTPS	12.0	13,442	15%	5,430	4.8	32.0	35,845	30%	15,332	13.7
Riverside Regional WQCP	55.0	61,608	70%	24,886	22.2	60.0	67,209	57%	28,747	25.7
Corona WWTPS #1	12.0	13,442	15%	5,430	4.8	13.0	14,562	12%	6,229	5.6
Subtotal WMWD	79.0	88,492		35,746	31.9	105.0	117,615		50,308	44.9
WMWD Obligation at Prado		17,000					17,000			
Theoretical Maximum Reuse per the 1969 Judgment				71,492	63.8				100,615	89.8
Assumed Maximum Rate of Reuse				50%					50%	
Total Reuse in WMWD Service Area				35,746	31.9				50,308	44.9
---------- *Inland Empire Utilities Agency Service Area* ----------										
Carbon Canyon WRP	10.2	11,426	12%	4,718	4.2	20.2	22,627	13%	10,207	9.1
Chino Basin Regional Plant #1	44.0	49,286	50%	20,354	18.2	68.0	76,170	44%	34,361	30.7
Chino Basin Regional Plant #2	0.0	0	0%	0	0.0	0.0	0	0%	0	0.0
Chino Basin Regional Plant #3	8.0	8,961	9%	3,701	3.3	16.0	17,922	10%	8,085	7.2
Chino Basin Regional Plant #4	7.0	7,841	8%	3,238	2.9	21.0	23,523	14%	10,611	9.5
Chino Basin Regional Plant #5	18.0	20,163	21%	8,327	7.4	30.0	33,604	19%	15,159	13.5
Subtotal IEUA	87.2	97,677		40,338	36.0	155.2	173,847		78,423	70.0
IEUA Obligation at Prado		17,000					17,000			
Theoretical Maximum Reuse per the 1969 Judgment				80,677	72.0				156,847	140.0
Assumed Maximum Rate of Reuse				50%					50%	
Totals in IEUA Service Area	87.2			40,338	36.0	155.2			78,423	70.0
---------- *San Bernardino Valley Municipal Water District Service Area* ----------										
Rialto	12	13,442	19%	6,721	6.0	20	22,403	22%	11,201	10.0
RIX[1]	49.7	55,671	81%	6,000	5.4	71.1	79,642	78%	6,000	5.4
Totals in SBVMWD Service Area	61.7	69,113		12,721	11.4	91.1	102,045		17,201	15.4
Total	227.9	69,113		88,805	79.3	351.3	102,045		145,933	130.3

Note [1] -- reuse in the SBVMWD service area and excludes export from RIX.

Table 3a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 1
Maximum Export of San Bernardino Effluent and No other Recycling

Hydrologic Month and Year	Month	Baseline Total Discharge At Riverside Narrows			Alt 1 Recycled Water Export			Alt 1 Total Discharge At Riverside Narrows			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
10/89	Oct	6,635	564	5	1,952	510	10	4,683	587	3	-1,952	23	-2
11/89	Nov	7,229	559	6	1,952	510	10	5,278	576	5	-1,952	18	-1
12/89	Dec	7,311	564	7	1,952	510	10	5,359	584	5	-1,952	20	-1
1/90	Jan	9,380	560	6	1,952	510	10	7,428	573	5	-1,952	13	-1
2/90	Feb	10,276	580	8	1,952	510	10	8,324	597	7	-1,952	17	-1
3/90	Mar	7,663	574	6	1,952	510	10	5,711	596	4	-1,952	22	-2
4/90	Apr	7,944	564	5	1,952	510	10	5,992	582	3	-1,952	18	-2
5/90	May	7,278	563	5	1,952	510	10	5,326	582	3	-1,952	19	-2
6/90	Jun	6,392	567	3	1,952	510	10	4,441	592	1	-1,952	25	-2
7/90	Jul	5,482	576	1	1,952	510	10	3,530	613	1	-1,952	37	0
8/90	Aug	5,827	564	4	1,952	510	10	3,876	591	1	-1,952	27	-3
9/90	Sep	5,680	569	6	1,952	510	10	3,728	600	5	-1,952	31	-2
10/90	Oct	5,913	560	11	1,952	510	10	3,961	585	11	-1,952	25	0
11/90	Nov	6,032	557	6	1,952	510	10	4,081	580	5	-1,952	23	-2
12/90	Dec	6,894	581	9	1,952	510	10	4,942	609	9	-1,952	28	0
1/91	Jan	8,080	567	4	1,952	510	10	6,128	585	2	-1,952	18	-2
2/91	Feb	13,864	589	10	1,952	510	10	11,913	602	10	-1,952	13	0
3/91	Mar	29,244	233	3	1,952	510	10	27,292	213	2	-1,952	-20	-1
4/91	Apr	7,869	560	2	1,952	510	10	5,918	577	1	-1,952	17	-1
5/91	May	6,093	596	3	1,952	510	10	4,142	636	1	-1,952	40	-2
6/91	Jun	6,358	596	3	1,952	510	10	4,407	634	1	-1,952	38	-2
7/91	Jul	5,121	596	5	1,952	510	10	3,170	649	3	-1,952	53	-3
8/91	Aug	5,102	575	8	1,952	510	10	3,150	615	7	-1,952	40	-1
9/91	Sep	4,893	593	8	1,952	510	10	2,941	647	7	-1,952	55	-1
10/91	Oct	5,520	579	7	1,952	510	10	3,568	617	5	-1,952	38	-2
11/91	Nov	6,179	575	5	1,952	510	10	4,228	605	2	-1,952	30	-3
12/91	Dec	7,570	574	7	1,952	510	10	5,619	597	5	-1,952	22	-1
1/92	Jan	8,974	590	8	1,952	510	10	7,022	613	7	-1,952	22	-1
2/92	Feb	24,183	503	7	1,952	510	10	22,232	502	6	-1,952	-1	0
3/92	Mar	17,232	540	6	1,952	510	10	15,280	543	5	-1,952	4	-1
4/92	Apr	7,017	583	10	1,952	510	10	5,066	611	10	-1,952	28	0
5/92	May	6,338	593	9	1,952	510	10	4,386	630	9	-1,952	37	0
6/92	Jun	5,724	557	8	1,952	510	10	3,772	581	7	-1,952	24	-1
7/92	Jul	5,704	577	10	1,952	510	10	3,752	612	10	-1,952	35	0
8/92	Aug	5,121	580	8	1,952	510	10	3,169	623	8	-1,952	43	-1
9/92	Sep	5,074	575	7	1,952	510	10	3,122	615	5	-1,952	40	-2
10/92	Oct	5,691	579	6	1,952	510	10	3,740	615	4	-1,952	36	-2
11/92	Nov	5,810	567	6	1,952	510	10	3,858	596	4	-1,952	29	-2
12/92	Dec	17,108	444	7	1,952	510	10	15,156	435	6	-1,952	-9	0
1/93	Jan	115,487	340	4	1,952	510	10	113,535	337	3	-1,952	-3	0
2/93	Feb	49,253	254	4	1,952	510	10	47,301	243	4	-1,952	-11	0
3/93	Mar	36,933	279	4	1,952	510	10	34,981	266	3	-1,952	-13	0
4/93	Apr	26,995	323	6	1,952	510	10	25,043	308	6	-1,952	-15	0
5/93	May	17,936	384	6	1,952	510	10	15,985	369	6	-1,952	-15	0
6/93	Jun	9,287	532	9	1,952	510	10	7,335	538	9	-1,952	6	0
7/93	Jul	5,318	624	8	1,952	510	10	3,366	691	7	-1,952	66	-1
8/93	Aug	4,466	639	10	1,952	510	10	2,515	739	10	-1,952	100	0
9/93	Sep	4,954	617	9	1,952	510	10	3,003	687	8	-1,952	70	-1
10/93	Oct	5,112	610	8	1,952	510	10	3,161	672	6	-1,952	62	-1

Table 3a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 1
Maximum Export of San Bernardino Effluent and No other Recycling

Hydrologic Month and Year	Month	Baseline Total Discharge At Riverside Narrows			Alt 1 Recycled Water Export			Alt 1 Total Discharge At Riverside Narrows			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
11/93	Nov	4,957	527	9	1,952	510	10	3,005	538	9	-1,952	11	0
12/93	Dec	6,121	591	8	1,952	510	10	4,169	629	7	-1,952	38	-1
1/94	Jan	6,647	519	7	1,952	510	10	4,695	523	6	-1,952	4	-1
2/94	Feb	12,178	385	8	1,952	510	10	10,226	361	8	-1,952	-24	0
3/94	Mar	11,720	637	8	1,952	510	10	9,769	662	7	-1,952	25	0
4/94	Apr	6,682	560	8	1,952	510	10	4,730	581	7	-1,952	21	-1
5/94	May	5,992	611	9	1,952	510	10	4,041	659	8	-1,952	49	-1
6/94	Jun	4,985	601	10	1,952	510	10	3,034	659	9	-1,952	58	0
7/94	Jul	4,832	617	10	1,952	510	10	2,881	689	10	-1,952	72	0
8/94	Aug	4,630	604	9	1,952	510	10	2,679	673	9	-1,952	69	-1
9/94	Sep	4,586	599	10	1,952	510	10	2,634	666	9	-1,952	66	0
10/94	Oct	6,258	574	8	1,952	510	10	4,307	603	8	-1,952	29	-1
11/94	Nov	7,893	519	9	1,952	510	10	5,941	522	8	-1,952	3	0
12/94	Dec	8,761	542	8	1,952	510	10	6,809	551	8	-1,952	9	0
1/95	Jan	52,989	295	4	1,952	510	10	51,037	287	4	-1,952	-8	0
2/95	Feb	22,910	306	6	1,952	510	10	20,958	287	6	-1,952	-19	0
3/95	Mar	113,440	163	4	1,952	510	10	111,488	157	4	-1,952	-6	0
4/95	Apr	19,494	372	7	1,952	510	10	17,542	357	7	-1,952	-15	0
5/95	May	16,281	408	7	1,952	510	10	14,330	394	6	-1,952	-14	0
6/95	Jun	11,158	493	9	1,952	510	10	9,207	490	9	-1,952	-4	0
7/95	Jul	6,105	598	8	1,952	510	10	4,154	639	8	-1,952	41	-1
8/95	Aug	5,508	621	10	1,952	510	10	3,556	682	10	-1,952	61	0
9/95	Sep	5,124	635	10	1,952	510	10	3,173	713	11	-1,952	77	0
10/95	Oct	5,908	623	9	1,952	510	10	3,957	678	9	-1,952	56	0
11/95	Nov	6,123	612	8	1,952	510	10	4,171	660	7	-1,952	48	-1
12/95	Dec	6,302	577	7	1,952	510	10	4,350	608	6	-1,952	30	-1
1/96	Jan	10,430	506	8	1,952	510	10	8,478	505	8	-1,952	-1	0
2/96	Feb	24,759	229	5	1,952	510	10	22,807	205	5	-1,952	-24	0
3/96	Mar	13,771	358	8	1,952	510	10	11,819	333	7	-1,952	-25	0
4/96	Apr	7,803	594	9	1,952	510	10	5,851	621	8	-1,952	28	0
5/96	May	7,614	629	8	1,952	510	10	5,662	670	8	-1,952	41	-1
6/96	Jun	6,770	625	8	1,952	510	10	4,818	672	7	-1,952	47	-1
7/96	Jul	6,523	614	8	1,952	510	10	4,571	659	7	-1,952	44	-1
8/96	Aug	6,164	585	9	1,952	510	10	4,212	620	8	-1,952	35	-1
9/96	Sep	6,610	532	9	1,952	510	10	4,659	542	8	-1,952	9	-1
10/96	Oct	8,145	592	9	1,952	510	10	6,193	618	9	-1,952	26	0
11/96	Nov	13,604	569	7	1,952	510	10	11,652	579	7	-1,952	10	0
12/96	Dec	11,007	494	8	1,952	510	10	9,056	490	8	-1,952	-3	0
1/97	Jan	38,267	506	5	1,952	510	10	36,315	506	4	-1,952	0	0
2/97	Feb	8,446	582	10	1,952	510	10	6,494	604	10	-1,952	22	0
3/97	Mar	7,767	601	9	1,952	510	10	5,816	632	9	-1,952	31	0
4/97	Apr	7,740	605	9	1,952	510	10	5,789	638	8	-1,952	32	0
5/97	May	6,861	586	9	1,952	510	10	4,909	616	9	-1,952	30	0
6/97	Jun	6,581	604	10	1,952	510	10	4,629	644	10	-1,952	40	0
7/97	Jul	6,135	617	7	1,952	510	10	4,183	667	5	-1,952	50	-1
8/97	Aug	6,016	621	10	1,952	510	10	4,065	674	9	-1,952	53	0
9/97	Sep	6,389	609	10	1,952	510	10	4,437	653	10	-1,952	44	0
10/97	Oct	6,270	602	12	1,952	510	10	4,319	644	13	-1,952	42	1
11/97	Nov	8,034	471	9	1,952	510	10	6,082	459	9	-1,952	-12	0

Table 3a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 1
Maximum Export of San Bernardino Effluent and No other Recycling

Hydrologic Month and Year	Month	Baseline Total Discharge At Riverside Narrows			Alt 1 Recycled Water Export			Alt 1 Total Discharge At Riverside Narrows			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
12/97	Dec	12,818	584	4	1,952	510	10	10,867	597	3	-1,952	13	-1
1/98	Jan	12,873	575	9	1,952	510	10	10,921	586	9	-1,952	12	0
2/98	Feb	74,803	214	4	1,952	510	10	72,851	206	4	-1,952	-8	0
3/98	Mar	17,115	495	7	1,952	510	10	15,164	493	7	-1,952	-2	0
4/98	Apr	20,838	390	6	1,952	510	10	18,886	377	5	-1,952	-12	0
5/98	May	35,188	260	3	1,952	510	10	33,236	245	2	-1,952	-15	0
6/98	Jun	13,896	417	6	1,952	510	10	11,945	402	5	-1,952	-15	-1
7/98	Jul	7,278	586	9	1,952	510	10	5,327	614	9	-1,952	28	0
8/98	Aug	9,029	543	11	1,952	510	10	7,077	552	11	-1,952	9	0
9/98	Sep	8,625	482	9	1,952	510	10	6,674	474	9	-1,952	-8	0
10/98	Oct	7,252	582	10	1,952	510	10	5,301	608	10	-1,952	26	0
11/98	Nov	7,604	548	9	1,952	510	10	5,653	560	8	-1,952	13	0
12/98	Dec	7,719	579	9	1,952	510	10	5,767	603	8	-1,952	23	0
1/99	Jan	8,709	468	7	1,952	510	10	6,757	456	6	-1,952	-12	-1
2/99	Feb	8,206	567	8	1,952	510	10	6,255	585	7	-1,952	18	-1
3/99	Mar	7,840	587	9	1,952	510	10	5,888	612	9	-1,952	25	0
4/99	Apr	8,935	496	8	1,952	510	10	6,983	492	8	-1,952	-4	0
5/99	May	6,863	639	10	1,952	510	10	4,912	690	10	-1,952	51	0
6/99	Jun	7,977	584	11	1,952	510	10	6,026	608	12	-1,952	24	0
7/99	Jul	7,046	534	10	1,952	510	10	5,094	543	10	-1,952	9	0
8/99	Aug	6,823	611	12	1,952	510	10	4,872	651	12	-1,952	40	1
9/99	Sep	6,345	612	12	1,952	510	10	4,394	657	13	-1,952	45	1
Average		12,538	534	7	1,952	510	10	10,587	557	7	-1,952	22	-1
Max		115,487	639	12				113,535	739	13	-1,952	100	1
Min		4,466	163	1				2,515	157	1	-1,952	-25	-3
StDev		16,829	105	2				16,829	126	3	0	25	1
Coef of Var		134%	20%	31%				159%	23%	41%	0%	113%	-109%

Table 3b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 1
Maximum Export of San Bernardino Effluent and No other Recycling

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 1 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
10/89	Oct	21,580	626	7	19,629	637	6.5	-1,952	12	-0.2
11/89	Nov	23,014	610	8	21,063	620	7.9	-1,952	9	-0.1
12/89	Dec	24,040	630	8	22,088	641	8.0	-1,952	11	-0.1
1/90	Jan	28,605	586	8	26,653	591	8.2	-1,952	6	-0.1
2/90	Feb	38,419	516	6	36,467	516	5.9	-1,952	0	-0.2
3/90	Mar	23,466	602	6	21,514	610	5.2	-1,952	8	-0.3
4/90	Apr	22,662	623	7	20,710	634	6.3	-1,952	11	-0.2
5/90	May	22,436	620	7	20,485	630	7.3	-1,952	10	-0.1
6/90	Jun	20,098	624	8	18,147	636	7.7	-1,952	12	0.0
7/90	Jul	18,425	638	7	16,474	653	7.3	-1,952	15	0.6
8/90	Aug	19,244	620	7	17,293	632	7.2	-1,952	12	0.1
9/90	Sep	18,728	626	7	16,776	639	7.0	-1,952	13	0.0
10/90	Oct	20,052	636	7	18,100	649	7.4	-1,952	14	-0.1
11/90	Nov	21,996	620	8	20,045	631	8.0	-1,952	11	0.0
12/90	Dec	22,409	641	8	20,457	654	7.2	-1,952	13	-0.3
1/91	Jan	28,328	598	5	26,376	605	4.8	-1,952	7	-0.3
2/91	Feb	35,568	604	11	33,616	609	10.6	-1,952	5	0.0
3/91	Mar	79,700	378	5	77,748	375	4.5	-1,952	-3	-0.1
4/91	Apr	22,848	548	5	20,896	551	4.6	-1,952	4	-0.1
5/91	May	21,876	578	7	19,925	585	7.7	-1,952	7	0.2
6/91	Jun	21,008	621	7	19,056	632	6.8	-1,952	11	0.0
7/91	Jul	19,067	617	7	17,116	629	7.2	-1,952	12	0.1
8/91	Aug	18,622	610	7	16,671	622	7.3	-1,952	12	0.1
9/91	Sep	17,971	610	7	16,019	623	7.3	-1,952	12	0.2
10/91	Oct	18,405	621	7	16,453	634	6.9	-1,952	13	0.0
11/91	Nov	20,861	638	7	18,909	651	7.3	-1,952	13	-0.1
12/91	Dec	24,800	615	8	22,849	624	8.0	-1,952	9	-0.1
1/92	Jan	31,054	542	9	29,103	544	9.0	-1,952	2	0.0
2/92	Feb	60,156	387	7	58,204	383	7.0	-1,952	-4	-0.1
3/92	Mar	53,778	465	9	51,827	463	8.6	-1,952	-2	0.0
4/92	Apr	23,274	536	6	21,322	538	5.4	-1,952	2	-0.4
5/92	May	22,119	628	7	20,168	639	7.3	-1,952	11	-0.2
6/92	Jun	19,743	630	8	17,791	643	7.5	-1,952	13	0.0
7/92	Jul	19,443	632	8	17,492	645	8.4	-1,952	14	0.1
8/92	Aug	19,107	593	9	17,155	602	8.8	-1,952	9	0.3
9/92	Sep	18,799	628	9	16,847	641	8.9	-1,952	14	0.3
10/92	Oct	21,423	646	8	19,472	660	8.2	-1,952	14	0.1
11/92	Nov	21,410	635	8	19,458	647	7.6	-1,952	13	0.0
12/92	Dec	45,118	480	6	43,166	479	6.3	-1,952	-1	-0.1
1/93	Jan	230,590	273	5	228,638	271	4.5	-1,952	-2	0.0
2/93	Feb	158,366	353	6	156,415	351	5.7	-1,952	-2	0.0
3/93	Mar	64,847	462	5	62,896	461	5.2	-1,952	-1	-0.1
4/93	Apr	42,981	511	7	41,030	511	6.7	-1,952	0	-0.1
5/93	May	32,021	563	7	30,069	566	6.6	-1,952	3	-0.2
6/93	Jun	26,449	619	7	24,498	628	6.4	-1,952	9	-0.3
7/93	Jul	20,510	654	9	18,558	669	9.0	-1,952	15	0.2
8/93	Aug	18,271	659	8	16,319	677	8.0	-1,952	18	0.3
9/93	Sep	17,717	656	8	15,766	674	8.2	-1,952	18	0.3
10/93	Oct	19,962	653	7	18,010	669	7.4	-1,952	16	0.1
11/93	Nov	25,664	639	8	23,712	650	8.6	-1,952	11	0.2

Table 3b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 1
Maximum Export of San Bernardino Effluent and No other Recycling

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 1 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
2/98	Feb	188,541	288	3	186,590	286	3.0	-1,952	-2	-0.1
3/98	Mar	48,221	490	5	46,269	489	4.9	-1,952	-1	-0.2
4/98	Apr	40,920	507	5	38,969	507	5.0	-1,952	0	-0.2
5/98	May	67,078	393	4	65,126	389	3.6	-1,952	-4	-0.2
6/98	Jun	31,108	509	6	29,157	509	5.5	-1,952	0	-0.2
7/98	Jul	21,686	612	7	19,734	622	6.2	-1,952	10	-0.4
8/98	Aug	22,403	608	9	20,452	617	8.9	-1,952	9	-0.1
9/98	Sep	22,490	606	9	20,538	615	8.4	-1,952	9	-0.1
10/98	Oct	22,477	625	8	20,525	636	8.2	-1,952	11	-0.2
11/98	Nov	24,648	617	8	22,696	626	7.6	-1,952	9	-0.2
12/98	Dec	25,148	642	9	23,197	653	9.3	-1,952	11	-0.1
1/99	Jan	29,359	583	8	27,408	588	8.4	-1,952	5	-0.1
2/99	Feb	26,040	589	9	24,088	595	8.5	-1,952	6	-0.1
3/99	Mar	24,969	582	9	23,017	588	9.0	-1,952	6	-0.1
4/99	Apr	28,272	576	8	26,320	581	7.5	-1,952	5	-0.2
5/99	May	23,931	631	8	21,980	642	7.9	-1,952	11	-0.2
6/99	Jun	22,083	636	9	20,132	648	9.0	-1,952	12	-0.1
7/99	Jul	21,339	626	9	19,387	637	8.4	-1,952	12	-0.2
8/99	Aug	19,817	626	9	17,866	638	8.7	-1,952	13	-0.2
9/99	Sep	19,706	626	9	17,754	638	8.8	-1,952	13	-0.1
Average		33,125	583	7.3	31,174	592	7.3	-1,952	8	-0.1
Max		230,590	676	10.6	228,638	692	10.6	-1,952	18	0.6
Min		17,602	273	3.0	15,651	271	2.9	-1,952	-4	-0.4
StDev		31,822	84	1.5	31,822	89	1.6	0.0	6.0	0.2
Coef of Var		96%	14%	21%	102%	15%	22%	0%	72%	-229%
					For August Data Only					
Average		19,261	628	8.1	17,309	642	8.2	-1,952	13	0.1
Max		22,403	659	9.0	20,452	677	9.1	-1,952	18	0.3
Min		17,602	593	7.1	15,651	602	7.2	-1,952	9	-0.2
StDev		1,296	21	0.7	1,296	23	0.7	0	3	0.2
Coef of Var		7%	3%	9%	7%	4%	8%	0%	21%	210%

Table 3c
Annual Flow and TDS Impacts of Exporting Recycled Water from RIX
Year 2010 Alternative 1
Maximum Export of San Bernardino Effluent and No other Recycling

Water Year	Baseline Total Discharge Below Prado Dam				Alternative 1 Total Discharge Below Prado Dam				Difference			
	Annual Average		5 year average		Annual Average		5 year average		Annual Average		5 year average	
	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)
89-90	280,718	603	353,507	540	257,298	612	330,088	542	-23,419	8	-23,419	2
90-91	329,445	551	356,250	535	306,026	555	332,831	537	-23,419	3	-23,419	2
91-92	331,539	541	358,587	531	308,119	543	335,167	532	-23,419	2	-23,419	1
92-93	699,704	416	385,839	517	676,284	413	362,419	518	-23,419	-3	-23,419	0
93-94	290,916	617	386,464	518	267,496	626	363,045	519	-23,419	9	-23,419	1
94-95	555,913	472	441,503	496	532,494	471	418,084	495	-23,419	-2	-23,419	-1
95-96	315,732	578	438,761	499	292,312	583	415,341	499	-23,419	5	-23,419	-1
96-97	319,856	566	436,424	503	296,436	570	413,004	502	-23,419	4	-23,419	0
97-98	563,443	435	409,172	513	540,024	432	385,752	514	-23,419	-3	-23,419	0
98-99	287,788	611	408,546	512	264,369	620	385,127	513	-23,419	9	-23,419	0
Average	397,505	539	397,505	516	374,086	542	374,086	517	-23,419	3	-23,419	0
Max	699,704	617	441,503	540	676,284	626	418,084	542	-23,419	9	-23,419	2
Min	280,718	416	353,507	496	257,298	413	330,088	495	-23,419	-3	-23,419	-1
StDev	150,071	73	34,675	15	150,071	78	34,675	16	0	5	0	1
Coef of Var	38%	14%	9%	3%	40%	14%	9%	3%	0%	143%	0%	208%

Table 4a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 1
Maximum Export of San Bernardino Effluent and No other Recycling

Hydrologic Month and Year	Month	Baseline Total Discharge At Riverside Narrows			Alt 1 Recycled Water Export			Alt 1 Total Discharge At Riverside Narrows			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
10/89	Oct	9,380	547	6	3,773	510	10	5,608	571	4	-3,773	25	-2
11/89	Nov	9,975	544	7	3,773	510	10	6,202	564	5	-3,773	20	-2
12/89	Dec	10,056	548	7	3,773	510	10	6,284	571	6	-3,773	23	-2
1/90	Jan	12,125	547	7	3,773	510	10	8,353	564	6	-3,773	17	-1
2/90	Feb	13,021	564	8	3,773	510	10	9,248	587	8	-3,773	22	-1
3/90	Mar	10,408	556	7	3,773	510	10	6,636	582	5	-3,773	26	-2
4/90	Apr	10,689	549	6	3,773	510	10	6,917	570	4	-3,773	21	-2
5/90	May	10,023	547	6	3,773	510	10	6,251	569	4	-3,773	22	-2
6/90	Jun	9,138	548	5	3,773	510	10	5,365	575	2	-3,773	27	-3
7/90	Jul	8,227	552	4	3,773	510	10	4,455	588	1	-3,773	36	-3
8/90	Aug	8,573	545	6	3,773	510	10	4,800	572	2	-3,773	27	-3
9/90	Sep	8,425	548	8	3,773	510	10	4,653	579	6	-3,773	31	-2
10/90	Oct	8,658	542	10	3,773	510	10	4,886	568	11	-3,773	25	0
11/90	Nov	8,777	541	8	3,773	510	10	5,005	564	6	-3,773	23	-2
12/90	Dec	9,639	559	9	3,773	510	10	5,867	591	9	-3,773	32	0
1/91	Jan	10,825	551	5	3,773	510	10	7,053	573	3	-3,773	22	-3
2/91	Feb	16,610	575	10	3,773	510	10	12,837	594	10	-3,773	19	0
3/91	Mar	31,989	256	4	3,773	510	10	28,217	222	3	-3,773	-34	-1
4/91	Apr	10,615	546	4	3,773	510	10	6,842	566	1	-3,773	20	-3
5/91	May	8,839	567	5	3,773	510	10	5,066	610	1	-3,773	43	-4
6/91	Jun	9,104	568	5	3,773	510	10	5,331	609	2	-3,773	41	-4
7/91	Jul	7,867	564	7	3,773	510	10	4,094	614	4	-3,773	50	-3
8/91	Aug	7,847	550	9	3,773	510	10	4,075	587	7	-3,773	37	-1
9/91	Sep	7,638	561	9	3,773	510	10	3,866	611	8	-3,773	50	-1
10/91	Oct	8,265	554	8	3,773	510	10	4,493	591	6	-3,773	37	-2
11/91	Nov	8,925	553	6	3,773	510	10	5,152	585	3	-3,773	32	-3
12/91	Dec	10,316	556	7	3,773	510	10	6,543	582	6	-3,773	26	-1
1/92	Jan	11,719	570	8	3,773	510	10	7,947	599	7	-3,773	29	-1
2/92	Feb	26,929	503	7	3,773	510	10	23,156	502	7	-3,773	-1	0
3/92	Mar	19,977	535	6	3,773	510	10	16,205	541	6	-3,773	6	-1
4/92	Apr	9,763	561	10	3,773	510	10	5,990	593	10	-3,773	32	0
5/92	May	9,083	566	9	3,773	510	10	5,311	606	9	-3,773	40	0
6/92	Jun	8,469	540	9	3,773	510	10	4,697	564	8	-3,773	24	-1
7/92	Jul	8,449	554	10	3,773	510	10	4,677	589	10	-3,773	35	0
8/92	Aug	7,866	553	9	3,773	510	10	4,093	594	8	-3,773	40	-1
9/92	Sep	7,819	550	8	3,773	510	10	4,047	587	6	-3,773	37	-2
10/92	Oct	8,437	555	7	3,773	510	10	4,664	591	5	-3,773	36	-2
11/92	Nov	8,555	547	7	3,773	510	10	4,782	576	5	-3,773	29	-2
12/92	Dec	19,853	452	7	3,773	510	10	16,080	439	7	-3,773	-14	-1
1/93	Jan	118,232	343	4	3,773	510	10	114,460	338	3	-3,773	-5	0
2/93	Feb	51,998	267	4	3,773	510	10	48,225	248	4	-3,773	-19	0
3/93	Mar	39,678	295	4	3,773	510	10	35,905	272	3	-3,773	-23	-1
4/93	Apr	29,740	339	7	3,773	510	10	25,968	315	6	-3,773	-25	0
5/93	May	20,682	400	7	3,773	510	10	16,909	376	6	-3,773	-24	-1
6/93	Jun	12,032	526	9	3,773	510	10	8,260	533	9	-3,773	7	0
7/93	Jul	8,063	584	9	3,773	510	10	4,291	648	8	-3,773	65	-1
8/93	Aug	7,212	588	10	3,773	510	10	3,439	673	10	-3,773	85	0
9/93	Sep	7,700	577	9	3,773	510	10	3,927	642	9	-3,773	64	-1
10/93	Oct	7,858	573	9	3,773	510	10	4,085	632	7	-3,773	58	-1

Table 4a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 1
Maximum Export of San Bernardino Effluent and No other Recycling

Hydrologic Month and Year	Month	Baseline			Alt 1						Difference		
		Total Discharge At Riverside Narrows			Recycled Water Export			Total Discharge At Riverside Narrows					
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
11/93	Nov	7,702	519	10	3,773	510	10	3,930	528	9	-3,773	9	0
12/93	Dec	8,866	564	9	3,773	510	10	5,094	605	8	-3,773	40	-1
1/94	Jan	9,392	515	8	3,773	510	10	5,619	518	7	-3,773	3	-1
2/94	Feb	14,923	407	8	3,773	510	10	11,150	372	8	-3,773	-35	-1
3/94	Mar	14,466	612	8	3,773	510	10	10,693	648	8	-3,773	36	-1
4/94	Apr	9,427	544	9	3,773	510	10	5,654	567	8	-3,773	23	-1
5/94	May	8,738	577	9	3,773	510	10	4,965	629	8	-3,773	51	-1
6/94	Jun	7,731	567	10	3,773	510	10	3,958	620	10	-3,773	54	0
7/94	Jul	7,578	576	10	3,773	510	10	3,805	642	10	-3,773	66	0
8/94	Aug	7,376	567	10	3,773	510	10	3,603	627	9	-3,773	60	-1
9/94	Sep	7,331	564	10	3,773	510	10	3,559	621	9	-3,773	57	0
10/94	Oct	9,004	553	9	3,773	510	10	5,231	584	8	-3,773	31	-1
11/94	Nov	10,638	516	9	3,773	510	10	6,865	519	8	-3,773	3	-1
12/94	Dec	11,506	533	9	3,773	510	10	7,734	544	8	-3,773	11	-1
1/95	Jan	55,734	306	5	3,773	510	10	51,962	291	4	-3,773	-15	0
2/95	Feb	25,655	327	7	3,773	510	10	21,883	296	6	-3,773	-31	-1
3/95	Mar	116,185	171	4	3,773	510	10	112,412	160	4	-3,773	-11	0
4/95	Apr	22,239	388	8	3,773	510	10	18,467	363	7	-3,773	-25	0
5/95	May	19,027	422	7	3,773	510	10	15,254	400	7	-3,773	-22	-1
6/95	Jun	13,904	496	9	3,773	510	10	10,131	490	9	-3,773	-5	0
7/95	Jul	8,850	569	9	3,773	510	10	5,078	613	8	-3,773	44	-1
8/95	Aug	8,253	583	10	3,773	510	10	4,481	644	10	-3,773	61	0
9/95	Sep	7,870	590	10	3,773	510	10	4,097	663	11	-3,773	73	0
10/95	Oct	8,654	585	9	3,773	510	10	4,881	643	9	-3,773	58	0
11/95	Nov	8,868	579	9	3,773	510	10	5,096	630	8	-3,773	51	-1
12/95	Dec	9,047	555	8	3,773	510	10	5,274	588	7	-3,773	32	-1
1/96	Jan	13,175	505	9	3,773	510	10	9,402	504	8	-3,773	-2	-1
2/96	Feb	27,504	257	6	3,773	510	10	23,731	216	5	-3,773	-40	-1
3/96	Mar	16,516	382	8	3,773	510	10	12,743	345	7	-3,773	-38	-1
4/96	Apr	10,548	570	9	3,773	510	10	6,776	604	8	-3,773	34	-1
5/96	May	10,359	596	9	3,773	510	10	6,586	645	8	-3,773	49	-1
6/96	Jun	9,515	590	9	3,773	510	10	5,742	643	8	-3,773	53	-1
7/96	Jul	9,268	582	9	3,773	510	10	5,495	631	8	-3,773	49	-1
8/96	Aug	8,909	560	9	3,773	510	10	5,137	597	9	-3,773	37	-1
9/96	Sep	9,356	524	9	3,773	510	10	5,583	534	9	-3,773	10	-1
10/96	Oct	10,890	570	9	3,773	510	10	7,118	602	9	-3,773	32	0
11/96	Nov	16,349	558	8	3,773	510	10	12,577	572	7	-3,773	14	-1
12/96	Dec	13,753	496	9	3,773	510	10	9,980	491	8	-3,773	-5	-1
1/97	Jan	41,012	506	5	3,773	510	10	37,239	506	5	-3,773	0	-1
2/97	Feb	11,191	563	10	3,773	510	10	7,419	590	10	-3,773	27	0
3/97	Mar	10,513	576	9	3,773	510	10	6,740	613	9	-3,773	37	0
4/97	Apr	10,486	579	9	3,773	510	10	6,713	618	8	-3,773	39	-1
5/97	May	9,606	563	9	3,773	510	10	5,834	597	9	-3,773	34	0
6/97	Jun	9,326	575	10	3,773	510	10	5,554	619	10	-3,773	44	0
7/97	Jul	8,880	582	8	3,773	510	10	5,107	636	6	-3,773	53	-2
8/97	Aug	8,762	584	10	3,773	510	10	4,989	641	10	-3,773	56	0
9/97	Sep	9,134	578	10	3,773	510	10	5,362	625	10	-3,773	48	0
10/97	Oct	9,016	573	11	3,773	510	10	5,243	617	12	-3,773	45	1
11/97	Nov	10,779	480	9	3,773	510	10	7,007	463	9	-3,773	-16	0

Table 4a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 1
Maximum Export of San Bernardino Effluent and No other Recycling

Hydrologic Month and Year	Month	Baseline Total Discharge At Riverside Narrows			Alt 1 Recycled Water Export			Alt 1 Total Discharge At Riverside Narrows			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
12/97	Dec	15,564	570	5	3,773	510	10	11,791	589	3	-3,773	19	-2
1/98	Jan	15,618	562	9	3,773	510	10	11,846	579	9	-3,773	17	0
2/98	Feb	77,548	225	4	3,773	510	10	73,776	210	4	-3,773	-15	0
3/98	Mar	19,861	497	8	3,773	510	10	16,088	493	7	-3,773	-3	-1
4/98	Apr	23,583	403	6	3,773	510	10	19,811	383	5	-3,773	-20	-1
5/98	May	37,933	278	3	3,773	510	10	34,161	252	3	-3,773	-26	-1
6/98	Jun	16,641	432	6	3,773	510	10	12,869	409	5	-3,773	-23	-1
7/98	Jul	10,024	564	9	3,773	510	10	6,251	597	9	-3,773	33	0
8/98	Aug	11,774	534	10	3,773	510	10	8,002	546	11	-3,773	11	0
9/98	Sep	11,371	487	9	3,773	510	10	7,598	476	9	-3,773	-11	0
10/98	Oct	9,998	561	10	3,773	510	10	6,225	591	10	-3,773	31	0
11/98	Nov	10,350	536	9	3,773	510	10	6,577	551	8	-3,773	15	-1
12/98	Dec	10,464	560	9	3,773	510	10	6,691	588	8	-3,773	28	-1
1/99	Jan	11,454	477	7	3,773	510	10	7,682	461	6	-3,773	-16	-1
2/99	Feb	10,952	552	8	3,773	510	10	7,179	573	8	-3,773	22	-1
3/99	Mar	10,585	565	9	3,773	510	10	6,813	596	9	-3,773	31	0
4/99	Apr	11,680	498	9	3,773	510	10	7,907	492	8	-3,773	-6	-1
5/99	May	9,609	600	10	3,773	510	10	5,836	659	10	-3,773	58	0
6/99	Jun	10,723	564	11	3,773	510	10	6,950	593	12	-3,773	29	1
7/99	Jul	9,791	526	10	3,773	510	10	6,019	535	10	-3,773	10	0
8/99	Aug	9,568	580	11	3,773	510	10	5,796	626	12	-3,773	46	1
9/99	Sep	9,091	580	12	3,773	510	10	5,318	629	13	-3,773	49	1
Average		15,284	519	8	3,773	510	10	11,511	541	7	-3,773	22	-1
Max		118,232	612	12				114,460	673	13	-3,773	85	1
Min		7,212	171	3				3,439	160	1	-3,773	-40	-4
StDev		16,829	90	2				16,829	113	3	0	27	1
Coef of Var		110%	17%	24%				146%	21%	36%	0%	124%	-108%

Table 4b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 1
Maximum Export of San Bernardino Effluent and No other Recycling

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 1 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
10/89	Oct	33,103	599	8	29,331	610	7.5	-3,773	11	-0.2
11/89	Nov	34,537	589	9	30,765	599	8.5	-3,773	10	-0.1
12/89	Dec	35,563	604	9	31,790	615	8.6	-3,773	11	-0.1
1/90	Jan	40,128	575	9	36,355	581	8.6	-3,773	7	-0.1
2/90	Feb	49,942	523	7	46,169	524	6.7	-3,773	1	-0.2
3/90	Mar	34,988	584	7	31,216	593	6.6	-3,773	9	-0.3
4/90	Apr	34,185	598	8	30,412	609	7.4	-3,773	11	-0.2
5/90	May	33,959	595	8	30,187	606	8.1	-3,773	11	-0.2
6/90	Jun	31,621	596	8	27,849	608	8.2	-3,773	12	-0.1
7/90	Jul	29,948	603	8	26,176	616	7.8	-3,773	13	0.0
8/90	Aug	30,767	593	8	26,995	604	7.9	-3,773	12	-0.2
9/90	Sep	30,251	596	8	26,478	608	7.9	-3,773	12	-0.2
10/90	Oct	31,575	603	8	27,802	616	8.2	-3,773	13	-0.3
11/90	Nov	33,519	595	9	29,747	606	8.5	-3,773	11	-0.1
12/90	Dec	33,932	609	8	30,159	622	8.2	-3,773	12	-0.2
1/91	Jan	39,851	584	6	36,078	591	6.1	-3,773	8	-0.3
2/91	Feb	47,091	590	10	43,319	597	10.5	-3,773	7	0.0
3/91	Mar	91,223	400	5	87,450	395	5.1	-3,773	-5	-0.2
4/91	Apr	34,371	548	6	30,599	552	6.0	-3,773	5	-0.3
5/91	May	33,399	568	8	29,627	575	8.1	-3,773	7	-0.1
6/91	Jun	32,531	595	8	28,758	606	7.6	-3,773	11	-0.2
7/91	Jul	30,590	591	8	26,818	602	7.9	-3,773	11	-0.2
8/91	Aug	30,145	586	8	26,373	597	8.0	-3,773	11	-0.3
9/91	Sep	29,494	586	8	25,721	597	8.0	-3,773	11	-0.3
10/91	Oct	29,927	592	8	26,155	604	7.8	-3,773	12	-0.3
11/91	Nov	32,384	606	8	28,612	618	8.1	-3,773	13	-0.2
12/91	Dec	36,323	593	9	32,551	603	8.6	-3,773	10	-0.1
1/92	Jan	42,577	544	9	38,805	547	9.2	-3,773	3	-0.1
2/92	Feb	71,679	413	8	67,906	407	7.4	-3,773	-5	-0.1
3/92	Mar	65,301	479	9	61,529	478	8.7	-3,773	-2	0.0
4/92	Apr	34,797	540	7	31,024	543	6.9	-3,773	4	-0.4
5/92	May	33,642	600	8	29,870	612	8.1	-3,773	11	-0.2
6/92	Jun	31,266	600	8	27,493	612	8.2	-3,773	12	-0.2
7/92	Jul	30,966	600	9	27,194	613	8.8	-3,773	13	-0.2
8/92	Aug	30,630	576	9	26,857	585	9.0	-3,773	9	-0.1
9/92	Sep	30,322	597	9	26,549	610	9.0	-3,773	12	-0.1
10/92	Oct	32,946	612	9	29,174	625	8.6	-3,773	13	-0.1
11/92	Nov	32,933	604	8	29,160	617	8.2	-3,773	12	-0.2
12/92	Dec	56,641	494	7	52,868	493	6.9	-3,773	-1	-0.2
1/93	Jan	242,113	286	5	238,340	283	4.8	-3,773	-4	-0.1
2/93	Feb	169,889	366	6	166,117	363	5.9	-3,773	-3	-0.1
3/93	Mar	76,370	475	6	72,598	473	5.8	-3,773	-2	-0.2
4/93	Apr	54,504	518	7	50,732	519	7.3	-3,773	1	-0.2
5/93	May	43,544	559	8	39,771	563	7.4	-3,773	5	-0.2
6/93	Jun	37,972	597	8	34,200	607	7.4	-3,773	10	-0.3
7/93	Jul	32,033	616	9	28,260	630	9.1	-3,773	14	-0.1
8/93	Aug	29,794	616	9	26,021	632	8.4	-3,773	15	-0.2
9/93	Sep	29,240	613	9	25,468	628	8.5	-3,773	15	-0.2
10/93	Oct	31,485	614	8	27,712	629	8.0	-3,773	14	-0.2
11/93	Nov	37,187	611	9	33,415	622	8.8	-3,773	11	-0.1

Table 4b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 1
Maximum Export of San Bernardino Effluent and No other Recycling

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 1 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
12/93	Dec	36,468	575	9	32,695	582	8.6	-3,773	7	-0.1
1/94	Jan	36,576	606	9	32,803	617	8.8	-3,773	11	-0.1
2/94	Feb	51,579	505	7	47,806	505	7.0	-3,773	0	-0.2
3/94	Mar	46,486	630	8	42,714	640	8.1	-3,773	11	-0.1
4/94	Apr	36,085	606	8	32,312	617	8.0	-3,773	11	-0.2
5/94	May	33,877	609	8	30,104	621	7.5	-3,773	12	-0.3
6/94	Jun	30,782	609	7	27,010	622	7.1	-3,773	14	-0.4
7/94	Jul	30,015	610	8	26,242	624	7.7	-3,773	14	-0.3
8/94	Aug	29,125	601	9	25,353	615	8.4	-3,773	14	-0.2
9/94	Sep	29,527	598	9	25,754	611	8.5	-3,773	13	-0.2
10/94	Oct	32,531	595	9	28,758	606	8.8	-3,773	11	-0.1
11/94	Nov	33,724	601	9	29,952	612	9.4	-3,773	11	-0.1
12/94	Dec	35,170	609	9	31,398	621	8.7	-3,773	12	-0.1
1/95	Jan	129,180	389	6	125,407	386	6.4	-3,773	-4	-0.1
2/95	Feb	57,028	521	7	53,255	521	6.7	-3,773	1	-0.2
3/95	Mar	164,743	357	5	160,971	354	5.1	-3,773	-4	-0.1
4/95	Apr	59,992	536	6	56,220	538	5.7	-3,773	2	-0.3
5/95	May	47,497	570	7	43,725	575	6.5	-3,773	5	-0.3
6/95	Jun	42,977	563	7	39,204	568	6.6	-3,773	5	-0.3
7/95	Jul	30,009	587	8	26,236	599	7.5	-3,773	11	-0.3
8/95	Aug	30,682	610	9	26,909	624	8.7	-3,773	14	-0.2
9/95	Sep	30,655	607	9	26,883	620	8.5	-3,773	14	-0.2
10/95	Oct	31,821	603	9	28,049	615	8.6	-3,773	13	-0.2
11/95	Nov	33,153	605	9	29,380	617	8.7	-3,773	12	-0.1
12/95	Dec	35,466	581	9	31,694	589	9.0	-3,773	8	-0.1
1/96	Jan	39,242	598	9	35,469	607	9.4	-3,773	9	-0.1
2/96	Feb	74,040	405	6	70,268	399	5.9	-3,773	-6	-0.2
3/96	Mar	45,364	544	7	41,591	547	6.7	-3,773	3	-0.3
4/96	Apr	35,871	625	9	32,098	638	8.4	-3,773	14	-0.2
5/96	May	34,025	633	9	30,253	648	9.4	-3,773	15	-0.1
6/96	Jun	31,666	618	9	27,894	633	9.3	-3,773	15	-0.1
7/96	Jul	30,519	621	9	26,747	637	9.2	-3,773	16	-0.1
8/96	Aug	31,331	603	9	27,558	616	9.3	-3,773	13	-0.1
9/96	Sep	31,509	597	9	27,736	609	9.3	-3,773	12	-0.1
10/96	Oct	33,915	601	10	30,143	612	9.6	-3,773	11	-0.1
11/96	Nov	41,974	549	6	38,202	553	5.7	-3,773	4	-0.4
12/96	Dec	44,343	542	6	40,570	545	5.4	-3,773	3	-0.4
1/97	Jan	73,408	424	5	69,635	419	4.5	-3,773	-5	-0.3
2/97	Feb	37,252	584	9	33,480	592	8.5	-3,773	8	-0.2
3/97	Mar	35,914	600	10	32,141	610	9.5	-3,773	11	-0.1
4/97	Apr	34,120	596	10	30,347	607	9.5	-3,773	11	-0.1
5/97	May	32,974	601	9	29,201	612	9.0	-3,773	12	-0.1
6/97	Jun	32,361	592	9	28,588	603	9.1	-3,773	11	-0.1
7/97	Jul	30,657	600	9	26,885	612	8.6	-3,773	13	-0.2
8/97	Aug	30,097	608	9	26,325	623	8.5	-3,773	14	-0.2
9/97	Sep	31,117	604	8	27,345	617	7.3	-3,773	13	-0.4
10/97	Oct	32,217	595	10	28,445	606	10.3	-3,773	11	0.0
11/97	Nov	37,330	563	8	33,558	569	7.5	-3,773	6	-0.3
12/97	Dec	48,055	508	5	44,282	508	4.4	-3,773	0	-0.4
1/98	Jan	49,485	489	7	45,713	487	6.9	-3,773	-2	-0.2

Table 4b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 1
Maximum Export of San Bernardino Effluent and No other Recycling

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 1 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
2/98	Feb	200,064	303	3	196,292	299	3.3	-3,773	-4	-0.1
3/98	Mar	59,744	501	6	55,971	501	5.8	-3,773	-1	-0.2
4/98	Apr	52,443	516	6	48,671	517	5.9	-3,773	0	-0.3
5/98	May	78,601	415	5	74,828	411	4.4	-3,773	-5	-0.2
6/98	Jun	42,631	520	7	38,859	521	6.6	-3,773	1	-0.3
7/98	Jul	33,209	590	8	29,437	600	7.5	-3,773	10	-0.3
8/98	Aug	33,926	587	9	30,154	597	9.3	-3,773	10	-0.1
9/98	Sep	34,013	586	9	30,240	595	8.9	-3,773	9	-0.1
10/98	Oct	34,000	599	9	30,227	610	8.8	-3,773	11	-0.2
11/98	Nov	36,171	595	8	32,398	604	8.3	-3,773	10	-0.2
12/98	Dec	36,671	612	10	32,899	624	9.5	-3,773	12	-0.1
1/99	Jan	40,882	573	9	37,110	579	8.8	-3,773	6	-0.1
2/99	Feb	37,563	576	9	33,790	584	8.9	-3,773	7	-0.1
3/99	Mar	36,492	571	9	32,719	578	9.3	-3,773	7	-0.1
4/99	Apr	39,795	568	8	36,022	574	8.1	-3,773	6	-0.2
5/99	May	35,454	604	9	31,682	615	8.6	-3,773	11	-0.2
6/99	Jun	33,606	605	10	29,834	618	9.4	-3,773	12	-0.1
7/99	Jul	32,862	598	9	29,089	610	9.0	-3,773	11	-0.1
8/99	Aug	31,340	597	9	27,568	609	9.2	-3,773	12	-0.1
9/99	Sep	31,229	597	9	27,456	609	9.3	-3,773	12	-0.1
Average		44,648	566	8.1	40,876	574	7.9	-3,773	8	-0.2
Max		242,113	633	10.5	238,340	648	10.5	-3,773	16	0.0
Min		29,125	286	3.4	25,353	283	3.3	-3,773	-6	-0.4
StDev		31,822	67	1.3	31,822	73	1.4	0.0	5.7	0.1
Coef of Var		71%	12%	16%	78%	13%	17%	0%	70%	-49%
				For August Data Only						
Average		30,784	598	8.8	27,011	610	8.7	-3,773	12	-0.2
Max		33,926	616	9.4	30,154	632	9.3	-3,773	15	-0.1
Min		29,125	576	8.1	25,353	585	7.9	-3,773	9	-0.3
StDev		1,296	12	0.5	1,296	14	0.5	0	2	0.1
Coef of Var		4%	2%	5%	5%	2%	6%	0%	16%	-32%

Table 4c
Annual Flow and TDS Impacts of Exporting Recycled Water from RIX
Year 2040 Alternative 1
Maximum Export of San Bernardino Effluent and No other Recycling

Water Year	Baseline Total Discharge Below Prado Dam				Alternative 1 Total Discharge Below Prado Dam				Difference			
	Annual Average		Five-year average		Annual Average		Five-year average		Annual Average		Five-year average	
	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)
89-90	418,993	585	491,783	542	373,723	594	446,513	545	-45,270	9	-45,270	3
90-91	467,721	550	494,526	538	422,451	555	449,256	541	-45,270	4	-45,270	3
91-92	469,815	543	496,863	535	424,545	546	451,592	538	-45,270	3	-45,270	3
92-93	837,979	438	524,115	525	792,709	434	478,844	527	-45,270	-4	-45,270	1
93-94	429,192	595	524,740	526	383,921	605	479,470	527	-45,270	10	-45,270	1
94-95	694,189	487	579,779	508	648,919	486	534,509	508	-45,270	-2	-45,270	0
95-96	454,007	569	577,036	511	408,737	575	531,766	511	-45,270	6	-45,270	0
96-97	458,132	560	574,700	513	412,861	566	529,430	514	-45,270	6	-45,270	0
97-98	701,719	457	547,448	522	656,449	453	502,178	523	-45,270	-4	-45,270	1
98-99	426,064	591	546,822	521	380,794	600	501,552	522	-45,270	10	-45,270	1
Average	535,781	537	535,781	524	490,511	541	490,511	526	-45,270	4	-45,270	1
Max	837,979	595	579,779	542	792,709	605	534,509	545	-45,270	10	-45,270	3
Min	418,993	438	491,783	508	373,723	434	446,513	508	-45,270	-4	-45,270	0
StDev	150,071	57	34,675	12	150,071	62	34,675	13	0	5	0	1
Coef of Var	28%	11%	6%	2%	31%	11%	7%	2%	0%	137%	0%	85%

Table 5a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 2
Intermediate Export of San Bernardino Effluent and No other Recycling

Hydrologic Month and Year	Month	Baseline Total Discharge At Riverside Narrows			Alt 2 Recycled Water Export			Alt 2 Total Discharge At Riverside Narrows			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
10/89	Oct	6,635	564	5	980	510	10	5,654	573	4	-980	9	-1
11/89	Nov	7,229	559	6	980	510	10	6,249	566	5	-980	8	-1
12/89	Dec	7,311	564	7	980	510	10	6,331	573	6	-980	8	-1
1/90	Jan	9,380	560	6	980	510	10	8,400	565	6	-980	6	0
2/90	Feb	10,276	580	8	980	510	10	9,295	588	8	-980	7	0
3/90	Mar	7,663	574	6	980	510	10	6,682	584	5	-980	9	-1
4/90	Apr	7,944	564	5	980	510	10	6,963	572	4	-980	8	-1
5/90	May	7,278	563	5	980	510	10	6,297	571	4	-980	8	-1
6/90	Jun	6,392	567	3	980	510	10	5,412	578	2	-980	10	-1
7/90	Jul	5,482	576	1	980	510	10	4,502	591	1	-980	14	0
8/90	Aug	5,827	564	4	980	510	10	4,847	575	2	-980	11	-1
9/90	Sep	5,680	569	6	980	510	10	4,700	582	6	-980	12	-1
10/90	Oct	5,913	560	11	980	510	10	4,933	570	11	-980	10	0
11/90	Nov	6,032	557	6	980	510	10	5,052	566	6	-980	9	-1
12/90	Dec	6,894	581	9	980	510	10	5,914	593	9	-980	12	0
1/91	Jan	8,080	567	4	980	510	10	7,100	575	3	-980	8	-1
2/91	Feb	13,864	589	10	980	510	10	12,884	595	10	-980	6	0
3/91	Mar	29,244	233	3	980	510	10	28,263	223	3	-980	-10	0
4/91	Apr	7,869	560	2	980	510	10	6,889	567	1	-980	7	-1
5/91	May	6,093	596	3	980	510	10	5,113	612	1	-980	16	-1
6/91	Jun	6,358	596	3	980	510	10	5,378	611	2	-980	16	-1
7/91	Jul	5,121	596	5	980	510	10	4,141	616	4	-980	20	-1
8/91	Aug	5,102	575	8	980	510	10	4,121	590	7	-980	15	0
9/91	Sep	4,893	593	8	980	510	10	3,912	613	8	-980	21	0
10/91	Oct	5,520	579	7	980	510	10	4,539	594	6	-980	15	-1
11/91	Nov	6,179	575	5	980	510	10	5,199	588	4	-980	12	-1
12/91	Dec	7,570	574	7	980	510	10	6,590	584	6	-980	10	-1
1/92	Jan	8,974	590	8	980	510	10	7,994	600	7	-980	10	0
2/92	Feb	24,183	503	7	980	510	10	23,203	502	7	-980	0	0
3/92	Mar	17,232	540	6	980	510	10	16,251	541	6	-980	2	0
4/92	Apr	7,017	583	10	980	510	10	6,037	594	10	-980	12	0
5/92	May	6,338	593	9	980	510	10	5,357	608	9	-980	15	0
6/92	Jun	5,724	557	8	980	510	10	4,743	567	8	-980	10	0
7/92	Jul	5,704	577	10	980	510	10	4,723	591	10	-980	14	0
8/92	Aug	5,121	580	8	980	510	10	4,140	596	8	-980	17	0
9/92	Sep	5,074	575	7	980	510	10	4,093	590	7	-980	15	-1
10/92	Oct	5,691	579	6	980	510	10	4,711	593	5	-980	14	-1
11/92	Nov	5,810	567	6	980	510	10	4,829	579	5	-980	12	-1
12/92	Dec	17,108	444	7	980	510	10	16,127	440	7	-980	-4	0
1/93	Jan	115,487	340	4	980	510	10	114,507	338	3	-980	-1	0
2/93	Feb	49,253	254	4	980	510	10	48,272	249	4	-980	-5	0
3/93	Mar	36,933	279	4	980	510	10	35,952	273	3	-980	-6	0
4/93	Apr	26,995	323	6	980	510	10	26,014	315	6	-980	-7	0
5/93	May	17,936	384	6	980	510	10	16,956	377	6	-980	-7	0
6/93	Jun	9,287	532	9	980	510	10	8,306	535	9	-980	3	0
7/93	Jul	5,318	624	8	980	510	10	4,338	650	8	-980	26	0
8/93	Aug	4,466	639	10	980	510	10	3,486	675	10	-980	36	0
9/93	Sep	4,954	617	9	980	510	10	3,974	644	9	-980	26	0
10/93	Oct	5,112	610	8	980	510	10	4,132	634	7	-980	24	-1

Table 5a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 2
Intermediate Export of San Bernardino Effluent and No other Recycling

Hydrologic Month and Year	Month	Baseline Total Discharge At Riverside Narrows			Alt 2 Recycled Water Export			Alt 2 Total Discharge At Riverside Narrows			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
11/93	Nov	4,957	527	9	980	510	10	3,976	531	9	-980	4	0
12/93	Dec	6,121	591	8	980	510	10	5,140	607	8	-980	15	0
1/94	Jan	6,647	519	7	980	510	10	5,666	521	7	-980	2	0
2/94	Feb	12,178	385	8	980	510	10	11,197	374	8	-980	-11	0
3/94	Mar	11,720	637	8	980	510	10	10,740	649	8	-980	12	0
4/94	Apr	6,682	560	8	980	510	10	5,701	569	8	-980	9	0
5/94	May	5,992	611	9	980	510	10	5,012	630	8	-980	20	0
6/94	Jun	4,985	601	10	980	510	10	4,005	623	10	-980	22	0
7/94	Jul	4,832	617	10	980	510	10	3,852	644	10	-980	27	0
8/94	Aug	4,630	604	9	980	510	10	3,650	630	9	-980	25	0
9/94	Sep	4,586	599	10	980	510	10	3,606	624	9	-980	24	0
10/94	Oct	6,258	574	8	980	510	10	5,278	586	8	-980	12	0
11/94	Nov	7,893	519	9	980	510	10	6,912	521	8	-980	1	0
12/94	Dec	8,761	542	8	980	510	10	7,781	546	8	-980	4	0
1/95	Jan	52,989	295	4	980	510	10	52,008	291	4	-980	-4	0
2/95	Feb	22,910	306	6	980	510	10	21,929	297	6	-980	-9	0
3/95	Mar	113,440	163	4	980	510	10	112,459	160	4	-980	-3	0
4/95	Apr	19,494	372	7	980	510	10	18,513	365	7	-980	-7	0
5/95	May	16,281	408	7	980	510	10	15,301	401	7	-980	-7	0
6/95	Jun	11,158	493	9	980	510	10	10,178	492	9	-980	-2	0
7/95	Jul	6,105	598	8	980	510	10	5,125	615	8	-980	17	0
8/95	Aug	5,508	621	10	980	510	10	4,527	645	10	-980	24	0
9/95	Sep	5,124	635	10	980	510	10	4,144	665	11	-980	30	0
10/95	Oct	5,908	623	9	980	510	10	4,928	645	9	-980	22	0
11/95	Nov	6,123	612	8	980	510	10	5,142	632	8	-980	20	0
12/95	Dec	6,302	577	7	980	510	10	5,321	590	7	-980	12	0
1/96	Jan	10,430	506	8	980	510	10	9,449	505	8	-980	0	0
2/96	Feb	24,759	229	5	980	510	10	23,778	218	5	-980	-12	0
3/96	Mar	13,771	358	8	980	510	10	12,790	346	7	-980	-12	0
4/96	Apr	7,803	594	9	980	510	10	6,823	606	8	-980	12	0
5/96	May	7,614	629	8	980	510	10	6,633	646	8	-980	18	0
6/96	Jun	6,770	625	8	980	510	10	5,789	645	8	-980	20	0
7/96	Jul	6,523	614	8	980	510	10	5,542	633	8	-980	18	0
8/96	Aug	6,164	585	9	980	510	10	5,184	600	9	-980	14	0
9/96	Sep	6,610	532	9	980	510	10	5,630	536	9	-980	4	0
10/96	Oct	8,145	592	9	980	510	10	7,164	603	9	-980	11	0
11/96	Nov	13,604	569	7	980	510	10	12,624	573	7	-980	5	0
12/96	Dec	11,007	494	8	980	510	10	10,027	492	8	-980	-2	0
1/97	Jan	38,267	506	5	980	510	10	37,286	506	5	-980	0	0
2/97	Feb	8,446	582	10	980	510	10	7,466	591	10	-980	9	0
3/97	Mar	7,767	601	9	980	510	10	6,787	614	9	-980	13	0
4/97	Apr	7,740	605	9	980	510	10	6,760	619	8	-980	14	0
5/97	May	6,861	586	9	980	510	10	5,880	599	9	-980	13	0
6/97	Jun	6,581	604	10	980	510	10	5,600	621	10	-980	17	0
7/97	Jul	6,135	617	7	980	510	10	5,154	638	6	-980	20	-1
8/97	Aug	6,016	621	10	980	510	10	5,036	642	10	-980	22	0
9/97	Sep	6,389	609	10	980	510	10	5,408	627	10	-980	18	0
10/97	Oct	6,270	602	12	980	510	10	5,290	619	12	-980	17	0
11/97	Nov	8,034	471	9	980	510	10	7,053	466	9	-980	-5	0

Table 5b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 2
Intermediate Export of San Bernardino Effluent and No other Recycling

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 2 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
10/89	Oct	21,580	626	7	20,600	631	6.6	-980	6	-0.1
11/89	Nov	23,014	610	8	22,034	615	8.0	-980	4	-0.1
12/89	Dec	24,040	630	8	23,060	636	8.1	-980	5	-0.1
1/90	Jan	28,605	586	8	27,624	588	8.2	-980	3	0.0
2/90	Feb	38,419	516	6	37,438	516	6.0	-980	0	-0.1
3/90	Mar	23,466	602	6	22,485	606	5.4	-980	4	-0.2
4/90	Apr	22,662	623	7	21,682	628	6.5	-980	5	-0.1
5/90	May	22,436	620	7	21,456	625	7.4	-980	5	-0.1
6/90	Jun	20,098	624	8	19,118	629	7.6	-980	6	-0.1
7/90	Jul	18,425	638	7	17,445	645	6.9	-980	7	0.2
8/90	Aug	19,244	620	7	18,264	626	7.0	-980	6	-0.1
9/90	Sep	18,728	626	7	17,748	632	6.9	-980	6	-0.1
10/90	Oct	20,052	636	7	19,071	642	7.3	-980	6	-0.2
11/90	Nov	21,996	620	8	21,016	625	7.9	-980	5	-0.1
12/90	Dec	22,409	641	8	21,428	647	7.4	-980	6	-0.1
1/91	Jan	28,328	598	5	27,347	601	4.9	-980	3	-0.1
2/91	Feb	35,568	604	11	34,588	606	10.6	-980	3	0.0
3/91	Mar	79,700	378	5	78,719	377	4.6	-980	-2	-0.1
4/91	Apr	22,848	548	5	21,868	550	4.5	-980	2	-0.2
5/91	May	21,876	578	7	20,896	582	7.4	-980	3	-0.1
6/91	Jun	21,008	621	7	20,027	626	6.7	-980	5	-0.1
7/91	Jul	19,067	617	7	18,087	622	7.1	-980	6	0.0
8/91	Aug	18,622	610	7	17,642	616	7.2	-980	6	0.0
9/91	Sep	17,971	610	7	16,990	616	7.2	-980	6	0.1
10/91	Oct	18,405	621	7	17,424	627	6.8	-980	6	-0.1
11/91	Nov	20,861	638	7	19,881	644	7.3	-980	6	-0.1
12/91	Dec	24,800	615	8	23,820	619	8.1	-980	4	-0.1
1/92	Jan	31,054	542	9	30,074	543	9.0	-980	1	0.0
2/92	Feb	60,156	387	7	59,175	385	7.1	-980	-2	0.0
3/92	Mar	53,778	465	9	52,798	464	8.6	-980	-1	0.0
4/92	Apr	23,274	536	6	22,293	537	5.6	-980	1	-0.2
5/92	May	22,119	628	7	21,139	633	7.3	-980	5	-0.1
6/92	Jun	19,743	630	8	18,762	636	7.4	-980	6	-0.1
7/92	Jul	19,443	632	8	18,463	638	8.2	-980	6	-0.1
8/92	Aug	19,107	593	9	18,126	597	8.6	-980	4	0.1
9/92	Sep	18,799	628	9	17,818	634	8.7	-980	6	0.1
10/92	Oct	21,423	646	8	20,443	652	8.1	-980	7	0.0
11/92	Nov	21,410	635	8	20,429	641	7.5	-980	6	-0.1
12/92	Dec	45,118	480	6	44,137	480	6.3	-980	-1	-0.1
1/93	Jan	230,590	273	5	229,609	272	4.6	-980	-1	0.0
2/93	Feb	158,366	353	6	157,386	352	5.7	-980	-1	0.0
3/93	Mar	64,847	462	5	63,867	462	5.3	-980	-1	-0.1
4/93	Apr	42,981	511	7	42,001	511	6.8	-980	0	-0.1
5/93	May	32,021	563	7	31,040	565	6.7	-980	2	-0.1
6/93	Jun	26,449	619	7	25,469	623	6.6	-980	4	-0.1
7/93	Jul	20,510	654	9	19,529	661	8.8	-980	7	0.1
8/93	Aug	18,271	659	8	17,290	668	7.9	-980	8	0.1
9/93	Sep	17,717	656	8	16,737	664	8.0	-980	9	0.1
10/93	Oct	19,962	653	7	18,981	660	7.3	-980	7	0.0
11/93	Nov	25,664	639	8	24,684	645	8.5	-980	5	0.1

Table 5b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 2
Intermediate Export of San Bernardino Effluent and No other Recycling

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 2 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
12/93	Dec	24,945	587	8	23,965	590	8.1	-980	3	-0.1
1/94	Jan	25,053	632	8	24,072	637	8.3	-980	5	-0.1
2/94	Feb	40,056	493	6	39,075	492	6.4	-980	0	-0.1
3/94	Mar	34,963	657	8	33,983	661	7.6	-980	4	-0.1
4/94	Apr	24,562	633	7	23,581	639	7.2	-980	5	-0.1
5/94	May	22,354	640	7	21,373	646	6.5	-980	6	-0.2
6/94	Jun	19,259	645	6	18,279	652	5.9	-980	7	0.0
7/94	Jul	18,492	649	7	17,511	656	6.8	-980	8	0.1
8/94	Aug	17,602	636	8	16,622	644	7.9	-980	7	0.1
9/94	Sep	18,004	630	8	17,023	637	8.0	-980	7	0.1
10/94	Oct	21,008	621	8	20,027	626	8.2	-980	5	-0.1
11/94	Nov	22,201	628	9	21,221	634	9.2	-980	5	0.0
12/94	Dec	23,647	639	8	22,667	644	8.3	-980	6	-0.1
1/95	Jan	117,657	374	6	116,676	373	6.1	-980	-1	0.0
2/95	Feb	45,505	514	6	44,524	514	6.0	-980	0	-0.1
3/95	Mar	153,220	343	5	152,240	342	4.8	-980	-1	0.0
4/95	Apr	48,469	533	5	47,489	534	5.0	-980	0	-0.1
5/95	May	35,974	577	6	34,994	579	5.6	-980	2	-0.1
6/95	Jun	31,454	568	6	30,473	570	5.6	-980	2	-0.1
7/95	Jul	18,486	612	6	17,505	618	6.2	-980	6	-0.2
8/95	Aug	19,159	647	8	18,178	655	8.1	-980	7	0.0
9/95	Sep	19,132	642	8	18,152	649	7.9	-980	7	0.1
10/95	Oct	20,298	634	8	19,318	641	8.0	-980	6	-0.1
11/95	Nov	21,630	636	8	20,650	642	8.2	-980	6	-0.1
12/95	Dec	23,943	597	9	22,963	601	8.6	-980	4	-0.1
1/96	Jan	27,719	619	9	26,738	623	9.2	-980	4	0.0
2/96	Feb	62,517	379	5	61,537	377	5.4	-980	-2	-0.1
3/96	Mar	33,841	542	6	32,860	543	5.8	-980	1	-0.1
4/96	Apr	24,348	662	8	23,367	668	7.8	-980	6	-0.1
5/96	May	22,502	676	9	21,522	684	9.1	-980	8	0.0
6/96	Jun	20,143	658	9	19,163	666	9.0	-980	8	0.0
7/96	Jul	18,996	666	9	18,016	674	8.8	-980	8	-0.1
8/96	Aug	19,808	636	9	18,827	643	9.0	-980	7	-0.1
9/96	Sep	19,986	625	9	19,005	631	9.0	-980	6	-0.1
10/96	Oct	22,392	628	9	21,412	633	9.4	-980	5	0.0
11/96	Nov	30,451	549	5	29,471	551	4.5	-980	1	-0.2
12/96	Dec	32,820	540	4	31,839	541	4.2	-980	1	-0.2
1/97	Jan	61,885	401	4	60,904	399	3.8	-980	-2	-0.1
2/97	Feb	25,729	600	8	24,749	603	8.0	-980	4	-0.1
3/97	Mar	24,391	624	9	23,410	629	9.3	-980	5	0.0
4/97	Apr	22,597	621	9	21,616	626	9.3	-980	5	0.0
5/97	May	21,451	629	9	20,470	635	8.5	-980	6	-0.1
6/97	Jun	20,838	617	9	19,857	622	8.7	-980	5	-0.1
7/97	Jul	19,134	631	8	18,154	638	7.9	-980	7	-0.1
8/97	Aug	18,574	646	8	17,594	654	7.8	-980	8	-0.1
9/97	Sep	19,594	637	6	18,614	644	6.0	-980	7	-0.2
10/97	Oct	20,694	621	10	19,714	627	10.3	-980	6	0.0
11/97	Nov	25,807	570	7	24,827	573	6.6	-980	2	-0.1
12/97	Dec	36,532	496	3	35,551	495	3.1	-980	0	-0.2
1/98	Jan	37,962	471	6	36,982	470	6.2	-980	-1	-0.1

Table 5b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 2
Intermediate Export of San Bernardino Effluent and No other Recycling

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 2 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
2/98	Feb	188,541	288	3	187,561	287	3.0	-980	-1	0.0
3/98	Mar	48,221	490	5	47,240	490	5.0	-980	0	-0.1
4/98	Apr	40,920	507	5	39,940	507	5.1	-980	0	-0.1
5/98	May	67,078	393	4	66,097	391	3.7	-980	-2	-0.1
6/98	Jun	31,108	509	6	30,128	509	5.6	-980	0	-0.1
7/98	Jul	21,686	612	7	20,706	617	6.4	-980	5	-0.2
8/98	Aug	22,403	608	9	21,423	612	8.9	-980	4	-0.1
9/98	Sep	22,490	606	9	21,509	610	8.4	-980	4	-0.1
10/98	Oct	22,477	625	8	21,496	630	8.3	-980	5	-0.1
11/98	Nov	24,648	617	8	23,667	621	7.7	-980	4	-0.1
12/98	Dec	25,148	642	9	24,168	647	9.3	-980	5	0.0
1/99	Jan	29,359	583	8	28,379	585	8.5	-980	3	0.0
2/99	Feb	26,040	589	9	25,059	592	8.5	-980	3	0.0
3/99	Mar	24,969	582	9	23,988	585	9.1	-980	3	0.0
4/99	Apr	28,272	576	8	27,291	579	7.5	-980	2	-0.1
5/99	May	23,931	631	8	22,951	636	8.0	-980	5	-0.1
6/99	Jun	22,083	636	9	21,103	642	9.1	-980	6	-0.1
7/99	Jul	21,339	626	9	20,358	631	8.5	-980	6	-0.1
8/99	Aug	19,817	626	9	18,837	632	8.8	-980	6	-0.1
9/99	Sep	19,706	626	9	18,725	632	8.8	-980	6	-0.1
Average		33,125	583	7.3	32,145	587	7.3	-980	4	-0.1
Max		230,590	676	10.6	229,609	684	10.6	-980	9	0.2
Min		17,602	273	3.0	16,622	272	3.0	-980	-2	-0.2
StDev		31,822	84	1.5	31,822	86	1.5	0.0	2.9	0.1
Coef of Var		96%	14%	21%	99%	15%	21%	0%	72%	-124%
					For August Data Only					
Average		19,261	628	8.1	18,280	635	8.1	-980	6	0.0
Max		22,403	659	9.0	21,423	668	9.0	-980	8	0.1
Min		17,602	593	7.1	16,622	597	7.0	-980	4	-0.1
StDev		1,296	21	0.7	1,296	22	0.7	0	1	0.1
Coef of Var		7%	3%	9%	7%	3%	9%	0%	21%	-1271%

Table 5c
Annual Flow and TDS Impacts of Exporting Recycled Water from RIX
Year 2010 Alternative 2
Intermediate Export of San Bernardino Effluent and No other Recycling

Water Year	Baseline Total Discharge Below Prado Dam				Alternative 2 Total Discharge Below Prado Dam				Difference			
	Annual Average		Five-year average		Annual Average		Five-year average		Annual Average		Five-year average	
	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)
89-90	280,718	603	353,507	540	268,952	607	341,741	541	-11,766	4	-11,766	1
90-91	329,445	551	356,250	535	317,680	553	344,484	536	-11,766	2	-11,766	1
91-92	331,539	541	358,587	531	319,773	542	346,821	531	-11,766	1	-11,766	1
92-93	699,704	416	385,839	517	687,938	415	374,073	517	-11,766	-2	-11,766	0
93-94	290,916	617	386,464	518	279,150	621	374,699	518	-11,766	5	-11,766	0
94-95	555,913	472	441,503	496	544,147	471	429,738	495	-11,766	-1	-11,766	0
95-96	315,732	578	438,761	499	303,966	580	426,995	499	-11,766	3	-11,766	0
96-97	319,856	566	436,424	503	308,090	568	424,658	502	-11,766	2	-11,766	0
97-98	563,443	435	409,172	513	551,678	433	397,406	514	-11,766	-2	-11,766	0
98-99	287,788	611	408,546	512	276,022	615	396,781	513	-11,766	4	-11,766	0
Average	397,505	539	397,505	516	385,740	541	385,740	517	-11,766	2	-11,766	0
Max	699,704	617	441,503	540	687,938	621	429,738	541	-11,766	5	-11,766	1
Min	280,718	416	353,507	496	268,952	415	341,741	495	-11,766	-2	-11,766	0
StDev	150,071	73	34,675	15	150,071	75	34,675	15	0	2	0	0
Coef of Var	38%	14%	9%	3%	39%	14%	9%	3%	0%	144%	0%	209%

Table 6a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 2
Intermediate Export of San Bernardino Effluent and No other Recycling

Hydrologic Month and Year	Month	Baseline			Alt 2						Difference		
		Total Discharge At Riverside Narrows			Recycled Water Export			Total Discharge At Riverside Narrows					
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
10/89	Oct	9,380	547	6	1,886	510	10	7,494	556	5	-1,886	9	-1
11/89	Nov	9,975	544	7	1,886	510	10	8,088	552	6	-1,886	8	-1
12/89	Dec	10,056	548	7	1,886	510	10	8,170	557	7	-1,886	9	-1
1/90	Jan	12,125	547	7	1,886	510	10	10,239	554	7	-1,886	7	-1
2/90	Feb	13,021	564	8	1,886	510	10	11,135	574	8	-1,886	9	0
3/90	Mar	10,408	556	7	1,886	510	10	8,522	566	6	-1,886	10	-1
4/90	Apr	10,689	549	6	1,886	510	10	8,803	557	5	-1,886	8	-1
5/90	May	10,023	547	6	1,886	510	10	8,137	555	5	-1,886	9	-1
6/90	Jun	9,138	548	5	1,886	510	10	7,252	558	4	-1,886	10	-1
7/90	Jul	8,227	552	4	1,886	510	10	6,341	565	2	-1,886	13	-2
8/90	Aug	8,573	545	6	1,886	510	10	6,686	555	4	-1,886	10	-1
9/90	Sep	8,425	548	8	1,886	510	10	6,539	559	7	-1,886	11	-1
10/90	Oct	8,658	542	10	1,886	510	10	6,772	552	11	-1,886	9	0
11/90	Nov	8,777	541	8	1,886	510	10	6,891	549	7	-1,886	8	-1
12/90	Dec	9,639	559	9	1,886	510	10	7,753	571	9	-1,886	12	0
1/91	Jan	10,825	551	5	1,886	510	10	8,939	560	4	-1,886	9	-1
2/91	Feb	16,610	575	10	1,886	510	10	14,723	583	10	-1,886	8	0
3/91	Mar	31,989	256	4	1,886	510	10	30,103	241	3	-1,886	-16	0
4/91	Apr	10,615	546	4	1,886	510	10	8,728	554	3	-1,886	8	-1
5/91	May	8,839	567	5	1,886	510	10	6,953	583	3	-1,886	16	-1
6/91	Jun	9,104	568	5	1,886	510	10	7,217	583	4	-1,886	15	-1
7/91	Jul	7,867	564	7	1,886	510	10	5,980	581	6	-1,886	17	-1
8/91	Aug	7,847	550	9	1,886	510	10	5,961	563	8	-1,886	13	0
9/91	Sep	7,638	561	9	1,886	510	10	5,752	578	9	-1,886	17	0
10/91	Oct	8,265	554	8	1,886	510	10	6,379	567	7	-1,886	13	-1
11/91	Nov	8,925	553	6	1,886	510	10	7,038	565	5	-1,886	12	-1
12/91	Dec	10,316	556	7	1,886	510	10	8,429	566	7	-1,886	10	-1
1/92	Jan	11,719	570	8	1,886	510	10	9,833	582	8	-1,886	12	0
2/92	Feb	26,929	503	7	1,886	510	10	25,043	502	7	-1,886	-1	0
3/92	Mar	19,977	535	6	1,886	510	10	18,091	537	6	-1,886	3	0
4/92	Apr	9,763	561	10	1,886	510	10	7,876	573	10	-1,886	12	0
5/92	May	9,083	566	9	1,886	510	10	7,197	581	9	-1,886	15	0
6/92	Jun	8,469	540	9	1,886	510	10	6,583	548	8	-1,886	9	0
7/92	Jul	8,449	554	10	1,886	510	10	6,563	566	10	-1,886	13	0
8/92	Aug	7,866	553	9	1,886	510	10	5,980	567	9	-1,886	14	0
9/92	Sep	7,819	550	8	1,886	510	10	5,933	563	8	-1,886	13	-1
10/92	Oct	8,437	555	7	1,886	510	10	6,550	567	7	-1,886	13	-1
11/92	Nov	8,555	547	7	1,886	510	10	6,669	557	6	-1,886	10	-1
12/92	Dec	19,853	452	7	1,886	510	10	17,967	446	7	-1,886	-6	0
1/93	Jan	118,232	343	4	1,886	510	10	116,346	341	4	-1,886	-3	0
2/93	Feb	51,998	267	4	1,886	510	10	50,112	258	4	-1,886	-9	0
3/93	Mar	39,678	295	4	1,886	510	10	37,792	284	4	-1,886	-11	0
4/93	Apr	29,740	339	7	1,886	510	10	27,854	328	6	-1,886	-12	0
5/93	May	20,682	400	7	1,886	510	10	18,795	389	6	-1,886	-11	0
6/93	Jun	12,032	526	9	1,886	510	10	10,146	529	9	-1,886	3	0
7/93	Jul	8,063	584	9	1,886	510	10	6,177	606	8	-1,886	22	0
8/93	Aug	7,212	588	10	1,886	510	10	5,326	615	10	-1,886	27	0
9/93	Sep	7,700	577	9	1,886	510	10	5,813	599	9	-1,886	22	0
10/93	Oct	7,858	573	9	1,886	510	10	5,971	593	8	-1,886	20	0

Table 6a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 2
Intermediate Export of San Bernardino Effluent and No other Recycling

Hydrologic Month and Year	Month	Baseline Total Discharge At Riverside Narrows			Alt 2 Recycled Water Export			Alt 2 Total Discharge At Riverside Narrows			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
11/93	Nov	7,702	519	10	1,886	510	10	5,816	522	9	-1,886	3	0
12/93	Dec	8,866	564	9	1,886	510	10	6,980	579	8	-1,886	15	0
1/94	Jan	9,392	515	8	1,886	510	10	7,506	516	8	-1,886	1	0
2/94	Feb	14,923	407	8	1,886	510	10	13,037	392	8	-1,886	-15	0
3/94	Mar	14,466	612	8	1,886	510	10	12,579	627	8	-1,886	15	0
4/94	Apr	9,427	544	9	1,886	510	10	7,541	552	8	-1,886	8	0
5/94	May	8,738	577	9	1,886	510	10	6,851	596	9	-1,886	19	0
6/94	Jun	7,731	567	10	1,886	510	10	5,844	585	10	-1,886	18	0
7/94	Jul	7,578	576	10	1,886	510	10	5,691	598	10	-1,886	22	0
8/94	Aug	7,376	567	10	1,886	510	10	5,489	587	9	-1,886	20	0
9/94	Sep	7,331	564	10	1,886	510	10	5,445	583	10	-1,886	19	0
10/94	Oct	9,004	553	9	1,886	510	10	7,117	564	9	-1,886	11	0
11/94	Nov	10,638	516	9	1,886	510	10	8,752	517	9	-1,886	1	0
12/94	Dec	11,506	533	9	1,886	510	10	9,620	537	9	-1,886	5	0
1/95	Jan	55,734	306	5	1,886	510	10	53,848	298	4	-1,886	-7	0
2/95	Feb	25,655	327	7	1,886	510	10	23,769	313	6	-1,886	-14	0
3/95	Mar	116,185	171	4	1,886	510	10	114,299	166	4	-1,886	-6	0
4/95	Apr	22,239	388	8	1,886	510	10	20,353	377	7	-1,886	-11	0
5/95	May	19,027	422	7	1,886	510	10	17,141	412	7	-1,886	-10	0
6/95	Jun	13,904	496	9	1,886	510	10	12,018	493	9	-1,886	-2	0
7/95	Jul	8,850	569	9	1,886	510	10	6,964	585	9	-1,886	16	0
8/95	Aug	8,253	583	10	1,886	510	10	6,367	604	10	-1,886	21	0
9/95	Sep	7,870	590	10	1,886	510	10	5,983	615	10	-1,886	25	0
10/95	Oct	8,654	585	9	1,886	510	10	6,767	606	9	-1,886	21	0
11/95	Nov	8,868	579	9	1,886	510	10	6,982	598	8	-1,886	19	0
12/95	Dec	9,047	555	8	1,886	510	10	7,161	567	8	-1,886	12	0
1/96	Jan	13,175	505	9	1,886	510	10	11,289	505	9	-1,886	-1	0
2/96	Feb	27,504	257	6	1,886	510	10	25,618	238	6	-1,886	-19	0
3/96	Mar	16,516	382	8	1,886	510	10	14,630	366	8	-1,886	-16	0
4/96	Apr	10,548	570	9	1,886	510	10	8,662	584	9	-1,886	13	0
5/96	May	10,359	596	9	1,886	510	10	8,473	615	9	-1,886	19	0
6/96	Jun	9,515	590	9	1,886	510	10	7,629	610	8	-1,886	20	0
7/96	Jul	9,268	582	9	1,886	510	10	7,382	600	8	-1,886	18	0
8/96	Aug	8,909	560	9	1,886	510	10	7,023	574	9	-1,886	14	0
9/96	Sep	9,356	524	9	1,886	510	10	7,469	528	9	-1,886	4	0
10/96	Oct	10,890	570	9	1,886	510	10	9,004	583	9	-1,886	13	0
11/96	Nov	16,349	558	8	1,886	510	10	14,463	564	8	-1,886	6	0
12/96	Dec	13,753	496	9	1,886	510	10	11,866	494	8	-1,886	-2	0
1/97	Jan	41,012	506	5	1,886	510	10	39,126	506	5	-1,886	0	0
2/97	Feb	11,191	563	10	1,886	510	10	9,305	574	10	-1,886	11	0
3/97	Mar	10,513	576	9	1,886	510	10	8,626	590	9	-1,886	14	0
4/97	Apr	10,486	579	9	1,886	510	10	8,599	594	9	-1,886	15	0
5/97	May	9,606	563	9	1,886	510	10	7,720	576	9	-1,886	13	0
6/97	Jun	9,326	575	10	1,886	510	10	7,440	591	10	-1,886	16	0
7/97	Jul	8,880	582	8	1,886	510	10	6,994	602	7	-1,886	20	-1
8/97	Aug	8,762	584	10	1,886	510	10	6,876	605	10	-1,886	20	0
9/97	Sep	9,134	578	10	1,886	510	10	7,248	595	10	-1,886	18	0
10/97	Oct	9,016	573	11	1,886	510	10	7,130	589	12	-1,886	17	0
11/97	Nov	10,779	480	9	1,886	510	10	8,893	473	9	-1,886	-6	0

Table 6a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 2
Intermediate Export of San Bernardino Effluent and No other Recycling

Hydrologic Month and Year	Month	Baseline Total Discharge At Riverside Narrows			Alt 2 Recycled Water Export			Alt 2 Total Discharge At Riverside Narrows			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
12/97	Dec	15,564	570	5	1,886	510	10	13,677	578	4	-1,886	8	-1
1/98	Jan	15,618	562	9	1,886	510	10	13,732	570	9	-1,886	7	0
2/98	Feb	77,548	225	4	1,886	510	10	75,662	217	4	-1,886	-7	0
3/98	Mar	19,861	497	8	1,886	510	10	17,975	495	7	-1,886	-1	0
4/98	Apr	23,583	403	6	1,886	510	10	21,697	394	6	-1,886	-9	0
5/98	May	37,933	278	3	1,886	510	10	36,047	266	3	-1,886	-12	0
6/98	Jun	16,641	432	6	1,886	510	10	14,755	422	6	-1,886	-10	0
7/98	Jul	10,024	564	9	1,886	510	10	8,137	577	9	-1,886	13	0
8/98	Aug	11,774	534	10	1,886	510	10	9,888	539	11	-1,886	5	0
9/98	Sep	11,371	487	9	1,886	510	10	9,485	483	9	-1,886	-4	0
10/98	Oct	9,998	561	10	1,886	510	10	8,111	572	10	-1,886	12	0
11/98	Nov	10,350	536	9	1,886	510	10	8,463	542	9	-1,886	6	0
12/98	Dec	10,464	560	9	1,886	510	10	8,578	571	9	-1,886	11	0
1/99	Jan	11,454	477	7	1,886	510	10	9,568	470	7	-1,886	-7	-1
2/99	Feb	10,952	552	8	1,886	510	10	9,065	560	8	-1,886	9	0
3/99	Mar	10,585	565	9	1,886	510	10	8,699	577	9	-1,886	12	0
4/99	Apr	11,680	498	9	1,886	510	10	9,794	496	9	-1,886	-2	0
5/99	May	9,609	600	10	1,886	510	10	7,722	622	10	-1,886	22	0
6/99	Jun	10,723	564	11	1,886	510	10	8,836	575	11	-1,886	11	0
7/99	Jul	9,791	526	10	1,886	510	10	7,905	529	10	-1,886	4	0
8/99	Aug	9,568	580	11	1,886	510	10	7,682	598	11	-1,886	17	0
9/99	Sep	9,091	580	12	1,886	510	10	7,204	598	12	-1,886	18	0
Average		15,284	519	8	1,886	510	10	13,398	527	8	-1,886	8	0
Max		118,232	612	12				116,346	627	12	-1,886	27	0
Min		7,212	171	3				5,326	166	2	-1,886	-19	-2
StDev		16,829	90	2				16,829	99	2	0	10	0
Coef of Var		110%	17%	24%				126%	19%	28%	0%	135%	-107%

Table 6b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 2
Intermediate Export of San Bernardino Effluent and No other Recycling

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 2 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
10/89	Oct	33,103	599	8	31,217	604	7.6	-1,886	5	-0.1
11/89	Nov	34,537	589	9	32,651	594	8.6	-1,886	5	-0.1
12/89	Dec	35,563	604	9	33,677	609	8.6	-1,886	5	-0.1
1/90	Jan	40,128	575	9	38,242	578	8.7	-1,886	3	0.0
2/90	Feb	49,942	523	7	48,055	524	6.8	-1,886	1	-0.1
3/90	Mar	34,988	584	7	33,102	588	6.8	-1,886	4	-0.2
4/90	Apr	34,185	598	8	32,299	603	7.5	-1,886	5	-0.1
5/90	May	33,959	595	8	32,073	600	8.2	-1,886	5	-0.1
6/90	Jun	31,621	596	8	29,735	601	8.3	-1,886	5	-0.1
7/90	Jul	29,948	603	8	28,062	609	7.7	-1,886	6	-0.1
8/90	Aug	30,767	593	8	28,881	598	8.0	-1,886	5	-0.1
9/90	Sep	30,251	596	8	28,365	602	8.0	-1,886	6	-0.1
10/90	Oct	31,575	603	8	29,689	609	8.3	-1,886	6	-0.1
11/90	Nov	33,519	595	9	31,633	600	8.6	-1,886	5	-0.1
12/90	Dec	33,932	609	8	32,045	615	8.3	-1,886	6	-0.1
1/91	Jan	39,851	584	6	37,965	587	6.2	-1,886	4	-0.1
2/91	Feb	47,091	590	10	45,205	593	10.5	-1,886	3	0.0
3/91	Mar	91,223	400	5	89,337	397	5.2	-1,886	-2	-0.1
4/91	Apr	34,371	548	6	32,485	550	6.2	-1,886	2	-0.2
5/91	May	33,399	568	8	31,513	571	8.1	-1,886	3	-0.1
6/91	Jun	32,531	595	8	30,645	600	7.7	-1,886	5	-0.1
7/91	Jul	30,590	591	8	28,704	596	8.0	-1,886	5	-0.1
8/91	Aug	30,145	586	8	28,259	592	8.1	-1,886	5	-0.1
9/91	Sep	29,494	586	8	27,608	591	8.1	-1,886	5	-0.1
10/91	Oct	29,927	592	8	28,041	598	7.9	-1,886	6	-0.1
11/91	Nov	32,384	606	8	30,498	611	8.1	-1,886	6	-0.1
12/91	Dec	36,323	593	9	34,437	598	8.6	-1,886	5	-0.1
1/92	Jan	42,577	544	9	40,691	545	9.2	-1,886	2	0.0
2/92	Feb	71,679	413	8	69,792	410	7.5	-1,886	-3	-0.1
3/92	Mar	65,301	479	9	63,415	479	8.8	-1,886	-1	0.0
4/92	Apr	34,797	540	7	32,910	541	7.1	-1,886	2	-0.2
5/92	May	33,642	600	8	31,756	606	8.2	-1,886	5	-0.1
6/92	Jun	31,266	600	8	29,379	605	8.3	-1,886	6	-0.1
7/92	Jul	30,966	600	9	29,080	606	8.9	-1,886	6	-0.1
8/92	Aug	30,630	576	9	28,744	580	9.0	-1,886	4	-0.1
9/92	Sep	30,322	597	9	28,436	603	9.1	-1,886	6	-0.1
10/92	Oct	32,946	612	9	31,060	618	8.6	-1,886	6	-0.1
11/92	Nov	32,933	604	8	31,047	610	8.3	-1,886	6	-0.1
12/92	Dec	56,641	494	7	54,755	494	7.0	-1,886	-1	-0.1
1/93	Jan	242,113	286	5	240,227	285	4.8	-1,886	-2	0.0
2/93	Feb	169,889	366	6	168,003	364	6.0	-1,886	-2	0.0
3/93	Mar	76,370	475	6	74,484	474	5.9	-1,886	-1	-0.1
4/93	Apr	54,504	518	7	52,618	519	7.4	-1,886	0	-0.1
5/93	May	43,544	559	8	41,658	561	7.5	-1,886	2	-0.1
6/93	Jun	37,972	597	8	36,086	602	7.6	-1,886	5	-0.1
7/93	Jul	32,033	616	9	30,146	622	9.2	-1,886	7	-0.1
8/93	Aug	29,794	616	9	27,908	623	8.5	-1,886	7	-0.1
9/93	Sep	29,240	613	9	27,354	620	8.6	-1,886	7	-0.1
10/93	Oct	31,485	614	8	29,598	621	8.2	-1,886	7	-0.1
11/93	Nov	37,187	611	9	35,301	616	8.9	-1,886	5	-0.1

Table 6b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 2
Intermediate Export of San Bernardino Effluent and No other Recycling

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 2 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
12/93	Dec	36,468	575	9	34,582	578	8.7	-1,886	4	-0.1
1/94	Jan	36,576	606	9	34,690	611	8.8	-1,886	5	-0.1
2/94	Feb	51,579	505	7	49,693	505	7.2	-1,886	0	-0.1
3/94	Mar	46,486	630	8	44,600	635	8.1	-1,886	5	-0.1
4/94	Apr	36,085	606	8	34,199	611	8.1	-1,886	5	-0.1
5/94	May	33,877	609	8	31,991	615	7.6	-1,886	6	-0.1
6/94	Jun	30,782	609	7	28,896	615	7.3	-1,886	6	-0.2
7/94	Jul	30,015	610	8	28,129	616	7.9	-1,886	7	-0.1
8/94	Aug	29,125	601	9	27,239	608	8.5	-1,886	6	-0.1
9/94	Sep	29,527	598	9	27,640	604	8.6	-1,886	6	-0.1
10/94	Oct	32,531	595	9	30,645	600	8.9	-1,886	5	-0.1
11/94	Nov	33,724	601	9	31,838	606	9.5	-1,886	5	0.0
12/94	Dec	35,170	609	9	33,284	615	8.8	-1,886	6	-0.1
1/95	Jan	129,180	389	6	127,294	388	6.4	-1,886	-2	0.0
2/95	Feb	57,028	521	7	55,142	521	6.8	-1,886	0	-0.1
3/95	Mar	164,743	357	5	162,857	356	5.2	-1,886	-2	-0.1
4/95	Apr	59,992	536	6	58,106	537	5.9	-1,886	1	-0.1
5/95	May	47,497	570	7	45,611	573	6.6	-1,886	2	-0.1
6/95	Jun	42,977	563	7	41,090	565	6.7	-1,886	2	-0.1
7/95	Jul	30,009	587	8	28,122	593	7.6	-1,886	5	-0.1
8/95	Aug	30,682	610	9	28,796	616	8.8	-1,886	7	-0.1
9/95	Sep	30,655	607	9	28,769	613	8.6	-1,886	6	-0.1
10/95	Oct	31,821	603	9	29,935	609	8.7	-1,886	6	-0.1
11/95	Nov	33,153	605	9	31,267	611	8.8	-1,886	6	-0.1
12/95	Dec	35,466	581	9	33,580	585	9.0	-1,886	4	0.0
1/96	Jan	39,242	598	9	37,356	603	9.4	-1,886	4	0.0
2/96	Feb	74,040	405	6	72,154	402	6.0	-1,886	-3	-0.1
3/96	Mar	45,364	544	7	43,478	545	6.8	-1,886	1	-0.1
4/96	Apr	35,871	625	9	33,985	631	8.5	-1,886	6	-0.1
5/96	May	34,025	633	9	32,139	640	9.4	-1,886	7	0.0
6/96	Jun	31,666	618	9	29,780	625	9.3	-1,886	7	0.0
7/96	Jul	30,519	621	9	28,633	628	9.2	-1,886	7	0.0
8/96	Aug	31,331	603	9	29,444	609	9.4	-1,886	6	0.0
9/96	Sep	31,509	597	9	29,622	602	9.4	-1,886	6	0.0
10/96	Oct	33,915	601	10	32,029	606	9.6	-1,886	5	0.0
11/96	Nov	41,974	549	6	40,088	551	5.9	-1,886	2	-0.2
12/96	Dec	44,343	542	6	42,456	544	5.6	-1,886	1	-0.2
1/97	Jan	73,408	424	5	71,521	421	4.7	-1,886	-2	-0.1
2/97	Feb	37,252	584	9	35,366	588	8.6	-1,886	4	-0.1
3/97	Mar	35,914	600	10	34,028	605	9.5	-1,886	5	0.0
4/97	Apr	34,120	596	10	32,234	601	9.5	-1,886	5	0.0
5/97	May	32,974	601	9	31,087	606	9.0	-1,886	5	-0.1
6/97	Jun	32,361	592	9	30,474	597	9.2	-1,886	5	-0.1
7/97	Jul	30,657	600	9	28,771	606	8.7	-1,886	6	-0.1
8/97	Aug	30,097	608	9	28,211	615	8.6	-1,886	7	-0.1
9/97	Sep	31,117	604	8	29,231	610	7.5	-1,886	6	-0.2
10/97	Oct	32,217	595	10	30,331	600	10.3	-1,886	5	0.0
11/97	Nov	37,330	563	8	35,444	566	7.7	-1,886	3	-0.1
12/97	Dec	48,055	508	5	46,169	508	4.6	-1,886	0	-0.2
1/98	Jan	49,485	489	7	47,599	488	7.1	-1,886	-1	-0.1

Table 6b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 2
Intermediate Export of San Bernardino Effluent and No other Recycling

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 2 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
2/98	Feb	200,064	303	3	198,178	301	3.4	-1,886	-2	-0.1
3/98	Mar	59,744	501	6	57,857	501	5.9	-1,886	0	-0.1
4/98	Apr	52,443	516	6	50,557	516	6.1	-1,886	0	-0.1
5/98	May	78,601	415	5	76,715	413	4.5	-1,886	-2	-0.1
6/98	Jun	42,631	520	7	40,745	520	6.7	-1,886	0	-0.1
7/98	Jul	33,209	590	8	31,323	594	7.6	-1,886	5	-0.1
8/98	Aug	33,926	587	9	32,040	592	9.3	-1,886	5	0.0
9/98	Sep	34,013	586	9	32,127	590	9.0	-1,886	4	-0.1
10/98	Oct	34,000	599	9	32,113	604	8.9	-1,886	5	-0.1
11/98	Nov	36,171	595	8	34,285	599	8.4	-1,886	5	-0.1
12/98	Dec	36,671	612	10	34,785	618	9.5	-1,886	6	0.0
1/99	Jan	40,882	573	9	38,996	576	8.8	-1,886	3	0.0
2/99	Feb	37,563	576	9	35,676	580	9.0	-1,886	3	0.0
3/99	Mar	36,492	571	9	34,605	575	9.4	-1,886	3	0.0
4/99	Apr	39,795	568	8	37,908	571	8.2	-1,886	3	-0.1
5/99	May	35,454	604	9	33,568	609	8.6	-1,886	5	-0.1
6/99	Jun	33,606	605	10	31,720	611	9.5	-1,886	6	0.0
7/99	Jul	32,862	598	9	30,975	604	9.1	-1,886	5	-0.1
8/99	Aug	31,340	597	9	29,454	603	9.3	-1,886	6	-0.1
9/99	Sep	31,229	597	9	29,343	602	9.3	-1,886	6	-0.1
Average		44,648	566	8.1	42,762	570	8.0	-1,886	4	-0.1
Max		242,113	633	10.5	240,227	640	10.5	-1,886	7	0.0
Min		29,125	286	3.4	27,239	285	3.4	-1,886	-3	-0.2
StDev		31,822	67	1.3	31,822	70	1.3	0.0	2.7	0.0
Coef of Var		71%	12%	16%	74%	12%	17%	0%	70%	-48%
				For August Data Only						
Average		30,784	598	8.8	28,897	604	8.8	-1,886	6	-0.1
Max		33,926	616	9.4	32,040	623	9.4	-1,886	7	0.0
Min		29,125	576	8.1	27,239	580	8.0	-1,886	4	-0.1
StDev		1,296	12	0.5	1,296	13	0.5	0	1	0.0
Coef of Var		4%	2%	5%	4%	2%	6%	0%	16%	-32%

Table 6c
Annual Flow and TDS Impacts of Exporting Recycled Water from RIX
Year 2040 Alternative 2
Intermediate Export of San Bernardino Effluent and No other Recycling

Water Year	Baseline Total Discharge Below Prado Dam				Alternative 2 Total Discharge Below Prado Dam				Difference			
	Annual Average		Five-year average		Annual Average		Five-year average		Annual Average		Five-year average	
	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)
89-90	418,993	585	491,783	542	396,358	589	469,148	543	-22,635	4	-22,635	2
90-91	467,721	550	494,526	538	445,086	552	471,891	540	-22,635	2	-22,635	1
91-92	469,815	543	496,863	535	447,180	544	474,227	536	-22,635	2	-22,635	1
92-93	837,979	438	524,115	525	815,344	436	501,480	526	-22,635	-2	-22,635	1
93-94	429,192	595	524,740	526	406,557	599	502,105	527	-22,635	5	-22,635	1
94-95	694,189	487	579,779	508	671,554	487	557,144	508	-22,635	-1	-22,635	0
95-96	454,007	569	577,036	511	431,372	572	554,401	511	-22,635	3	-22,635	0
96-97	458,132	560	574,700	513	435,496	563	552,065	514	-22,635	3	-22,635	0
97-98	701,719	457	547,448	522	679,084	455	524,813	523	-22,635	-2	-22,635	1
98-99	426,064	591	546,822	521	403,429	595	524,187	522	-22,635	5	-22,635	0
Average	535,781	537	535,781	524	513,146	539	513,146	525	-22,635	2	-22,635	1
Max	837,979	595	579,779	542	815,344	599	557,144	543	-22,635	5	-22,635	2
Min	418,993	438	491,783	508	396,358	436	469,148	508	-22,635	-2	-22,635	0
StDev	150,071	57	34,675	12	150,071	59	34,675	12	0	3	0	1
Coef of Var	28%	11%	6%	2%	29%	11%	7%	2%	0%	138%	0%	85%

Table 7a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 3
Maximum Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge At Riverside Narrows			Alt 3 Recycled Water Export			Alt 3 Total Discharge At Riverside Narrows			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
10/89	Oct	6,635	564	5	1,952	510	10	4,123	600	2	-2,512	36	-3
11/89	Nov	7,229	559	6	1,952	510	10	4,717	587	4	-2,512	28	-2
12/89	Dec	7,311	564	7	1,952	510	10	4,799	595	5	-2,512	31	-2
1/90	Jan	9,380	560	6	1,952	510	10	6,868	579	5	-2,512	20	-1
2/90	Feb	10,276	580	8	1,952	510	10	7,764	605	7	-2,512	24	-1
3/90	Mar	7,663	574	6	1,952	510	10	5,151	608	3	-2,512	33	-2
4/90	Apr	7,944	564	5	1,952	510	10	5,432	592	2	-2,512	27	-2
5/90	May	7,278	563	5	1,952	510	10	4,766	593	2	-2,512	30	-3
6/90	Jun	6,392	567	3	1,952	510	10	3,881	607	1	-2,512	40	-2
7/90	Jul	5,482	576	1	1,952	510	10	2,970	636	1	-2,512	60	0
8/90	Aug	5,827	564	4	1,952	510	10	3,315	608	1	-2,512	44	-3
9/90	Sep	5,680	569	6	1,952	510	10	3,168	620	4	-2,512	51	-3
10/90	Oct	5,913	560	11	1,952	510	10	3,401	600	11	-2,512	40	0
11/90	Nov	6,032	557	6	1,952	510	10	3,520	594	4	-2,512	37	-3
12/90	Dec	6,894	581	9	1,952	510	10	4,382	625	9	-2,512	43	0
1/91	Jan	8,080	567	4	1,952	510	10	5,568	594	1	-2,512	28	-3
2/91	Feb	13,864	589	10	1,952	510	10	11,352	607	10	-2,512	18	0
3/91	Mar	29,244	233	3	1,952	510	10	26,732	208	2	-2,512	-26	-1
4/91	Apr	7,869	560	2	1,952	510	10	5,357	586	1	-2,512	26	-1
5/91	May	6,093	596	3	1,952	510	10	3,582	659	1	-2,512	63	-2
6/91	Jun	6,358	596	3	1,952	510	10	3,846	654	1	-2,512	59	-2
7/91	Jul	5,121	596	5	1,952	510	10	2,609	683	1	-2,512	87	-4
8/91	Aug	5,102	575	8	1,952	510	10	2,590	642	6	-2,512	67	-2
9/91	Sep	4,893	593	8	1,952	510	10	2,381	684	7	-2,512	92	-2
10/91	Oct	5,520	579	7	1,952	510	10	3,008	640	4	-2,512	61	-3
11/91	Nov	6,179	575	5	1,952	510	10	3,667	623	1	-2,512	48	-4
12/91	Dec	7,570	574	7	1,952	510	10	5,058	608	5	-2,512	34	-2
1/92	Jan	8,974	590	8	1,952	510	10	6,462	623	7	-2,512	33	-1
2/92	Feb	24,183	503	7	1,952	510	10	21,672	502	6	-2,512	0	0
3/92	Mar	17,232	540	6	1,952	510	10	14,720	546	5	-2,512	6	-1
4/92	Apr	7,017	583	10	1,952	510	10	4,505	626	10	-2,512	43	0
5/92	May	6,338	593	9	1,952	510	10	3,826	650	8	-2,512	57	-1
6/92	Jun	5,724	557	8	1,952	510	10	3,212	597	7	-2,512	40	-2
7/92	Jul	5,704	577	10	1,952	510	10	3,192	633	10	-2,512	56	0
8/92	Aug	5,121	580	8	1,952	510	10	2,609	651	7	-2,512	71	-1
9/92	Sep	5,074	575	7	1,952	510	10	2,562	642	4	-2,512	68	-3
10/92	Oct	5,691	579	6	1,952	510	10	3,179	637	3	-2,512	58	-3
11/92	Nov	5,810	567	6	1,952	510	10	3,298	614	3	-2,512	47	-3
12/92	Dec	17,108	444	7	1,952	510	10	14,596	433	6	-2,512	-11	-1
1/93	Jan	115,487	340	4	1,952	510	10	112,975	336	3	-2,512	-4	0
2/93	Feb	49,253	254	4	1,952	510	10	46,741	240	4	-2,512	-14	0
3/93	Mar	36,933	279	4	1,952	510	10	34,421	262	3	-2,512	-17	0
4/93	Apr	26,995	323	6	1,952	510	10	24,483	304	6	-2,512	-19	0
5/93	May	17,936	384	6	1,952	510	10	15,424	365	6	-2,512	-20	-1
6/93	Jun	9,287	532	9	1,952	510	10	6,775	542	9	-2,512	10	0
7/93	Jul	5,318	624	8	1,952	510	10	2,806	731	7	-2,512	106	-2
8/93	Aug	4,466	639	10	1,952	510	10	1,955	810	10	-2,512	171	0
9/93	Sep	4,954	617	9	1,952	510	10	2,442	732	8	-2,512	115	-1
10/93	Oct	5,112	610	8	1,952	510	10	2,600	711	6	-2,512	101	-2

Table 7a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 3
Maximum Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge At Riverside Narrows			Alt 3 Recycled Water Export			Alt 3 Total Discharge At Riverside Narrows			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
11/93	Nov	4,957	527	9	1,952	510	10	2,445	549	9	-2,512	22	-1
12/93	Dec	6,121	591	8	1,952	510	10	3,609	651	7	-2,512	60	-1
1/94	Jan	6,647	519	7	1,952	510	10	4,135	527	6	-2,512	8	-2
2/94	Feb	12,178	385	8	1,952	510	10	9,666	354	8	-2,512	-31	-1
3/94	Mar	11,720	637	8	1,952	510	10	9,208	673	7	-2,512	36	-1
4/94	Apr	6,682	560	8	1,952	510	10	4,170	593	7	-2,512	33	-1
5/94	May	5,992	611	9	1,952	510	10	3,480	687	8	-2,512	76	-1
6/94	Jun	4,985	601	10	1,952	510	10	2,473	697	9	-2,512	97	0
7/94	Jul	4,832	617	10	1,952	510	10	2,320	737	10	-2,512	120	0
8/94	Aug	4,630	604	9	1,952	510	10	2,118	721	8	-2,512	117	-1
9/94	Sep	4,586	599	10	1,952	510	10	2,074	713	9	-2,512	114	0
10/94	Oct	6,258	574	8	1,952	510	10	3,746	620	7	-2,512	46	-1
11/94	Nov	7,893	519	9	1,952	510	10	5,381	526	8	-2,512	6	-1
12/94	Dec	8,761	542	8	1,952	510	10	6,249	556	8	-2,512	15	-1
1/95	Jan	52,989	295	4	1,952	510	10	50,477	285	4	-2,512	-10	0
2/95	Feb	22,910	306	6	1,952	510	10	20,398	282	6	-2,512	-25	0
3/95	Mar	113,440	163	4	1,952	510	10	110,928	155	4	-2,512	-8	0
4/95	Apr	19,494	372	7	1,952	510	10	16,982	352	7	-2,512	-20	0
5/95	May	16,281	408	7	1,952	510	10	13,770	390	6	-2,512	-18	-1
6/95	Jun	11,158	493	9	1,952	510	10	8,647	490	9	-2,512	-4	0
7/95	Jul	6,105	598	8	1,952	510	10	3,593	662	7	-2,512	64	-1
8/95	Aug	5,508	621	10	1,952	510	10	2,996	718	11	-2,512	97	0
9/95	Sep	5,124	635	10	1,952	510	10	2,612	760	11	-2,512	125	0
10/95	Oct	5,908	623	9	1,952	510	10	3,396	709	8	-2,512	87	-1
11/95	Nov	6,123	612	8	1,952	510	10	3,611	687	7	-2,512	74	-1
12/95	Dec	6,302	577	7	1,952	510	10	3,790	625	6	-2,512	48	-2
1/96	Jan	10,430	506	8	1,952	510	10	7,918	506	8	-2,512	0	-1
2/96	Feb	24,759	229	5	1,952	510	10	22,247	198	5	-2,512	-31	-1
3/96	Mar	13,771	358	8	1,952	510	10	11,259	325	7	-2,512	-33	-1
4/96	Apr	7,803	594	9	1,952	510	10	5,291	635	8	-2,512	42	-1
5/96	May	7,614	629	8	1,952	510	10	5,102	690	8	-2,512	61	-1
6/96	Jun	6,770	625	8	1,952	510	10	4,258	696	7	-2,512	71	-1
7/96	Jul	6,523	614	8	1,952	510	10	4,011	682	7	-2,512	68	-1
8/96	Aug	6,164	585	9	1,952	510	10	3,652	640	8	-2,512	55	-1
9/96	Sep	6,610	532	9	1,952	510	10	4,098	549	8	-2,512	16	-1
10/96	Oct	8,145	592	9	1,952	510	10	5,633	631	9	-2,512	39	0
11/96	Nov	13,604	569	7	1,952	510	10	11,092	583	7	-2,512	14	-1
12/96	Dec	11,007	494	8	1,952	510	10	8,495	490	8	-2,512	-3	0
1/97	Jan	38,267	506	5	1,952	510	10	35,755	506	4	-2,512	0	0
2/97	Feb	8,446	582	10	1,952	510	10	5,934	614	10	-2,512	32	0
3/97	Mar	7,767	601	9	1,952	510	10	5,255	647	8	-2,512	46	0
4/97	Apr	7,740	605	9	1,952	510	10	5,228	653	8	-2,512	48	-1
5/97	May	6,861	586	9	1,952	510	10	4,349	633	9	-2,512	47	0
6/97	Jun	6,581	604	10	1,952	510	10	4,069	665	10	-2,512	61	0
7/97	Jul	6,135	617	7	1,952	510	10	3,623	695	5	-2,512	77	-2
8/97	Aug	6,016	621	10	1,952	510	10	3,505	703	9	-2,512	83	0
9/97	Sep	6,389	609	10	1,952	510	10	3,877	676	10	-2,512	67	0
10/97	Oct	6,270	602	12	1,952	510	10	3,759	667	13	-2,512	65	1
11/97	Nov	8,034	471	9	1,952	510	10	5,522	456	9	-2,512	-16	0

Table 7a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 3
Maximum Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge At Riverside Narrows			Alt 3 Recycled Water Export			Alt 3 Total Discharge At Riverside Narrows			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
12/97	Dec	12,818	584	4	1,952	510	10	10,306	603	2	-2,512	19	-2
1/98	Jan	12,873	575	9	1,952	510	10	10,361	592	9	-2,512	17	0
2/98	Feb	74,803	214	4	1,952	510	10	72,291	204	4	-2,512	-10	0
3/98	Mar	17,115	495	7	1,952	510	10	14,604	493	7	-2,512	-2	0
4/98	Apr	20,838	390	6	1,952	510	10	18,326	374	5	-2,512	-16	-1
5/98	May	35,188	260	3	1,952	510	10	32,676	241	2	-2,512	-19	-1
6/98	Jun	13,896	417	6	1,952	510	10	11,384	398	5	-2,512	-19	-1
7/98	Jul	7,278	586	9	1,952	510	10	4,766	629	9	-2,512	43	0
8/98	Aug	9,029	543	11	1,952	510	10	6,517	558	11	-2,512	14	0
9/98	Sep	8,625	482	9	1,952	510	10	6,114	472	9	-2,512	-10	0
10/98	Oct	7,252	582	10	1,952	510	10	4,740	622	10	-2,512	40	0
11/98	Nov	7,604	548	9	1,952	510	10	5,092	568	8	-2,512	21	-1
12/98	Dec	7,719	579	9	1,952	510	10	5,207	615	8	-2,512	36	-1
1/99	Jan	8,709	468	7	1,952	510	10	6,197	453	5	-2,512	-15	-1
2/99	Feb	8,206	567	8	1,952	510	10	5,694	595	7	-2,512	27	-1
3/99	Mar	7,840	587	9	1,952	510	10	5,328	625	9	-2,512	38	0
4/99	Apr	8,935	496	8	1,952	510	10	6,423	492	8	-2,512	-4	-1
5/99	May	6,863	639	10	1,952	510	10	4,351	716	10	-2,512	77	0
6/99	Jun	7,977	584	11	1,952	510	10	5,465	620	12	-2,512	36	1
7/99	Jul	7,046	534	10	1,952	510	10	4,534	550	10	-2,512	16	0
8/99	Aug	6,823	611	12	1,952	510	10	4,311	672	12	-2,512	61	1
9/99	Sep	6,345	612	12	1,952	510	10	3,833	682	14	-2,512	70	1
Average		12,538	534	7	1,952	510	10	10,027	570	7	-2,512	36	-1
Max		115,487	639	12				112,975	810	14	-2,512	171	1
Min		4,466	163	1				1,955	155	1	-2,512	-33	-4
StDev		16,829	105	2				16,829	137	3	0	39	1
Coef of Var		134%	20%	31%				168%	24%	45%	0%	109%	-109%

Table 7b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX.
Year 2010 Alternative 3
Maximum Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 3 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
10/89	Oct	21,580	626	7	12,726	667	5.6	-8,855	42	-1.2
11/89	Nov	23,014	610	8	14,160	638	7.6	-8,855	28	-0.4
12/89	Dec	24,040	630	8	15,185	668	7.8	-8,855	38	-0.3
1/90	Jan	28,605	586	8	19,750	595	7.7	-8,855	9	-0.6
2/90	Feb	38,419	516	6	29,564	501	4.8	-8,855	-15	-1.2
3/90	Mar	23,466	602	6	14,611	623	3.6	-8,855	22	-2.0
4/90	Apr	22,662	623	7	13,807	660	5.1	-8,855	37	-1.4
5/90	May	22,436	620	7	13,582	654	6.8	-8,855	35	-0.7
6/90	Jun	20,098	624	8	11,244	669	7.5	-8,855	45	-0.1
7/90	Jul	18,425	638	7	9,571	704	6.8	-8,855	66	0.1
8/90	Aug	19,244	620	7	10,390	665	6.7	-8,855	46	-0.4
9/90	Sep	18,728	626	7	9,873	680	6.2	-8,855	54	-0.9
10/90	Oct	20,052	636	7	11,197	691	6.8	-8,855	55	-0.6
11/90	Nov	21,996	620	8	13,142	657	7.8	-8,855	36	-0.1
12/90	Dec	22,409	641	8	13,554	690	6.7	-8,855	49	-0.8
1/91	Jan	28,328	598	5	19,473	613	3.4	-8,855	15	-1.6
2/91	Feb	35,568	604	11	26,714	616	10.7	-8,855	12	0.0
3/91	Mar	79,700	378	5	70,845	355	4.0	-8,855	-23	-0.6
4/91	Apr	22,848	548	5	13,994	536	2.8	-8,855	-12	-2.0
5/91	May	21,876	578	7	13,022	587	7.6	-8,855	8	0.1
6/91	Jun	21,008	621	7	12,153	660	6.2	-8,855	40	-0.6
7/91	Jul	19,067	617	7	10,213	660	6.5	-8,855	44	-0.6
8/91	Aug	18,622	610	7	9,768	651	6.6	-8,855	40	-0.5
9/91	Sep	17,971	610	7	9,116	654	6.5	-8,855	43	-0.5
10/91	Oct	18,405	621	7	9,550	671	5.9	-8,855	50	-1.0
11/91	Nov	20,861	638	7	12,007	690	6.8	-8,855	53	-0.5
12/91	Dec	24,800	615	8	15,946	642	7.8	-8,855	27	-0.4
1/92	Jan	31,054	542	9	22,200	533	8.8	-8,855	-10	-0.2
2/92	Feb	60,156	387	7	51,301	356	6.6	-8,855	-31	-0.5
3/92	Mar	53,778	465	9	44,924	445	8.3	-8,855	-20	-0.3
4/92	Apr	23,274	536	6	14,419	517	4.0	-8,855	-19	-1.8
5/92	May	22,119	628	7	13,265	669	6.8	-8,855	41	-0.7
6/92	Jun	19,743	630	8	10,888	682	7.1	-8,855	52	-0.5
7/92	Jul	19,443	632	8	10,589	687	8.5	-8,855	55	0.2
8/92	Aug	19,107	593	9	10,252	616	9.2	-8,855	23	0.7
9/92	Sep	18,799	628	9	9,944	683	9.4	-8,855	55	0.8
10/92	Oct	21,423	646	8	12,569	702	8.2	-8,855	56	0.1
11/92	Nov	21,410	635	8	12,555	683	7.2	-8,855	48	-0.4
12/92	Dec	45,118	480	6	36,263	459	5.5	-8,855	-21	-0.9
1/93	Jan	230,590	273	5	221,735	262	4.4	-8,855	-12	-0.2
2/93	Feb	158,366	353	6	149,512	340	5.5	-8,855	-13	-0.3
3/93	Mar	64,847	462	5	55,993	446	4.6	-8,855	-16	-0.7
4/93	Apr	42,981	511	7	34,127	496	6.0	-8,855	-14	-0.8
5/93	May	32,021	563	7	23,166	562	5.6	-8,855	-1	-1.2
6/93	Jun	26,449	619	7	17,595	646	5.1	-8,855	27	-1.6
7/93	Jul	20,510	654	9	11,655	720	9.5	-8,855	67	0.7
8/93	Aug	18,271	659	8	9,416	747	7.9	-8,855	88	0.1
9/93	Sep	17,717	656	8	8,863	745	8.1	-8,855	90	0.2
10/93	Oct	19,962	653	7	11,107	722	6.9	-8,855	69	-0.4
11/93	Nov	25,664	639	8	16,810	678	8.8	-8,855	39	0.4

Table 7b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 3
Maximum Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 3 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
12/93	Dec	24,945	587	8	16,090	599	8.1	-8,855	12	-0.1
1/94	Jan	25,053	632	8	16,198	668	8.4	-8,855	36	0.0
2/94	Feb	40,056	493	6	31,201	472	5.4	-8,855	-21	-1.1
3/94	Mar	34,963	657	8	26,109	688	6.8	-8,855	31	-0.9
4/94	Apr	24,562	633	7	15,707	671	6.6	-8,855	38	-0.7
5/94	May	22,354	640	7	13,499	689	5.6	-8,855	49	-1.0
6/94	Jun	19,259	645	6	10,405	712	4.3	-8,855	67	-1.6
7/94	Jul	18,492	649	7	9,637	724	5.8	-8,855	76	-0.9
8/94	Aug	17,602	636	8	8,748	708	7.8	-8,855	71	0.1
9/94	Sep	18,004	630	8	9,149	691	8.1	-8,855	62	0.2
10/94	Oct	21,008	621	8	12,153	661	8.3	-8,855	40	0.0
11/94	Nov	22,201	628	9	13,347	670	9.3	-8,855	41	0.0
12/94	Dec	23,647	639	8	14,793	682	7.6	-8,855	43	-0.7
1/95	Jan	117,657	374	6	108,802	358	5.8	-8,855	-16	-0.3
2/95	Feb	45,505	514	6	36,650	501	5.2	-8,855	-13	-0.9
3/95	Mar	153,220	343	5	144,366	329	4.5	-8,855	-14	-0.3
4/95	Apr	48,469	533	5	39,615	526	3.9	-8,855	-7	-1.1
5/95	May	35,974	577	6	27,120	581	4.3	-8,855	4	-1.4
6/95	Jun	31,454	568	6	22,599	569	3.9	-8,855	1	-1.8
7/95	Jul	18,486	612	6	9,631	655	4.7	-8,855	42	-1.7
8/95	Aug	19,159	647	8	10,304	717	8.3	-8,855	70	0.2
9/95	Sep	19,132	642	8	10,278	708	7.8	-8,855	66	0.0
10/95	Oct	20,298	634	8	11,444	687	8.0	-8,855	53	-0.1
11/95	Nov	21,630	636	8	12,775	684	8.3	-8,855	48	0.0
12/95	Dec	23,943	597	9	15,089	615	8.8	-8,855	18	0.2
1/96	Jan	27,719	619	9	18,864	644	8.7	-8,855	25	-0.5
2/96	Feb	62,517	379	5	53,663	348	4.7	-8,855	-31	-0.7
3/96	Mar	33,841	542	6	24,986	534	4.5	-8,855	-8	-1.5
4/96	Apr	24,348	662	8	15,493	716	7.2	-8,855	55	-0.7
5/96	May	22,502	676	9	13,648	748	9.2	-8,855	71	0.1
6/96	Jun	20,143	658	9	11,289	731	9.4	-8,855	72	0.4
7/96	Jul	18,996	666	9	10,142	753	9.2	-8,855	87	0.3
8/96	Aug	19,808	636	9	10,953	692	9.6	-8,855	56	0.6
9/96	Sep	19,986	625	9	11,131	672	9.5	-8,855	47	0.4
10/96	Oct	22,392	628	9	13,538	669	9.5	-8,855	41	0.1
11/96	Nov	30,451	549	5	21,597	542	2.4	-8,855	-7	-2.2
12/96	Dec	32,820	540	4	23,965	531	2.2	-8,855	-10	-2.2
1/97	Jan	61,885	401	4	53,030	373	2.8	-8,855	-28	-1.0
2/97	Feb	25,729	600	8	16,875	618	7.2	-8,855	18	-0.8
3/97	Mar	24,391	624	9	15,536	658	9.5	-8,855	33	0.1
4/97	Apr	22,597	621	9	13,742	657	9.4	-8,855	35	0.1
5/97	May	21,451	629	9	12,596	673	8.5	-8,855	44	-0.1
6/97	Jun	20,838	617	9	11,983	655	8.9	-8,855	38	0.1
7/97	Jul	19,134	631	8	10,280	687	7.9	-8,855	56	-0.2
8/97	Aug	18,574	646	8	9,720	719	7.6	-8,855	73	-0.3
9/97	Sep	19,594	637	6	10,740	696	4.3	-8,855	59	-1.9
10/97	Oct	20,694	621	10	11,840	662	11.8	-8,855	41	1.4
11/97	Nov	25,807	570	7	16,953	572	5.5	-8,855	2	-1.3
12/97	Dec	36,532	496	3	27,677	473	1.3	-8,855	-23	-2.0
1/98	Jan	37,962	471	6	29,108	442	5.1	-8,855	-29	-1.2

Table 7b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 3
Maximum Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 3 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
2/98	Feb	188,541	288	3	179,687	275	2.7	-8,855	-14	-0.4
3/98	Mar	48,221	490	5	39,366	473	4.0	-8,855	-17	-1.1
4/98	Apr	40,920	507	5	32,066	491	3.9	-8,855	-16	-1.3
5/98	May	67,078	393	4	58,223	366	2.8	-8,855	-26	-0.9
6/98	Jun	31,108	509	6	22,254	487	4.1	-8,855	-23	-1.6
7/98	Jul	21,686	612	7	12,832	644	4.9	-8,855	32	-1.6
8/98	Aug	22,403	608	9	13,549	635	8.3	-8,855	27	-0.6
9/98	Sep	22,490	606	9	13,635	631	7.8	-8,855	26	-0.7
10/98	Oct	22,477	625	8	13,622	663	8.1	-8,855	38	-0.4
11/98	Nov	24,648	617	8	15,793	645	7.1	-8,855	28	-0.7
12/98	Dec	25,148	642	9	16,294	683	9.5	-8,855	41	0.1
1/99	Jan	29,359	583	8	20,505	590	8.1	-8,855	7	-0.4
2/99	Feb	26,040	589	9	17,185	600	8.2	-8,855	12	-0.3
3/99	Mar	24,969	582	9	16,114	591	9.1	-8,855	9	0.0
4/99	Apr	28,272	576	8	19,417	581	6.7	-8,855	5	-0.9
5/99	May	23,931	631	8	15,077	669	7.7	-8,855	38	-0.4
6/99	Jun	22,083	636	9	13,229	682	8.9	-8,855	47	-0.2
7/99	Jul	21,339	626	9	12,484	668	8.4	-8,855	42	-0.2
8/99	Aug	19,817	626	9	10,963	674	9.0	-8,855	48	0.1
9/99	Sep	19,706	626	9	10,851	674	9.2	-8,855	49	0.3
Average		33,125	583	7.3	24,271	610	6.8	-8,855	27	-0.5
Max		230,590	676	10.6	221,735	753	11.8	-8,855	90	1.4
Min		17,602	273	3.0	8,748	262	1.3	-8,855	-31	-2.2
StDev		31,822	84	1.5	31,822	111	2.1	0.0	31.2	0.7
Coef of Var		96%	14%	21%	131%	18%	31%	0%	115%	-130%
					For August Data Only					
Average		19,261	628	8.1	10,406	682	8.1	-8,855	54	0.0
Max		22,403	659	9.0	13,549	747	9.6	-8,855	88	0.7
Min		17,602	593	7.1	8,748	616	6.6	-8,855	23	-0.6
StDev		1,296	21	0.7	1,296	42	1.0	0	21	0.4
Coef of Var		7%	3%	9%	12%	6%	12%	0%	39%	-2013%

Table 7c
Annual Flow and TDS Impacts of Exporting Recycled Water from RIX
Year 2010 Alternative 3
Maximum Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Water Year	Baseline Total Discharge Below Prado Dam				Alternative 3 Total Discharge Below Prado Dam				Difference			
	Annual Average		Five-year average		Annual Average		Five-year average		Annual Average		Five-year average	
	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)
89-90	280,718	603	353,507	540	174,463	626	247,253	528	-106,254	23	-106,254	-11
90-91	329,445	551	356,250	535	223,191	544	249,996	522	-106,254	-7	-106,254	-13
91-92	331,539	541	358,587	531	225,284	529	252,332	516	-106,254	-12	-106,254	-15
92-93	699,704	416	385,839	517	593,449	390	279,584	498	-106,254	-27	-106,254	-19
93-94	290,916	617	386,464	518	184,661	646	280,210	500	-106,254	29	-106,254	-18
94-95	555,913	472	441,503	496	449,659	450	335,249	473	-106,254	-22	-106,254	-22
95-96	315,732	578	438,761	499	209,477	584	332,506	478	-106,254	6	-106,254	-21
96-97	319,856	566	436,424	503	213,601	565	330,170	482	-106,254	0	-106,254	-20
97-98	563,443	435	409,172	513	457,189	404	302,917	495	-106,254	-30	-106,254	-18
98-99	287,788	611	408,546	512	181,534	637	302,292	494	-106,254	26	-106,254	-19
Average	397,505	539	397,505	516	291,251	538	291,251	499	-106,254	-1	-106,254	-18
Max	699,704	617	441,503	540	593,449	646	335,249	528	-106,254	29	-106,254	-11
Min	280,718	416	353,507	496	174,463	390	247,253	473	-106,254	-30	-106,254	-22
StDev	150,071	73	34,675	15	150,071	94	34,675	18	0	22	0	4
Coef of Var	38%	14%	9%	3%	52%	18%	12%	4%	0%	-1520%	0%	-20%

Table 8a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 3
Maximum Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline			Alt 3						Difference		
		Total Discharge At Riverside Narrows			Recycled Water Export			Total Discharge At Riverside Narrows					
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
10/89	Oct	9,380	547	6	3,773	510	10	4,674	587	3	-4,706	41	-4
11/89	Nov	9,975	544	7	3,773	510	10	5,268	577	5	-4,706	34	-3
12/89	Dec	10,056	548	7	3,773	510	10	5,350	585	5	-4,706	37	-2
1/90	Jan	12,125	547	7	3,773	510	10	7,419	573	5	-4,706	26	-2
2/90	Feb	13,021	564	8	3,773	510	10	8,315	597	7	-4,706	33	-1
3/90	Mar	10,408	556	7	3,773	510	10	5,702	597	4	-4,706	41	-3
4/90	Apr	10,689	549	6	3,773	510	10	5,983	583	3	-4,706	34	-3
5/90	May	10,023	547	6	3,773	510	10	5,317	583	3	-4,706	36	-3
6/90	Jun	9,138	548	5	3,773	510	10	4,431	593	1	-4,706	45	-4
7/90	Jul	8,227	552	4	3,773	510	10	3,521	614	1	-4,706	62	-3
8/90	Aug	8,573	545	6	3,773	510	10	3,866	592	1	-4,706	47	-5
9/90	Sep	8,425	548	8	3,773	510	10	3,719	602	5	-4,706	53	-3
10/90	Oct	8,658	542	10	3,773	510	10	3,952	586	11	-4,706	43	0
11/90	Nov	8,777	541	8	3,773	510	10	4,071	581	5	-4,706	40	-3
12/90	Dec	9,639	559	9	3,773	510	10	4,933	610	9	-4,706	51	-1
1/91	Jan	10,825	551	5	3,773	510	10	6,119	585	2	-4,706	35	-4
2/91	Feb	16,610	575	10	3,773	510	10	11,903	602	10	-4,706	27	0
3/91	Mar	31,989	256	4	3,773	510	10	27,283	213	2	-4,706	-43	-1
4/91	Apr	10,615	546	4	3,773	510	10	5,908	578	1	-4,706	32	-3
5/91	May	8,839	567	5	3,773	510	10	4,132	637	1	-4,706	70	-4
6/91	Jun	9,104	568	5	3,773	510	10	4,397	635	1	-4,706	66	-4
7/91	Jul	7,867	564	7	3,773	510	10	3,160	650	3	-4,706	86	-4
8/91	Aug	7,847	550	9	3,773	510	10	3,141	616	7	-4,706	66	-2
9/91	Sep	7,638	561	9	3,773	510	10	2,932	649	7	-4,706	88	-2
10/91	Oct	8,265	554	8	3,773	510	10	3,559	618	5	-4,706	64	-3
11/91	Nov	8,925	553	6	3,773	510	10	4,218	606	2	-4,706	53	-4
12/91	Dec	10,316	556	7	3,773	510	10	5,609	597	5	-4,706	42	-2
1/92	Jan	11,719	570	8	3,773	510	10	7,013	613	7	-4,706	43	-1
2/92	Feb	26,929	503	7	3,773	510	10	22,222	502	6	-4,706	-1	-1
3/92	Mar	19,977	535	6	3,773	510	10	15,271	544	5	-4,706	9	-1
4/92	Apr	9,763	561	10	3,773	510	10	5,056	612	10	-4,706	51	0
5/92	May	9,083	566	9	3,773	510	10	4,377	631	9	-4,706	65	-1
6/92	Jun	8,469	540	9	3,773	510	10	3,763	582	7	-4,706	42	-2
7/92	Jul	8,449	554	10	3,773	510	10	3,743	613	10	-4,706	60	0
8/92	Aug	7,866	553	9	3,773	510	10	3,160	624	8	-4,706	71	-1
9/92	Sep	7,819	550	8	3,773	510	10	3,113	616	5	-4,706	66	-3
10/92	Oct	8,437	555	7	3,773	510	10	3,730	616	4	-4,706	61	-3
11/92	Nov	8,555	547	7	3,773	510	10	3,849	597	4	-4,706	50	-3
12/92	Dec	19,853	452	7	3,773	510	10	15,147	436	6	-4,706	-17	-1
1/93	Jan	118,232	343	4	3,773	510	10	113,526	337	3	-4,706	-7	0
2/93	Feb	51,998	267	4	3,773	510	10	47,292	243	4	-4,706	-24	-1
3/93	Mar	39,678	295	4	3,773	510	10	34,972	266	3	-4,706	-28	-1
4/93	Apr	29,740	339	7	3,773	510	10	25,034	308	6	-4,706	-31	-1
5/93	May	20,682	400	7	3,773	510	10	15,975	369	6	-4,706	-31	-1
6/93	Jun	12,032	526	9	3,773	510	10	7,326	538	9	-4,706	13	-1
7/93	Jul	8,063	584	9	3,773	510	10	3,357	692	7	-4,706	109	-2
8/93	Aug	7,212	588	10	3,773	510	10	2,505	741	10	-4,706	153	0
9/93	Sep	7,700	577	9	3,773	510	10	2,993	689	8	-4,706	112	-1
10/93	Oct	7,858	573	9	3,773	510	10	3,151	674	6	-4,706	101	-2

Table 8a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 3
Maximum Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge At Riverside Narrows			Alt 3 Recycled Water Export			Alt 3 Total Discharge At Riverside Narrows			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
11/93	Nov	7,702	519	10	3,773	510	10	2,996	539	9	-4,706	20	-1
12/93	Dec	8,866	564	9	3,773	510	10	4,160	630	7	-4,706	66	-1
1/94	Jan	9,392	515	8	3,773	510	10	4,686	524	6	-4,706	9	-2
2/94	Feb	14,923	407	8	3,773	510	10	10,217	361	8	-4,706	-46	-1
3/94	Mar	14,466	612	8	3,773	510	10	9,759	663	7	-4,706	51	-1
4/94	Apr	9,427	544	9	3,773	510	10	4,721	582	7	-4,706	38	-1
5/94	May	8,738	577	9	3,773	510	10	4,031	661	8	-4,706	83	-1
6/94	Jun	7,731	567	10	3,773	510	10	3,024	661	9	-4,706	94	0
7/94	Jul	7,578	576	10	3,773	510	10	2,871	691	10	-4,706	115	0
8/94	Aug	7,376	567	10	3,773	510	10	2,669	675	9	-4,706	108	-1
9/94	Sep	7,331	564	10	3,773	510	10	2,625	668	9	-4,706	104	0
10/94	Oct	9,004	553	9	3,773	510	10	4,297	604	8	-4,706	51	-1
11/94	Nov	10,638	516	9	3,773	510	10	5,932	523	8	-4,706	8	-1
12/94	Dec	11,506	533	9	3,773	510	10	6,800	552	8	-4,706	19	-1
1/95	Jan	55,734	306	5	3,773	510	10	51,028	287	4	-4,706	-18	0
2/95	Feb	25,655	327	7	3,773	510	10	20,949	287	6	-4,706	-40	-1
3/95	Mar	116,185	171	4	3,773	510	10	111,479	157	4	-4,706	-14	0
4/95	Apr	22,239	388	8	3,773	510	10	17,533	357	7	-4,706	-32	-1
5/95	May	19,027	422	7	3,773	510	10	14,320	394	6	-4,706	-28	-1
6/95	Jun	13,904	496	9	3,773	510	10	9,197	490	9	-4,706	-5	0
7/95	Jul	8,850	569	9	3,773	510	10	4,144	640	8	-4,706	71	-1
8/95	Aug	8,253	583	10	3,773	510	10	3,547	684	10	-4,706	101	0
9/95	Sep	7,870	590	10	3,773	510	10	3,163	714	11	-4,706	125	0
10/95	Oct	8,654	585	9	3,773	510	10	3,947	679	9	-4,706	94	-1
11/95	Nov	8,868	579	9	3,773	510	10	4,162	662	7	-4,706	83	-1
12/95	Dec	9,047	555	8	3,773	510	10	4,341	609	6	-4,706	53	-2
1/96	Jan	13,175	505	9	3,773	510	10	8,469	505	8	-4,706	0	-1
2/96	Feb	27,504	257	6	3,773	510	10	22,798	205	5	-4,706	-51	-1
3/96	Mar	16,516	382	8	3,773	510	10	11,810	333	7	-4,706	-49	-1
4/96	Apr	10,548	570	9	3,773	510	10	5,842	622	8	-4,706	52	-1
5/96	May	10,359	596	9	3,773	510	10	5,653	671	8	-4,706	75	-1
6/96	Jun	9,515	590	9	3,773	510	10	4,809	673	7	-4,706	83	-1
7/96	Jul	9,268	582	9	3,773	510	10	4,562	660	7	-4,706	78	-1
8/96	Aug	8,909	560	9	3,773	510	10	4,203	621	8	-4,706	61	-1
9/96	Sep	9,356	524	9	3,773	510	10	4,649	543	8	-4,706	18	-1
10/96	Oct	10,890	570	9	3,773	510	10	6,184	619	9	-4,706	49	0
11/96	Nov	16,349	558	8	3,773	510	10	11,643	579	7	-4,706	21	-1
12/96	Dec	13,753	496	9	3,773	510	10	9,046	491	8	-4,706	-5	-1
1/97	Jan	41,012	506	5	3,773	510	10	36,306	506	4	-4,706	0	-1
2/97	Feb	11,191	563	10	3,773	510	10	6,485	604	10	-4,706	41	0
3/97	Mar	10,513	576	9	3,773	510	10	5,806	633	9	-4,706	57	-1
4/97	Apr	10,486	579	9	3,773	510	10	5,779	639	8	-4,706	59	-1
5/97	May	9,606	563	9	3,773	510	10	4,900	617	9	-4,706	55	-1
6/97	Jun	9,326	575	10	3,773	510	10	4,620	645	10	-4,706	70	0
7/97	Jul	8,880	582	8	3,773	510	10	4,174	668	5	-4,706	86	-2
8/97	Aug	8,762	584	10	3,773	510	10	4,056	675	9	-4,706	91	0
9/97	Sep	9,134	578	10	3,773	510	10	4,428	654	10	-4,706	76	0
10/97	Oct	9,016	573	11	3,773	510	10	4,309	645	13	-4,706	73	1
11/97	Nov	10,779	480	9	3,773	510	10	6,073	459	9	-4,706	-20	-1

Table 8a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 3
Maximum Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge At Riverside Narrows			Alt 3 Recycled Water Export			Alt 3 Total Discharge At Riverside Narrows			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
12/97	Dec	15,564	570	5	3,773	510	10	10,857	597	2	-4,706	28	-2
1/98	Jan	15,618	562	9	3,773	510	10	10,912	587	9	-4,706	24	0
2/98	Feb	77,548	225	4	3,773	510	10	72,842	206	4	-4,706	-18	0
3/98	Mar	19,861	497	8	3,773	510	10	15,154	494	7	-4,706	-3	-1
4/98	Apr	23,583	403	6	3,773	510	10	18,877	378	5	-4,706	-26	-1
5/98	May	37,933	278	3	3,773	510	10	33,227	245	2	-4,706	-32	-1
6/98	Jun	16,641	432	6	3,773	510	10	11,935	402	5	-4,706	-29	-1
7/98	Jul	10,024	564	9	3,773	510	10	5,317	615	9	-4,706	51	0
8/98	Aug	11,774	534	10	3,773	510	10	7,068	553	11	-4,706	19	0
9/98	Sep	11,371	487	9	3,773	510	10	6,665	474	9	-4,706	-13	-1
10/98	Oct	9,998	561	10	3,773	510	10	5,291	609	10	-4,706	49	0
11/98	Nov	10,350	536	9	3,773	510	10	5,643	561	8	-4,706	25	-1
12/98	Dec	10,464	560	9	3,773	510	10	5,758	604	8	-4,706	44	-1
1/99	Jan	11,454	477	7	3,773	510	10	6,748	456	6	-4,706	-20	-2
2/99	Feb	10,952	552	8	3,773	510	10	6,245	586	7	-4,706	34	-1
3/99	Mar	10,585	565	9	3,773	510	10	5,879	613	9	-4,706	47	0
4/99	Apr	11,680	498	9	3,773	510	10	6,974	493	8	-4,706	-5	-1
5/99	May	9,609	600	10	3,773	510	10	4,902	691	10	-4,706	91	0
6/99	Jun	10,723	564	11	3,773	510	10	6,016	609	12	-4,706	45	1
7/99	Jul	9,791	526	10	3,773	510	10	5,085	544	10	-4,706	18	0
8/99	Aug	9,568	580	11	3,773	510	10	4,862	652	12	-4,706	72	1
9/99	Sep	9,091	580	12	3,773	510	10	4,384	659	13	-4,706	79	2
Average		15,284	519	8	3,773	510	10	10,578	557	7	-4,706	38	-1
Max		118,232	612	12				113,526	741	13	-4,706	153	2
Min		7,212	171	3				2,505	157	1	-4,706	-51	-5
StDev		16,829	90	2				16,829	126	3	0	43	1
Coef of Var		110%	17%	24%				159%	23%	41%	0%	112%	-104%

Table 8b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 3
Maximum Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 3 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
10/89	Oct	33,103	599	8	17,665	635	6.4	-15,438	37	-1.4
11/89	Nov	34,537	589	9	19,099	616	7.9	-15,438	27	-0.7
12/89	Dec	35,563	604	9	20,125	640	8.0	-15,438	36	-0.7
1/90	Jan	40,128	575	9	24,690	586	8.1	-15,438	11	-0.6
2/90	Feb	49,942	523	7	34,504	508	5.6	-15,438	-15	-1.3
3/90	Mar	34,988	584	7	19,551	606	4.9	-15,438	22	-2.1
4/90	Apr	34,185	598	8	18,747	632	6.0	-15,438	34	-1.6
5/90	May	33,959	595	8	18,521	627	7.3	-15,438	32	-1.0
6/90	Jun	31,621	596	8	16,183	634	7.7	-15,438	38	-0.7
7/90	Jul	29,948	603	8	14,511	652	7.3	-15,438	49	-0.5
8/90	Aug	30,767	593	8	15,329	629	7.2	-15,438	36	-0.9
9/90	Sep	30,251	596	8	14,813	637	7.0	-15,438	41	-1.1
10/90	Oct	31,575	603	8	16,137	648	7.4	-15,438	45	-1.1
11/90	Nov	33,519	595	9	18,082	628	8.0	-15,438	33	-0.6
12/90	Dec	33,932	609	8	18,494	654	7.2	-15,438	44	-1.1
1/91	Jan	39,851	584	6	24,413	601	4.4	-15,438	17	-1.9
2/91	Feb	47,091	590	10	31,653	606	10.7	-15,438	16	0.2
3/91	Mar	91,223	400	5	75,785	368	4.4	-15,438	-32	-0.9
4/91	Apr	34,371	548	6	18,933	541	4.2	-15,438	-7	-2.2
5/91	May	33,399	568	8	17,961	578	7.7	-15,438	10	-0.5
6/91	Jun	32,531	595	8	17,093	629	6.8	-15,438	35	-1.0
7/91	Jul	30,590	591	8	15,153	625	7.2	-15,438	35	-0.9
8/91	Aug	30,145	586	8	14,707	618	7.3	-15,438	31	-1.0
9/91	Sep	29,494	586	8	14,056	618	7.3	-15,438	32	-1.0
10/91	Oct	29,927	592	8	14,490	631	6.8	-15,438	38	-1.2
11/91	Nov	32,384	606	8	16,946	650	7.3	-15,438	45	-0.9
12/91	Dec	36,323	593	9	20,885	621	8.0	-15,438	27	-0.7
1/92	Jan	42,577	544	9	27,140	536	8.9	-15,438	-7	-0.4
2/92	Feb	71,679	413	8	56,241	373	6.9	-15,438	-39	-0.6
3/92	Mar	65,301	479	9	49,863	456	8.5	-15,438	-24	-0.3
4/92	Apr	34,797	540	7	19,359	526	5.2	-15,438	-13	-2.1
5/92	May	33,642	600	8	18,205	638	7.3	-15,438	37	-1.1
6/92	Jun	31,266	600	8	15,828	642	7.5	-15,438	42	-0.9
7/92	Jul	30,966	600	9	15,529	644	8.5	-15,438	44	-0.5
8/92	Aug	30,630	576	9	15,192	595	9.0	-15,438	20	-0.1
9/92	Sep	30,322	597	9	14,884	640	9.1	-15,438	42	0.0
10/92	Oct	32,946	612	9	17,508	660	8.3	-15,438	49	-0.4
11/92	Nov	32,933	604	8	17,495	647	7.6	-15,438	42	-0.8
12/92	Dec	56,641	494	7	41,203	471	6.1	-15,438	-23	-1.0
1/93	Jan	242,113	286	5	226,675	268	4.5	-15,438	-18	-0.3
2/93	Feb	169,889	366	6	154,452	347	5.7	-15,438	-19	-0.4
3/93	Mar	76,370	475	6	60,933	455	5.1	-15,438	-21	-0.9
4/93	Apr	54,504	518	7	39,067	503	6.5	-15,438	-15	-0.9
5/93	May	43,544	559	8	28,106	560	6.4	-15,438	1	-1.2
6/93	Jun	37,972	597	8	22,534	625	6.1	-15,438	28	-1.6
7/93	Jul	32,033	616	9	16,595	671	9.2	-15,438	55	0.0
8/93	Aug	29,794	616	9	14,356	680	8.1	-15,438	64	-0.5
9/93	Sep	29,240	613	9	13,802	677	8.3	-15,438	63	-0.5
10/93	Oct	31,485	614	8	16,047	670	7.4	-15,438	56	-0.8
11/93	Nov	37,187	611	9	21,749	650	8.7	-15,438	39	-0.2

Table 8b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 3
Maximum Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 3 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
12/93	Dec	36,468	575	9	21,030	588	8.2	-15,438	13	-0.5
1/94	Jan	36,576	606	9	21,138	641	8.4	-15,438	36	-0.5
2/94	Feb	51,579	505	7	36,141	483	6.1	-15,438	-22	-1.1
3/94	Mar	46,486	630	8	31,049	666	7.4	-15,438	36	-0.8
4/94	Apr	36,085	606	8	20,647	643	7.1	-15,438	37	-1.1
5/94	May	33,877	609	8	18,439	652	6.4	-15,438	44	-1.4
6/94	Jun	30,782	609	7	15,345	661	5.7	-15,438	52	-1.8
7/94	Jul	30,015	610	8	14,577	666	6.8	-15,438	56	-1.2
8/94	Aug	29,125	601	9	13,688	652	8.1	-15,438	51	-0.5
9/94	Sep	29,527	598	9	14,089	643	8.3	-15,438	45	-0.4
10/94	Oct	32,531	595	9	17,093	630	8.4	-15,438	35	-0.5
11/94	Nov	33,724	601	9	18,287	638	9.1	-15,438	37	-0.4
12/94	Dec	35,170	609	9	19,733	650	8.0	-15,438	41	-0.9
1/95	Jan	129,180	389	6	113,742	367	6.0	-15,438	-23	-0.4
2/95	Feb	57,028	521	7	41,590	507	5.8	-15,438	-13	-1.1
3/95	Mar	164,743	357	5	149,306	337	4.7	-15,438	-21	-0.5
4/95	Apr	59,992	536	6	44,555	529	4.7	-15,438	-7	-1.3
5/95	May	47,497	570	7	32,059	577	5.3	-15,438	7	-1.5
6/95	Jun	42,977	563	7	27,539	566	5.1	-15,438	4	-1.8
7/95	Jul	30,009	587	8	14,571	620	6.0	-15,438	33	-1.8
8/95	Aug	30,682	610	9	15,244	664	8.4	-15,438	54	-0.5
9/95	Sep	30,655	607	9	15,218	658	8.1	-15,438	51	-0.6
10/95	Oct	31,821	603	9	16,383	647	8.2	-15,438	44	-0.6
11/95	Nov	33,153	605	9	17,715	647	8.4	-15,438	42	-0.5
12/95	Dec	35,466	581	9	20,028	600	8.7	-15,438	19	-0.3
1/96	Jan	39,242	598	9	23,804	625	9.1	-15,438	27	-0.4
2/96	Feb	74,040	405	6	58,603	365	5.1	-15,438	-40	-1.0
3/96	Mar	45,364	544	7	29,926	537	5.4	-15,438	-7	-1.5
4/96	Apr	35,871	625	9	20,433	677	7.5	-15,438	52	-1.0
5/96	May	34,025	633	9	18,587	696	9.1	-15,438	63	-0.4
6/96	Jun	31,666	618	9	16,229	677	9.2	-15,438	59	-0.2
7/96	Jul	30,519	621	9	15,082	687	9.0	-15,438	66	-0.3
8/96	Aug	31,331	603	9	15,893	649	9.3	-15,438	46	-0.1
9/96	Sep	31,509	597	9	16,071	635	9.2	-15,438	39	-0.2
10/96	Oct	33,915	601	10	18,477	638	9.3	-15,438	37	-0.4
11/96	Nov	41,974	549	6	26,536	544	3.9	-15,438	-4	-2.2
12/96	Dec	44,343	542	6	28,905	535	3.6	-15,438	-8	-2.2
1/97	Jan	73,408	424	5	57,970	388	3.5	-15,438	-35	-1.3
2/97	Feb	37,252	584	9	21,814	603	7.6	-15,438	19	-1.0
3/97	Mar	35,914	600	10	20,476	632	9.3	-15,438	33	-0.3
4/97	Apr	34,120	596	10	18,682	629	9.2	-15,438	33	-0.3
5/97	May	32,974	601	9	17,536	639	8.5	-15,438	39	-0.6
6/97	Jun	32,361	592	9	16,923	625	8.8	-15,438	33	-0.4
7/97	Jul	30,657	600	9	15,219	644	8.1	-15,438	44	-0.6
8/97	Aug	30,097	608	9	14,659	663	7.9	-15,438	55	-0.8
9/97	Sep	31,117	604	8	15,680	651	5.6	-15,438	47	-2.0
10/97	Oct	32,217	595	10	16,780	630	10.8	-15,438	35	0.5
11/97	Nov	37,330	563	8	21,893	568	6.2	-15,438	5	-1.6
12/97	Dec	48,055	508	5	32,617	485	2.6	-15,438	-23	-2.2
1/98	Jan	49,485	489	7	34,048	458	5.9	-15,438	-31	-1.3

Table 8b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 3
Maximum Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 3 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
2/98	Feb	200,064	303	3	184,627	282	2.9	-15,438	-21	-0.5
3/98	Mar	59,744	501	6	44,306	482	4.7	-15,438	-19	-1.3
4/98	Apr	52,443	516	6	37,005	499	4.7	-15,438	-17	-1.5
5/98	May	78,601	415	5	63,163	381	3.4	-15,438	-34	-1.2
6/98	Jun	42,631	520	7	27,193	499	5.2	-15,438	-21	-1.6
7/98	Jul	33,209	590	8	17,771	618	5.9	-15,438	29	-1.8
8/98	Aug	33,926	587	9	18,489	613	8.7	-15,438	26	-0.7
9/98	Sep	34,013	586	9	18,575	610	8.2	-15,438	24	-0.9
10/98	Oct	34,000	599	9	18,562	634	8.2	-15,438	35	-0.8
11/98	Nov	36,171	595	8	20,733	623	7.4	-15,438	28	-1.0
12/98	Dec	36,671	612	10	21,233	653	9.3	-15,438	41	-0.3
1/99	Jan	40,882	573	9	25,444	583	8.3	-15,438	10	-0.6
2/99	Feb	37,563	576	9	22,125	590	8.3	-15,438	14	-0.7
3/99	Mar	36,492	571	9	21,054	582	9.0	-15,438	11	-0.4
4/99	Apr	39,795	568	8	24,357	575	7.2	-15,438	7	-1.1
5/99	May	35,454	604	9	20,017	641	7.9	-15,438	37	-0.8
6/99	Jun	33,606	605	10	18,168	647	8.8	-15,438	42	-0.7
7/99	Jul	32,862	598	9	17,424	635	8.5	-15,438	37	-0.7
8/99	Aug	31,340	597	9	15,903	636	8.9	-15,438	39	-0.5
9/99	Sep	31,229	597	9	15,791	636	9.0	-15,438	39	-0.4
Average		44,648	566	8.1	29,211	588	7.2	-15,438	22	-0.9
Max		242,113	633	10.5	226,675	696	10.8	-15,438	66	0.5
Min		29,125	286	3.4	13,688	268	2.6	-15,438	-40	-2.2
StDev		31,822	67	1.3	31,822	92	1.7	0.0	27.5	0.6
Coef of Var		71%	12%	16%	109%	16%	24%	0%	124%	-64%
					For August Data Only					
Average		30,784	598	8.8	15,346	640	8.3	-15,438	42	-0.6
Max		33,926	616	9.4	18,489	680	9.3	-15,438	64	-0.1
Min		29,125	576	8.1	13,688	595	7.2	-15,438	20	-1.0
StDev		1,296	12	0.5	1,296	26	0.7	0	14	0.3
Coef of Var		4%	2%	5%	8%	4%	9%	0%	33%	-53%

Table 8c
Annual Flow and TDS Impacts of Exporting Recycled Water from RIX
Year 2040 Alternative 3
Maximum Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Water Year	Baseline Total Discharge Below Prado Dam				Alternative 3 Total Discharge Below Prado Dam				Difference			
	Annual Average		Five-year average		Annual Average		Five-year average		Annual Average		Five-year average	
	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)
89-90	418,993	585	491,783	542	233,740	607	306,530	533	-185,253	23	-185,253	-9
90-91	467,721	550	494,526	538	282,468	546	309,273	528	-185,253	-4	-185,253	-11
91-92	469,815	543	496,863	535	284,562	534	311,609	523	-185,253	-9	-185,253	-13
92-93	837,979	438	524,115	525	652,726	404	338,861	508	-185,253	-34	-185,253	-17
93-94	429,192	595	524,740	526	243,939	624	339,487	509	-185,253	29	-185,253	-17
94-95	694,189	487	579,779	508	508,936	462	394,526	485	-185,253	-25	-185,253	-23
95-96	454,007	569	577,036	511	268,754	577	391,783	489	-185,253	8	-185,253	-22
96-97	458,132	560	574,700	513	272,878	563	389,447	493	-185,253	3	-185,253	-20
97-98	701,719	457	547,448	522	516,466	421	362,195	504	-185,253	-36	-185,253	-18
98-99	426,064	591	546,822	521	240,811	617	361,569	503	-185,253	26	-185,253	-18
Average	535,781	537	535,781	524	350,528	536	350,528	508	-185,253	-2	-185,253	-17
Max	837,979	595	579,779	542	652,726	624	394,526	533	-185,253	29	-185,253	-9
Min	418,993	438	491,783	508	233,740	404	306,530	485	-185,253	-36	-185,253	-23
StDev	150,071	57	34,675	12	150,071	80	34,675	16	0	24	0	5
Coef of Var	28%	11%	6%	2%	43%	15%	10%	3%	0%	-1279%	0%	-28%

Table 9a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 4
Intermediate Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline			Alt 4						Difference		
		Total Discharge At Riverside Narrows			Recycled Water Export			Total Discharge At Riverside Narrows					
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
10/89	Oct	6,635	564	5	980	510	10	5,094	583	3	-1,541	19	-2
11/89	Nov	7,229	559	6	980	510	10	5,689	574	5	-1,541	15	-1
12/89	Dec	7,311	564	7	980	510	10	5,770	581	6	-1,541	16	-1
1/90	Jan	9,380	560	6	980	510	10	7,839	571	6	-1,541	11	-1
2/90	Feb	10,276	580	8	980	510	10	8,735	594	7	-1,541	14	0
3/90	Mar	7,663	574	6	980	510	10	6,122	592	4	-1,541	18	-1
4/90	Apr	7,944	564	5	980	510	10	6,403	579	3	-1,541	15	-1
5/90	May	7,278	563	5	980	510	10	5,737	579	3	-1,541	16	-1
6/90	Jun	6,392	567	3	980	510	10	4,852	588	1	-1,541	20	-2
7/90	Jul	5,482	576	1	980	510	10	3,941	605	1	-1,541	29	0
8/90	Aug	5,827	564	4	980	510	10	4,286	586	1	-1,541	22	-2
9/90	Sep	5,680	569	6	980	510	10	4,139	594	5	-1,541	25	-1
10/90	Oct	5,913	560	11	980	510	10	4,372	580	11	-1,541	20	0
11/90	Nov	6,032	557	6	980	510	10	4,491	576	5	-1,541	19	-1
12/90	Dec	6,894	581	9	980	510	10	5,353	604	9	-1,541	23	0
1/91	Jan	8,080	567	4	980	510	10	6,539	582	2	-1,541	15	-2
2/91	Feb	13,864	589	10	980	510	10	12,324	600	10	-1,541	11	0
3/91	Mar	29,244	233	3	980	510	10	27,703	218	3	-1,541	-15	0
4/91	Apr	7,869	560	2	980	510	10	6,328	574	1	-1,541	14	-1
5/91	May	6,093	596	3	980	510	10	4,553	627	1	-1,541	31	-2
6/91	Jun	6,358	596	3	980	510	10	4,818	625	1	-1,541	30	-2
7/91	Jul	5,121	596	5	980	510	10	3,580	636	3	-1,541	40	-2
8/91	Aug	5,102	575	8	980	510	10	3,561	606	7	-1,541	31	-1
9/91	Sep	4,893	593	8	980	510	10	3,352	634	8	-1,541	41	-1
10/91	Oct	5,520	579	7	980	510	10	3,979	609	5	-1,541	30	-1
11/91	Nov	6,179	575	5	980	510	10	4,638	599	3	-1,541	24	-2
12/91	Dec	7,570	574	7	980	510	10	6,030	593	6	-1,541	18	-1
1/92	Jan	8,974	590	8	980	510	10	7,433	608	7	-1,541	18	0
2/92	Feb	24,183	503	7	980	510	10	22,643	503	7	-1,541	0	0
3/92	Mar	17,232	540	6	980	510	10	15,691	543	5	-1,541	4	0
4/92	Apr	7,017	583	10	980	510	10	5,477	605	10	-1,541	22	0
5/92	May	6,338	593	9	980	510	10	4,797	622	9	-1,541	29	0
6/92	Jun	5,724	557	8	980	510	10	4,183	577	7	-1,541	20	-1
7/92	Jul	5,704	577	10	980	510	10	4,163	605	10	-1,541	28	0
8/92	Aug	5,121	580	8	980	510	10	3,580	613	8	-1,541	33	-1
9/92	Sep	5,074	575	7	980	510	10	3,533	606	6	-1,541	31	-1
10/92	Oct	5,691	579	6	980	510	10	4,151	607	5	-1,541	28	-1
11/92	Nov	5,810	567	6	980	510	10	4,269	590	4	-1,541	23	-1
12/92	Dec	17,108	444	7	980	510	10	15,567	438	6	-1,541	-6	0
1/93	Jan	115,487	340	4	980	510	10	113,946	337	3	-1,541	-2	0
2/93	Feb	49,253	254	4	980	510	10	47,712	246	4	-1,541	-8	0
3/93	Mar	36,933	279	4	980	510	10	35,392	269	3	-1,541	-10	0
4/93	Apr	26,995	323	6	980	510	10	25,454	312	6	-1,541	-11	0
5/93	May	17,936	384	6	980	510	10	16,396	373	6	-1,541	-11	0
6/93	Jun	9,287	532	9	980	510	10	7,746	538	9	-1,541	6	0
7/93	Jul	5,318	624	8	980	510	10	3,777	674	8	-1,541	50	-1
8/93	Aug	4,466	639	10	980	510	10	2,926	710	10	-1,541	72	0
9/93	Sep	4,954	617	9	980	510	10	3,413	669	8	-1,541	52	-1
10/93	Oct	5,112	610	8	980	510	10	3,571	657	7	-1,541	46	-1

Table 9a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 4
Intermediate Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge At Riverside Narrows			Alt 4 Recycled Water Export			Alt 4 Total Discharge At Riverside Narrows			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
11/93	Nov	4,957	527	9	980	510	10	3,416	538	9	-1,541	11	0
12/93	Dec	6,121	591	8	980	510	10	4,580	621	8	-1,541	30	-1
1/94	Jan	6,647	519	7	980	510	10	5,106	524	7	-1,541	5	-1
2/94	Feb	12,178	385	8	980	510	10	10,637	368	8	-1,541	-17	0
3/94	Mar	11,720	637	8	980	510	10	10,180	657	8	-1,541	20	0
4/94	Apr	6,682	560	8	980	510	10	5,141	577	8	-1,541	17	-1
5/94	May	5,992	611	9	980	510	10	4,452	648	8	-1,541	37	0
6/94	Jun	4,985	601	10	980	510	10	3,445	644	10	-1,541	44	0
7/94	Jul	4,832	617	10	980	510	10	3,291	670	10	-1,541	53	0
8/94	Aug	4,630	604	9	980	510	10	3,089	655	9	-1,541	51	0
9/94	Sep	4,586	599	10	980	510	10	3,045	648	9	-1,541	49	0
10/94	Oct	6,258	574	8	980	510	10	4,717	597	8	-1,541	23	0
11/94	Nov	7,893	519	9	980	510	10	6,352	523	8	-1,541	4	0
12/94	Dec	8,761	542	8	980	510	10	7,220	550	8	-1,541	8	0
1/95	Jan	52,989	295	4	980	510	10	51,448	289	4	-1,541	-6	0
2/95	Feb	22,910	306	6	980	510	10	21,369	292	6	-1,541	-14	0
3/95	Mar	113,440	163	4	980	510	10	111,899	158	4	-1,541	-5	0
4/95	Apr	19,494	372	7	980	510	10	17,953	361	7	-1,541	-11	0
5/95	May	16,281	408	7	980	510	10	14,741	398	7	-1,541	-10	0
6/95	Jun	11,158	493	9	980	510	10	9,618	492	9	-1,541	-1	0
7/95	Jul	6,105	598	8	980	510	10	4,564	630	8	-1,541	32	-1
8/95	Aug	5,508	621	10	980	510	10	3,967	667	10	-1,541	46	0
9/95	Sep	5,124	635	10	980	510	10	3,583	692	11	-1,541	57	0
10/95	Oct	5,908	623	9	980	510	10	4,367	665	9	-1,541	42	0
11/95	Nov	6,123	612	8	980	510	10	4,582	649	8	-1,541	37	-1
12/95	Dec	6,302	577	7	980	510	10	4,761	602	7	-1,541	24	-1
1/96	Jan	10,430	506	8	980	510	10	8,889	506	8	-1,541	1	0
2/96	Feb	24,759	229	5	980	510	10	23,218	211	5	-1,541	-18	0
3/96	Mar	13,771	358	8	980	510	10	12,230	340	7	-1,541	-18	0
4/96	Apr	7,803	594	9	980	510	10	6,262	616	8	-1,541	22	0
5/96	May	7,614	629	8	980	510	10	6,073	661	8	-1,541	32	0
6/96	Jun	6,770	625	8	980	510	10	5,229	661	7	-1,541	36	-1
7/96	Jul	6,523	614	8	980	510	10	4,982	649	7	-1,541	34	-1
8/96	Aug	6,164	585	9	980	510	10	4,623	613	9	-1,541	28	0
9/96	Sep	6,610	532	9	980	510	10	5,070	541	8	-1,541	9	0
10/96	Oct	8,145	592	9	980	510	10	6,604	613	9	-1,541	21	0
11/96	Nov	13,604	569	7	980	510	10	12,063	577	7	-1,541	8	0
12/96	Dec	11,007	494	8	980	510	10	9,467	492	8	-1,541	-1	0
1/97	Jan	38,267	506	5	980	510	10	36,726	506	4	-1,541	0	0
2/97	Feb	8,446	582	10	980	510	10	6,905	600	10	-1,541	18	0
3/97	Mar	7,767	601	9	980	510	10	6,226	626	9	-1,541	24	0
4/97	Apr	7,740	605	9	980	510	10	6,200	631	8	-1,541	26	0
5/97	May	6,861	586	9	980	510	10	5,320	610	9	-1,541	24	0
6/97	Jun	6,581	604	10	980	510	10	5,040	635	10	-1,541	31	0
7/97	Jul	6,135	617	7	980	510	10	4,594	656	6	-1,541	38	-1
8/97	Aug	6,016	621	10	980	510	10	4,476	662	9	-1,541	41	0
9/97	Sep	6,389	609	10	980	510	10	4,848	643	10	-1,541	34	0
10/97	Oct	6,270	602	12	980	510	10	4,730	635	12	-1,541	32	1
11/97	Nov	8,034	471	9	980	510	10	6,493	464	9	-1,541	-7	0

Table 9a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 4
Intermediate Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge At Riverside Narrows			Alt 4 Recycled Water Export			Alt 4 Total Discharge At Riverside Narrows			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
12/97	Dec	12,818	584	4	980	510	10	11,277	595	3	-1,541	11	-1
1/98	Jan	12,873	575	9	980	510	10	11,332	585	9	-1,541	10	0
2/98	Feb	74,803	214	4	980	510	10	73,262	208	4	-1,541	-6	0
3/98	Mar	17,115	495	7	980	510	10	15,575	495	7	-1,541	-1	0
4/98	Apr	20,838	390	6	980	510	10	19,297	381	5	-1,541	-9	0
5/98	May	35,188	260	3	980	510	10	33,647	249	2	-1,541	-11	0
6/98	Jun	13,896	417	6	980	510	10	12,355	407	5	-1,541	-11	-1
7/98	Jul	7,278	586	9	980	510	10	5,737	609	9	-1,541	22	0
8/98	Aug	9,029	543	11	980	510	10	7,488	551	11	-1,541	8	0
9/98	Sep	8,625	482	9	980	510	10	7,085	477	9	-1,541	-5	0
10/98	Oct	7,252	582	10	980	510	10	5,712	603	10	-1,541	21	0
11/98	Nov	7,604	548	9	980	510	10	6,064	559	8	-1,541	11	0
12/98	Dec	7,719	579	9	980	510	10	6,178	598	8	-1,541	19	0
1/99	Jan	8,709	468	7	980	510	10	7,168	461	6	-1,541	-7	-1
2/99	Feb	8,206	567	8	980	510	10	6,665	582	7	-1,541	15	0
3/99	Mar	7,840	587	9	980	510	10	6,299	607	9	-1,541	21	0
4/99	Apr	8,935	496	8	980	510	10	7,394	495	8	-1,541	-1	0
5/99	May	6,863	639	10	980	510	10	5,323	678	10	-1,541	39	0
6/99	Jun	7,977	584	11	980	510	10	6,437	604	12	-1,541	19	0
7/99	Jul	7,046	534	10	980	510	10	5,505	543	10	-1,541	9	0
8/99	Aug	6,823	611	12	980	510	10	5,282	642	12	-1,541	32	0
9/99	Sep	6,345	612	12	980	510	10	4,804	647	13	-1,541	35	1
Average		12,538	534	7	980	510	10	10,998	552	7	-1,541	18	0
Max		115,487	639	12				113,946	710	13	-1,541	72	1
Min		4,466	163	1				2,926	158	1	-1,541	-18	-2
StDev		16,829	105	2				16,829	120	3	0	19	1
Coef of Var		134%	20%	31%				153%	22%	38%	0%	105%	-111%

Table 9b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 4
Intermediate Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 4 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
10/89	Oct	21,580	626	7	13,697	656	5.5	-7,883	30	-1.2
11/89	Nov	23,014	610	8	15,131	630	7.5	-7,883	19	-0.5
12/89	Dec	24,040	630	8	16,157	658	7.7	-7,883	28	-0.5
1/90	Jan	28,605	586	8	20,722	591	7.6	-7,883	5	-0.7
2/90	Feb	38,419	516	6	30,535	501	5.0	-7,883	-15	-1.1
3/90	Mar	23,466	602	6	15,582	616	3.7	-7,883	15	-1.8
4/90	Apr	22,662	623	7	14,779	650	5.2	-7,883	27	-1.4
5/90	May	22,436	620	7	14,553	645	6.7	-7,883	25	-0.8
6/90	Jun	20,098	624	8	12,215	656	7.1	-7,883	33	-0.6
7/90	Jul	18,425	638	7	10,542	686	6.3	-7,883	48	-0.4
8/90	Aug	19,244	620	7	11,361	652	6.3	-7,883	32	-0.8
9/90	Sep	18,728	626	7	10,845	664	6.1	-7,883	38	-0.9
10/90	Oct	20,052	636	7	12,169	676	6.7	-7,883	41	-0.7
11/90	Nov	21,996	620	8	14,113	647	7.7	-7,883	26	-0.3
12/90	Dec	22,409	641	8	14,525	678	6.6	-7,883	37	-0.9
1/91	Jan	28,328	598	5	20,444	608	3.5	-7,883	10	-1.6
2/91	Feb	35,568	604	11	27,685	612	10.6	-7,883	9	0.0
3/91	Mar	79,700	378	5	71,817	357	4.1	-7,883	-21	-0.6
4/91	Apr	22,848	548	5	14,965	535	2.6	-7,883	-13	-2.1
5/91	May	21,876	578	7	13,993	582	7.1	-7,883	3	-0.4
6/91	Jun	21,008	621	7	13,125	649	5.8	-7,883	29	-1.0
7/91	Jul	19,067	617	7	11,184	647	6.4	-7,883	31	-0.7
8/91	Aug	18,622	610	7	10,739	638	6.5	-7,883	27	-0.6
9/91	Sep	17,971	610	7	10,088	640	6.4	-7,883	29	-0.6
10/91	Oct	18,405	621	7	10,521	656	5.8	-7,883	36	-1.0
11/91	Nov	20,861	638	7	12,978	677	6.7	-7,883	39	-0.7
12/91	Dec	24,800	615	8	16,917	634	7.6	-7,883	19	-0.5
1/92	Jan	31,054	542	9	23,171	532	8.7	-7,883	-11	-0.4
2/92	Feb	60,156	387	7	52,272	359	6.6	-7,883	-28	-0.5
3/92	Mar	53,778	465	9	45,895	446	8.3	-7,883	-19	-0.2
4/92	Apr	23,274	536	6	15,390	517	4.1	-7,883	-19	-1.7
5/92	May	22,119	628	7	14,236	658	6.7	-7,883	30	-0.7
6/92	Jun	19,743	630	8	11,859	668	6.9	-7,883	38	-0.6
7/92	Jul	19,443	632	8	11,560	672	8.2	-7,883	40	-0.1
8/92	Aug	19,107	593	9	11,223	607	8.9	-7,883	14	0.3
9/92	Sep	18,799	628	9	10,916	667	9.1	-7,883	39	0.4
10/92	Oct	21,423	646	8	13,540	688	8.0	-7,883	42	-0.1
11/92	Nov	21,410	635	8	13,526	671	7.1	-7,883	36	-0.5
12/92	Dec	45,118	480	6	37,235	461	5.6	-7,883	-20	-0.8
1/93	Jan	230,590	273	5	222,706	263	4.4	-7,883	-11	-0.2
2/93	Feb	158,366	353	6	150,483	341	5.5	-7,883	-12	-0.2
3/93	Mar	64,847	462	5	56,964	447	4.7	-7,883	-15	-0.7
4/93	Apr	42,981	511	7	35,098	497	6.1	-7,883	-14	-0.7
5/93	May	32,021	563	7	24,137	560	5.7	-7,883	-3	-1.1
6/93	Jun	26,449	619	7	18,566	639	5.1	-7,883	20	-1.6
7/93	Jul	20,510	654	9	12,626	704	9.2	-7,883	50	0.4
8/93	Aug	18,271	659	8	10,387	725	7.6	-7,883	66	-0.1
9/93	Sep	17,717	656	8	9,834	722	7.8	-7,883	66	-0.1
10/93	Oct	19,962	653	7	12,078	705	6.8	-7,883	52	-0.5
11/93	Nov	25,664	639	8	17,781	669	8.6	-7,883	29	0.2

Table 9b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 4
Intermediate Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 4 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
12/93	Dec	24,945	587	8	17,062	594	8.0	-7,883	6	-0.2
1/94	Jan	25,053	632	8	17,170	659	8.2	-7,883	27	-0.2
2/94	Feb	40,056	493	6	32,173	473	5.6	-7,883	-20	-0.9
3/94	Mar	34,963	657	8	27,080	681	6.9	-7,883	24	-0.8
4/94	Apr	24,562	633	7	16,678	662	6.6	-7,883	29	-0.8
5/94	May	22,354	640	7	14,470	677	5.6	-7,883	37	-1.1
6/94	Jun	19,259	645	6	11,376	695	4.4	-7,883	50	-1.5
7/94	Jul	18,492	649	7	10,609	705	5.8	-7,883	56	-0.9
8/94	Aug	17,602	636	8	9,719	688	7.6	-7,883	51	-0.1
9/94	Sep	18,004	630	8	10,120	674	7.8	-7,883	44	0.0
10/94	Oct	21,008	621	8	13,124	649	8.1	-7,883	29	-0.2
11/94	Nov	22,201	628	9	14,318	659	9.0	-7,883	31	-0.2
12/94	Dec	23,647	639	8	15,764	672	7.5	-7,883	33	-0.9
1/95	Jan	117,657	374	6	109,773	360	5.9	-7,883	-14	-0.3
2/95	Feb	45,505	514	6	37,622	501	5.3	-7,883	-12	-0.8
3/95	Mar	153,220	343	5	145,337	331	4.6	-7,883	-12	-0.3
4/95	Apr	48,469	533	5	40,586	525	4.1	-7,883	-8	-1.0
5/95	May	35,974	577	6	28,091	578	4.5	-7,883	1	-1.2
6/95	Jun	31,454	568	6	23,570	567	4.1	-7,883	-2	-1.6
7/95	Jul	18,486	612	6	10,602	642	4.8	-7,883	29	-1.6
8/95	Aug	19,159	647	8	11,275	699	8.1	-7,883	52	-0.1
9/95	Sep	19,132	642	8	11,249	691	7.6	-7,883	48	-0.2
10/95	Oct	20,298	634	8	12,415	673	7.8	-7,883	39	-0.3
11/95	Nov	21,630	636	8	13,747	672	8.1	-7,883	36	-0.2
12/95	Dec	23,943	597	9	16,060	609	8.6	-7,883	12	0.0
1/96	Jan	27,719	619	9	19,835	637	8.8	-7,883	18	-0.4
2/96	Feb	62,517	379	5	54,634	351	4.8	-7,883	-28	-0.7
3/96	Mar	33,841	542	6	25,958	533	4.7	-7,883	-9	-1.3
4/96	Apr	24,348	662	8	16,465	704	7.1	-7,883	42	-0.8
5/96	May	22,502	676	9	14,619	732	9.0	-7,883	56	-0.2
6/96	Jun	20,143	658	9	12,260	713	9.1	-7,883	55	0.1
7/96	Jul	18,996	666	9	11,113	732	8.8	-7,883	66	0.0
8/96	Aug	19,808	636	9	11,924	678	9.3	-7,883	42	0.3
9/96	Sep	19,986	625	9	12,102	659	9.1	-7,883	34	0.1
10/96	Oct	22,392	628	9	14,509	658	9.2	-7,883	30	-0.2
11/96	Nov	30,451	549	5	22,568	541	2.7	-7,883	-8	-1.9
12/96	Dec	32,820	540	4	24,936	530	2.5	-7,883	-10	-1.9
1/97	Jan	61,885	401	4	54,001	375	2.9	-7,883	-25	-0.9
2/97	Feb	25,729	600	8	17,846	612	7.2	-7,883	12	-0.9
3/97	Mar	24,391	624	9	16,507	649	9.2	-7,883	25	-0.1
4/97	Apr	22,597	621	9	14,713	647	9.2	-7,883	26	-0.1
5/97	May	21,451	629	9	13,567	661	8.3	-7,883	32	-0.3
6/97	Jun	20,838	617	9	12,954	644	8.6	-7,883	27	-0.1
7/97	Jul	19,134	631	8	11,251	672	7.7	-7,883	41	-0.4
8/97	Aug	18,574	646	8	10,691	700	7.4	-7,883	54	-0.5
9/97	Sep	19,594	637	6	11,711	681	4.4	-7,883	43	-1.8
10/97	Oct	20,694	621	10	12,811	651	11.3	-7,883	30	0.9
11/97	Nov	25,807	570	7	17,924	569	5.5	-7,883	-1	-1.3
12/97	Dec	36,532	496	3	28,648	474	1.5	-7,883	-21	-1.8
1/98	Jan	37,962	471	6	30,079	444	5.2	-7,883	-27	-1.1

Table 9b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 4
Intermediate Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 4 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
2/98	Feb	188,541	288	3	180,658	276	2.7	-7,883	-12	-0.3
3/98	Mar	48,221	490	5	40,337	474	4.1	-7,883	-16	-1.0
4/98	Apr	40,920	507	5	33,037	492	4.1	-7,883	-16	-1.2
5/98	May	67,078	393	4	59,195	369	2.9	-7,883	-24	-0.8
6/98	Jun	31,108	509	6	23,225	488	4.3	-7,883	-22	-1.4
7/98	Jul	21,686	612	7	13,803	634	5.0	-7,883	22	-1.6
8/98	Aug	22,403	608	9	14,520	627	8.2	-7,883	19	-0.8
9/98	Sep	22,490	606	9	14,606	623	7.7	-7,883	18	-0.8
10/98	Oct	22,477	625	8	14,593	653	7.9	-7,883	28	-0.5
11/98	Nov	24,648	617	8	16,765	637	7.0	-7,883	20	-0.8
12/98	Dec	25,148	642	9	17,265	673	9.2	-7,883	31	-0.1
1/99	Jan	29,359	583	8	21,476	586	8.0	-7,883	4	-0.5
2/99	Feb	26,040	589	9	18,156	596	8.1	-7,883	7	-0.5
3/99	Mar	24,969	582	9	17,085	587	8.9	-7,883	4	-0.2
4/99	Apr	28,272	576	8	20,388	578	6.6	-7,883	1	-1.0
5/99	May	23,931	631	8	16,048	660	7.5	-7,883	29	-0.5
6/99	Jun	22,083	636	9	14,200	671	8.7	-7,883	35	-0.5
7/99	Jul	21,339	626	9	13,455	656	8.2	-7,883	31	-0.4
8/99	Aug	19,817	626	9	11,934	661	8.7	-7,883	35	-0.2
9/99	Sep	19,706	626	9	11,823	661	8.9	-7,883	35	0.0
Average		33,125	583	7.3	25,242	602	6.7	-7,883	19	-0.6
Max		230,590	676	10.6	222,706	732	11.3	-7,883	66	0.9
Min		17,602	273	3.0	9,719	263	1.5	-7,883	-28	-2.1
StDev		31,822	84	1.5	31,822	105	1.9	0.0	24.6	0.6
Coef of Var		96%	14%	21%	126%	17%	29%	0%	131%	-90%
					For August Data Only					
Average		19,261	628	8.1	11,377	667	7.8	-7,883	39	-0.3
Max		22,403	659	9.0	14,520	725	9.3	-7,883	66	0.3
Min		17,602	593	7.1	9,719	607	6.3	-7,883	14	-0.8
StDev		1,296	21	0.7	1,296	37	1.0	0	17	0.4
Coef of Var		7%	3%	9%	11%	6%	12%	0%	42%	-150%

Table 9c
Annual Flow and TDS Impacts of Exporting Recycled Water from RIX
Year 2010 Alternative 4
Intermediate Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Water Year	Baseline Total Discharge Below Prado Dam				Alternative 4 Total Discharge Below Prado Dam				Difference			
	Annual Average		Five-year average		Annual Average		Five-year average		Annual Average		Five-year average	
	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)
89-90	280,718	603	353,507	540	186,117	619	258,907	527	-94,601	15	-94,601	-12
90-91	329,445	551	356,250	535	234,845	543	261,649	521	-94,601	-9	-94,601	-14
91-92	331,539	541	358,587	531	236,938	528	263,986	515	-94,601	-13	-94,601	-15
92-93	699,704	416	385,839	517	605,103	392	291,238	499	-94,601	-24	-94,601	-18
93-94	290,916	617	386,464	518	196,315	638	291,864	500	-94,601	21	-94,601	-18
94-95	555,913	472	441,503	496	461,312	452	346,903	475	-94,601	-21	-94,601	-21
95-96	315,732	578	438,761	499	221,131	580	344,160	479	-94,601	2	-94,601	-20
96-97	319,856	566	436,424	503	225,255	563	341,823	483	-94,601	-3	-94,601	-19
97-98	563,443	435	409,172	513	468,843	407	314,571	496	-94,601	-28	-94,601	-18
98-99	287,788	611	408,546	512	193,188	630	313,946	494	-94,601	19	-94,601	-18
Average	397,505	539	397,505	516	302,905	535	302,905	499	-94,601	-4	-94,601	-17
Max	699,704	617	441,503	540	605,103	638	346,903	527	-94,601	21	-94,601	-12
Min	280,718	416	353,507	496	186,117	392	258,907	475	-94,601	-28	-94,601	-21
StDev	150,071	73	34,675	15	150,071	90	34,675	18	0	18	0	3
Coef of Var	38%	14%	9%	3%	50%	17%	11%	4%	0%	-445%	0%	-16%

Table 10a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 4
Intermediate Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline			Alt 4						Difference		
		Total Discharge At Riverside Narrows			Recycled Water Export			Total Discharge At Riverside Narrows					
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
10/89	Oct	9,380	547	6	1,886	510	10	6,560	565	5	-2,820	19	-2
11/89	Nov	9,975	544	7	1,886	510	10	7,155	560	6	-2,820	16	-1
12/89	Dec	10,056	548	7	1,886	510	10	7,236	565	6	-2,820	17	-1
1/90	Jan	12,125	547	7	1,886	510	10	9,305	560	6	-2,820	13	-1
2/90	Feb	13,021	564	8	1,886	510	10	10,201	581	8	-2,820	17	0
3/90	Mar	10,408	556	7	1,886	510	10	7,588	575	6	-2,820	19	-1
4/90	Apr	10,689	549	6	1,886	510	10	7,869	565	5	-2,820	16	-1
5/90	May	10,023	547	6	1,886	510	10	7,203	564	5	-2,820	17	-2
6/90	Jun	9,138	548	5	1,886	510	10	6,318	569	3	-2,820	20	-2
7/90	Jul	8,227	552	4	1,886	510	10	5,407	578	1	-2,820	25	-3
8/90	Aug	8,573	545	6	1,886	510	10	5,752	565	3	-2,820	20	-2
9/90	Sep	8,425	548	8	1,886	510	10	5,605	571	6	-2,820	23	-1
10/90	Oct	8,658	542	10	1,886	510	10	5,838	561	11	-2,820	19	0
11/90	Nov	8,777	541	8	1,886	510	10	5,957	558	6	-2,820	18	-1
12/90	Dec	9,639	559	9	1,886	510	10	6,819	583	9	-2,820	23	0
1/91	Jan	10,825	551	5	1,886	510	10	8,005	568	4	-2,820	17	-2
2/91	Feb	16,610	575	10	1,886	510	10	13,790	589	10	-2,820	15	0
3/91	Mar	31,989	256	4	1,886	510	10	29,169	233	3	-2,820	-24	-1
4/91	Apr	10,615	546	4	1,886	510	10	7,795	561	2	-2,820	15	-2
5/91	May	8,839	567	5	1,886	510	10	6,019	597	2	-2,820	30	-2
6/91	Jun	9,104	568	5	1,886	510	10	6,284	597	3	-2,820	29	-2
7/91	Jul	7,867	564	7	1,886	510	10	5,047	598	5	-2,820	34	-2
8/91	Aug	7,847	550	9	1,886	510	10	5,027	577	8	-2,820	26	-1
9/91	Sep	7,638	561	9	1,886	510	10	4,818	595	8	-2,820	34	-1
10/91	Oct	8,265	554	8	1,886	510	10	5,445	581	7	-2,820	26	-1
11/91	Nov	8,925	553	6	1,886	510	10	6,105	577	5	-2,820	23	-2
12/91	Dec	10,316	556	7	1,886	510	10	7,496	575	7	-2,820	20	-1
1/92	Jan	11,719	570	8	1,886	510	10	8,899	591	8	-2,820	21	-1
2/92	Feb	26,929	503	7	1,886	510	10	24,109	503	7	-2,820	0	0
3/92	Mar	19,977	535	6	1,886	510	10	17,157	540	6	-2,820	5	-1
4/92	Apr	9,763	561	10	1,886	510	10	6,943	584	10	-2,820	23	0
5/92	May	9,083	566	9	1,886	510	10	6,263	595	9	-2,820	28	0
6/92	Jun	8,469	540	9	1,886	510	10	5,649	558	8	-2,820	18	-1
7/92	Jul	8,449	554	10	1,886	510	10	5,629	579	10	-2,820	25	0
8/92	Aug	7,866	553	9	1,886	510	10	5,046	581	8	-2,820	28	-1
9/92	Sep	7,819	550	8	1,886	510	10	4,999	576	7	-2,820	26	-1
10/92	Oct	8,437	555	7	1,886	510	10	5,617	580	6	-2,820	26	-1
11/92	Nov	8,555	547	7	1,886	510	10	5,735	568	6	-2,820	21	-1
12/92	Dec	19,853	452	7	1,886	510	10	17,033	444	7	-2,820	-8	0
1/93	Jan	118,232	343	4	1,886	510	10	115,412	339	4	-2,820	-4	0
2/93	Feb	51,998	267	4	1,886	510	10	49,178	254	4	-2,820	-14	0
3/93	Mar	39,678	295	4	1,886	510	10	36,858	279	4	-2,820	-16	0
4/93	Apr	29,740	339	7	1,886	510	10	26,920	322	6	-2,820	-17	0
5/93	May	20,682	400	7	1,886	510	10	17,862	384	6	-2,820	-16	-1
6/93	Jun	12,032	526	9	1,886	510	10	9,212	533	9	-2,820	7	0
7/93	Jul	8,063	584	9	1,886	510	10	5,243	627	8	-2,820	43	-1
8/93	Aug	7,212	588	10	1,886	510	10	4,392	642	10	-2,820	54	0
9/93	Sep	7,700	577	9	1,886	510	10	4,880	620	9	-2,820	43	0
10/93	Oct	7,858	573	9	1,886	510	10	5,038	613	8	-2,820	39	-1

Table 10a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 4
Intermediate Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline			Alt 4						Difference		
		Total Discharge At Riverside Narrows			Recycled Water Export			Total Discharge At Riverside Narrows					
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
11/93	Nov	7,702	519	10	1,886	510	10	4,882	528	9	-2,820	9	0
12/93	Dec	8,866	564	9	1,886	510	10	6,046	593	8	-2,820	28	-1
1/94	Jan	9,392	515	8	1,886	510	10	6,572	520	7	-2,820	5	-1
2/94	Feb	14,923	407	8	1,886	510	10	12,103	384	8	-2,820	-22	0
3/94	Mar	14,466	612	8	1,886	510	10	11,646	638	8	-2,820	26	0
4/94	Apr	9,427	544	9	1,886	510	10	6,607	561	8	-2,820	17	-1
5/94	May	8,738	577	9	1,886	510	10	5,918	613	9	-2,820	35	0
6/94	Jun	7,731	567	10	1,886	510	10	4,911	603	10	-2,820	36	0
7/94	Jul	7,578	576	10	1,886	510	10	4,758	619	10	-2,820	43	0
8/94	Aug	7,376	567	10	1,886	510	10	4,556	607	9	-2,820	39	0
9/94	Sep	7,331	564	10	1,886	510	10	4,511	602	10	-2,820	38	0
10/94	Oct	9,004	553	9	1,886	510	10	6,183	575	8	-2,820	23	0
11/94	Nov	10,638	516	9	1,886	510	10	7,818	520	9	-2,820	4	0
12/94	Dec	11,506	533	9	1,886	510	10	8,686	543	8	-2,820	10	0
1/95	Jan	55,734	306	5	1,886	510	10	52,914	295	4	-2,820	-11	0
2/95	Feb	25,655	327	7	1,886	510	10	22,835	306	6	-2,820	-22	0
3/95	Mar	116,185	171	4	1,886	510	10	113,365	163	4	-2,820	-8	0
4/95	Apr	22,239	388	8	1,886	510	10	19,419	372	7	-2,820	-17	0
5/95	May	19,027	422	7	1,886	510	10	16,207	408	7	-2,820	-14	0
6/95	Jun	13,904	496	9	1,886	510	10	11,084	494	9	-2,820	-2	0
7/95	Jul	8,850	569	9	1,886	510	10	6,030	599	8	-2,820	31	-1
8/95	Aug	8,253	583	10	1,886	510	10	5,433	624	10	-2,820	41	0
9/95	Sep	7,870	590	10	1,886	510	10	5,049	638	10	-2,820	48	0
10/95	Oct	8,654	585	9	1,886	510	10	5,834	625	9	-2,820	40	0
11/95	Nov	8,868	579	9	1,886	510	10	6,048	614	8	-2,820	35	-1
12/95	Dec	9,047	555	8	1,886	510	10	6,227	579	7	-2,820	24	-1
1/96	Jan	13,175	505	9	1,886	510	10	10,355	506	8	-2,820	1	0
2/96	Feb	27,504	257	6	1,886	510	10	24,684	228	5	-2,820	-28	0
3/96	Mar	16,516	382	8	1,886	510	10	13,696	357	8	-2,820	-25	0
4/96	Apr	10,548	570	9	1,886	510	10	7,728	595	8	-2,820	24	0
5/96	May	10,359	596	9	1,886	510	10	7,539	631	8	-2,820	35	0
6/96	Jun	9,515	590	9	1,886	510	10	6,695	627	8	-2,820	37	-1
7/96	Jul	9,268	582	9	1,886	510	10	6,448	616	8	-2,820	34	-1
8/96	Aug	8,909	560	9	1,886	510	10	6,089	587	9	-2,820	26	0
9/96	Sep	9,356	524	9	1,886	510	10	6,536	533	9	-2,820	9	0
10/96	Oct	10,890	570	9	1,886	510	10	8,070	593	9	-2,820	23	0
11/96	Nov	16,349	558	8	1,886	510	10	13,529	569	7	-2,820	11	0
12/96	Dec	13,753	496	9	1,886	510	10	10,933	494	8	-2,820	-2	0
1/97	Jan	41,012	506	5	1,886	510	10	38,192	506	5	-2,820	0	0
2/97	Feb	11,191	563	10	1,886	510	10	8,371	583	10	-2,820	20	0
3/97	Mar	10,513	576	9	1,886	510	10	7,692	603	9	-2,820	27	0
4/97	Apr	10,486	579	9	1,886	510	10	7,666	607	9	-2,820	28	0
5/97	May	9,606	563	9	1,886	510	10	6,786	588	9	-2,820	25	0
6/97	Jun	9,326	575	10	1,886	510	10	6,506	606	10	-2,820	31	0
7/97	Jul	8,880	582	8	1,886	510	10	6,060	619	7	-2,820	37	-1
8/97	Aug	8,762	584	10	1,886	510	10	5,942	623	10	-2,820	38	0
9/97	Sep	9,134	578	10	1,886	510	10	6,314	611	10	-2,820	33	0
10/97	Oct	9,016	573	11	1,886	510	10	6,196	604	12	-2,820	31	1
11/97	Nov	10,779	480	9	1,886	510	10	7,959	471	9	-2,820	-8	0

Table 10a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 4
Intermediate Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline			Alt 4						Difference		
		Total Discharge At Riverside Narrows			Recycled Water Export			Total Discharge At Riverside Narrows					
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
12/97	Dec	15,564	570	5	1,886	510	10	12,744	584	4	-2,820	15	-1
1/98	Jan	15,618	562	9	1,886	510	10	12,798	576	9	-2,820	13	0
2/98	Feb	77,548	225	4	1,886	510	10	74,728	214	4	-2,820	-11	0
3/98	Mar	19,861	497	8	1,886	510	10	17,041	495	7	-2,820	-1	0
4/98	Apr	23,583	403	6	1,886	510	10	20,763	390	6	-2,820	-14	-1
5/98	May	37,933	278	3	1,886	510	10	35,113	260	3	-2,820	-18	-1
6/98	Jun	16,641	432	6	1,886	510	10	13,821	417	6	-2,820	-15	-1
7/98	Jul	10,024	564	9	1,886	510	10	7,204	588	9	-2,820	24	0
8/98	Aug	11,774	534	10	1,886	510	10	8,954	544	11	-2,820	10	0
9/98	Sep	11,371	487	9	1,886	510	10	8,551	482	9	-2,820	-5	0
10/98	Oct	9,998	561	10	1,886	510	10	7,178	583	10	-2,820	23	0
11/98	Nov	10,350	536	9	1,886	510	10	7,530	548	9	-2,820	12	0
12/98	Dec	10,464	560	9	1,886	510	10	7,644	581	9	-2,820	21	0
1/99	Jan	11,454	477	7	1,886	510	10	8,634	468	7	-2,820	-9	-1
2/99	Feb	10,952	552	8	1,886	510	10	8,131	568	8	-2,820	17	-1
3/99	Mar	10,585	565	9	1,886	510	10	7,765	588	9	-2,820	23	0
4/99	Apr	11,680	498	9	1,886	510	10	8,860	496	8	-2,820	-2	0
5/99	May	9,609	600	10	1,886	510	10	6,789	641	10	-2,820	40	0
6/99	Jun	10,723	564	11	1,886	510	10	7,903	585	11	-2,820	22	0
7/99	Jul	9,791	526	10	1,886	510	10	6,971	535	10	-2,820	9	0
8/99	Aug	9,568	580	11	1,886	510	10	6,748	613	12	-2,820	32	0
9/99	Sep	9,091	580	12	1,886	510	10	6,270	614	12	-2,820	34	1
Average		15,284	519	8	1,886	510	10	12,464	535	7	-2,820	16	-1
Max		118,232	612	12				115,412	642	12	-2,820	54	1
Min		7,212	171	3				4,392	163	1	-2,820	-28	-3
StDev		16,829	90	2				16,829	106	2	0	18	1
Coef of Var		110%	17%	24%				135%	20%	31%	0%	115%	-108%

Table 10b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 4
Intermediate Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 4 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
10/89	Oct	33,103	599	8	19,552	623	6.4	-13,552	25	-1.4
11/89	Nov	34,537	589	9	20,986	607	7.8	-13,552	17	-0.8
12/89	Dec	35,563	604	9	22,012	629	8.0	-13,552	25	-0.7
1/90	Jan	40,128	575	9	26,576	581	8.2	-13,552	6	-0.6
2/90	Feb	49,942	523	7	36,390	508	5.8	-13,552	-15	-1.1
3/90	Mar	34,988	584	7	21,437	597	5.2	-13,552	13	-1.8
4/90	Apr	34,185	598	8	20,634	621	6.3	-13,552	23	-1.4
5/90	May	33,959	595	8	20,408	617	7.3	-13,552	21	-1.0
6/90	Jun	31,621	596	8	18,070	621	7.4	-13,552	25	-0.9
7/90	Jul	29,948	603	8	16,397	636	6.5	-13,552	33	-1.2
8/90	Aug	30,767	593	8	17,216	616	6.9	-13,552	23	-1.2
9/90	Sep	30,251	596	8	16,700	623	6.8	-13,552	27	-1.3
10/90	Oct	31,575	603	8	18,023	634	7.2	-13,552	30	-1.3
11/90	Nov	33,519	595	9	19,968	617	7.8	-13,552	22	-0.8
12/90	Dec	33,932	609	8	20,380	640	7.2	-13,552	31	-1.2
1/91	Jan	39,851	584	6	26,299	594	4.7	-13,552	11	-1.7
2/91	Feb	47,091	590	10	33,540	601	10.6	-13,552	11	0.1
3/91	Mar	91,223	400	5	77,671	371	4.5	-13,552	-28	-0.8
4/91	Apr	34,371	548	6	20,820	538	4.3	-13,552	-10	-2.0
5/91	May	33,399	568	8	19,848	571	7.3	-13,552	3	-0.9
6/91	Jun	32,531	595	8	18,979	617	6.5	-13,552	23	-1.3
7/91	Jul	30,590	591	8	17,039	613	7.0	-13,552	22	-1.1
8/91	Aug	30,145	586	8	16,594	606	7.1	-13,552	19	-1.2
9/91	Sep	29,494	586	8	15,942	605	7.1	-13,552	20	-1.2
10/91	Oct	29,927	592	8	16,376	617	6.6	-13,552	24	-1.4
11/91	Nov	32,384	606	8	18,833	636	7.2	-13,552	31	-1.1
12/91	Dec	36,323	593	9	22,772	612	8.0	-13,552	18	-0.7
1/92	Jan	42,577	544	9	29,026	535	8.9	-13,552	-9	-0.3
2/92	Feb	71,679	413	8	58,127	378	7.0	-13,552	-35	-0.5
3/92	Mar	65,301	479	9	51,750	458	8.5	-13,552	-22	-0.3
4/92	Apr	34,797	540	7	21,245	525	5.4	-13,552	-15	-1.9
5/92	May	33,642	600	8	20,091	626	7.1	-13,552	25	-1.2
6/92	Jun	31,266	600	8	17,714	628	7.3	-13,552	28	-1.1
7/92	Jul	30,966	600	9	17,415	630	8.2	-13,552	29	-0.8
8/92	Aug	30,630	576	9	17,078	586	8.6	-13,552	10	-0.5
9/92	Sep	30,322	597	9	16,770	625	8.7	-13,552	28	-0.4
10/92	Oct	32,946	612	9	19,395	646	8.0	-13,552	34	-0.7
11/92	Nov	32,933	604	8	19,381	633	7.4	-13,552	29	-1.0
12/92	Dec	56,641	494	7	43,089	472	6.2	-13,552	-22	-0.9
1/93	Jan	242,113	286	5	228,561	270	4.5	-13,552	-16	-0.3
2/93	Feb	169,889	366	6	156,338	349	5.7	-13,552	-17	-0.3
3/93	Mar	76,370	475	6	62,819	456	5.2	-13,552	-19	-0.8
4/93	Apr	54,504	518	7	40,953	504	6.7	-13,552	-15	-0.8
5/93	May	43,544	559	8	29,992	557	6.6	-13,552	-2	-1.0
6/93	Jun	37,972	597	8	24,421	617	6.4	-13,552	19	-1.3
7/93	Jul	32,033	616	9	18,481	654	8.8	-13,552	39	-0.4
8/93	Aug	29,794	616	9	16,242	661	7.8	-13,552	44	-0.8
9/93	Sep	29,240	613	9	15,689	656	7.9	-13,552	43	-0.8
10/93	Oct	31,485	614	8	17,933	653	7.2	-13,552	39	-1.0
11/93	Nov	37,187	611	9	23,636	639	8.5	-13,552	28	-0.5

Table 10b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 4
Intermediate Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 4 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
12/93	Dec	36,468	575	9	22,916	581	8.0	-13,552	7	-0.7
1/94	Jan	36,576	606	9	23,024	631	8.2	-13,552	25	-0.6
2/94	Feb	51,579	505	7	38,027	484	6.3	-13,552	-21	-1.0
3/94	Mar	46,486	630	8	32,935	657	7.5	-13,552	28	-0.7
4/94	Apr	36,085	606	8	22,533	632	7.1	-13,552	26	-1.1
5/94	May	33,877	609	8	20,325	639	6.3	-13,552	31	-1.5
6/94	Jun	30,782	609	7	17,231	645	5.7	-13,552	36	-1.8
7/94	Jul	30,015	610	8	16,463	648	6.6	-13,552	39	-1.4
8/94	Aug	29,125	601	9	15,574	635	7.8	-13,552	33	-0.8
9/94	Sep	29,527	598	9	15,975	627	7.9	-13,552	29	-0.8
10/94	Oct	32,531	595	9	18,979	618	8.1	-13,552	23	-0.8
11/94	Nov	33,724	601	9	20,173	626	9.1	-13,552	25	-0.4
12/94	Dec	35,170	609	9	21,619	638	8.2	-13,552	29	-0.7
1/95	Jan	129,180	389	6	115,628	369	6.1	-13,552	-20	-0.4
2/95	Feb	57,028	521	7	43,476	507	5.9	-13,552	-13	-0.9
3/95	Mar	164,743	357	5	151,192	339	4.8	-13,552	-18	-0.4
4/95	Apr	59,992	536	6	46,441	528	4.9	-13,552	-8	-1.1
5/95	May	47,497	570	7	33,946	573	5.5	-13,552	3	-1.2
6/95	Jun	42,977	563	7	29,425	563	5.4	-13,552	0	-1.5
7/95	Jul	30,009	587	8	16,457	608	6.0	-13,552	20	-1.8
8/95	Aug	30,682	610	9	17,130	647	8.1	-13,552	37	-0.8
9/95	Sep	30,655	607	9	17,104	641	7.8	-13,552	35	-0.9
10/95	Oct	31,821	603	9	18,270	633	7.9	-13,552	30	-0.9
11/95	Nov	33,153	605	9	19,601	634	8.1	-13,552	29	-0.8
12/95	Dec	35,466	581	9	21,915	592	8.5	-13,552	11	-0.6
1/96	Jan	39,242	598	9	25,690	617	9.1	-13,552	19	-0.3
2/96	Feb	74,040	405	6	60,489	370	5.3	-13,552	-35	-0.8
3/96	Mar	45,364	544	7	31,812	535	5.7	-13,552	-8	-1.3
4/96	Apr	35,871	625	9	22,319	663	7.7	-13,552	38	-0.9
5/96	May	34,025	633	9	20,474	679	9.0	-13,552	46	-0.4
6/96	Jun	31,666	618	9	18,115	659	8.9	-13,552	41	-0.5
7/96	Jul	30,519	621	9	16,968	668	8.7	-13,552	47	-0.6
8/96	Aug	31,331	603	9	17,779	634	8.9	-13,552	31	-0.5
9/96	Sep	31,509	597	9	17,957	622	8.9	-13,552	26	-0.5
10/96	Oct	33,915	601	10	20,364	626	9.3	-13,552	25	-0.3
11/96	Nov	41,974	549	6	28,423	542	4.2	-13,552	-7	-1.8
12/96	Dec	44,343	542	6	30,791	533	4.0	-13,552	-9	-1.8
1/97	Jan	73,408	424	5	59,856	392	3.6	-13,552	-32	-1.1
2/97	Feb	37,252	584	9	23,701	596	7.8	-13,552	12	-0.8
3/97	Mar	35,914	600	10	22,362	622	9.3	-13,552	22	-0.3
4/97	Apr	34,120	596	10	20,568	618	9.2	-13,552	22	-0.3
5/97	May	32,974	601	9	19,422	627	8.4	-13,552	26	-0.7
6/97	Jun	32,361	592	9	18,809	613	8.6	-13,552	21	-0.7
7/97	Jul	30,657	600	9	17,106	629	7.8	-13,552	29	-0.9
8/97	Aug	30,097	608	9	16,546	646	7.6	-13,552	37	-1.1
9/97	Sep	31,117	604	8	17,566	636	5.7	-13,552	32	-2.0
10/97	Oct	32,217	595	10	18,666	618	10.3	-13,552	23	0.0
11/97	Nov	37,330	563	8	23,779	563	6.5	-13,552	0	-1.3
12/97	Dec	48,055	508	5	34,503	487	2.9	-13,552	-22	-1.9
1/98	Jan	49,485	489	7	35,934	461	6.1	-13,552	-28	-1.1

Table 10b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 4
Intermediate Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 4 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
2/98	Feb	200,064	303	3	186,513	285	3.0	-13,552	-19	-0.5
3/98	Mar	59,744	501	6	46,192	483	4.9	-13,552	-18	-1.1
4/98	Apr	52,443	516	6	38,892	500	5.0	-13,552	-16	-1.2
5/98	May	78,601	415	5	65,049	385	3.6	-13,552	-31	-1.1
6/98	Jun	42,631	520	7	29,080	499	5.5	-13,552	-20	-1.4
7/98	Jul	33,209	590	8	19,658	608	6.2	-13,552	18	-1.6
8/98	Aug	33,926	587	9	20,375	604	8.8	-13,552	16	-0.5
9/98	Sep	34,013	586	9	20,461	601	8.3	-13,552	15	-0.7
10/98	Oct	34,000	599	9	20,448	622	8.2	-13,552	24	-0.8
11/98	Nov	36,171	595	8	22,619	614	7.6	-13,552	19	-0.9
12/98	Dec	36,671	612	10	23,120	641	9.2	-13,552	29	-0.3
1/99	Jan	40,882	573	9	27,331	578	8.4	-13,552	5	-0.5
2/99	Feb	37,563	576	9	24,011	584	8.4	-13,552	7	-0.6
3/99	Mar	36,492	571	9	22,940	576	9.0	-13,552	5	-0.4
4/99	Apr	39,795	568	8	26,243	571	7.4	-13,552	3	-0.9
5/99	May	35,454	604	9	21,903	629	7.8	-13,552	25	-0.9
6/99	Jun	33,606	605	10	20,055	634	9.0	-13,552	29	-0.5
7/99	Jul	32,862	598	9	19,310	623	8.4	-13,552	25	-0.7
8/99	Aug	31,340	597	9	17,789	623	8.7	-13,552	26	-0.7
9/99	Sep	31,229	597	9	17,677	623	8.7	-13,552	26	-0.7
Average		44,648	566	8.1	31,097	580	7.1	-13,552	13	-0.9
Max		242,113	633	10.5	228,561	679	10.6	-13,552	47	0.1
Min		29,125	286	3.4	15,574	270	2.9	-13,552	-35	-2.0
StDev		31,822	67	1.3	31,822	86	1.6	0.0	21.0	0.4
Coef of Var		71%	12%	16%	102%	15%	22%	0%	156%	-49%
					For August Data Only					
Average		30,784	598	8.8	17,232	626	8.0	-13,552	28	-0.8
Max		33,926	616	9.4	20,375	661	8.9	-13,552	44	-0.5
Min		29,125	576	8.1	15,574	586	6.9	-13,552	10	-1.2
StDev		1,296	12	0.5	1,296	23	0.7	0	11	0.3
Coef of Var		4%	2%	5%	8%	4%	9%	0%	38%	-32%

Table 10c
Annual Flow and TDS Impacts of Exporting Recycled Water from RIX
Year 2040 Alternative 4
Intermediate Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Water Year	Baseline Total Discharge Below Prado Dam				Alternative 4 Total Discharge Below Prado Dam				Difference			
	Annual Average		Five-year average		Annual Average		Five-year average		Annual Average		Five-year average	
	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)
89-90	418,993	585	491,783	542	256,375	599	329,165	531	-162,618	14	-162,618	-10
90-91	467,721	550	494,526	538	305,103	543	331,908	526	-162,618	-7	-162,618	-12
91-92	469,815	543	496,863	535	307,197	532	334,245	522	-162,618	-11	-162,618	-13
92-93	837,979	438	524,115	525	675,361	408	361,497	508	-162,618	-30	-162,618	-17
93-94	429,192	595	524,740	526	266,574	614	362,122	509	-162,618	19	-162,618	-17
94-95	694,189	487	579,779	508	531,571	464	417,161	487	-162,618	-23	-162,618	-21
95-96	454,007	569	577,036	511	291,389	572	414,418	490	-162,618	3	-162,618	-20
96-97	458,132	560	574,700	513	295,513	559	412,082	494	-162,618	-1	-162,618	-20
97-98	701,719	457	547,448	522	539,101	425	384,830	505	-162,618	-32	-162,618	-17
98-99	426,064	591	546,822	521	263,446	608	384,204	504	-162,618	17	-162,618	-18
Average	535,781	537	535,781	524	373,163	532	373,163	508	-162,618	-5	-162,618	-17
Max	837,979	595	579,779	542	675,361	614	417,161	531	-162,618	19	-162,618	-10
Min	418,993	438	491,783	508	256,375	408	329,165	487	-162,618	-32	-162,618	-21
StDev	150,071	57	34,675	12	150,071	75	34,675	15	0	19	0	4
Coef of Var	28%	11%	6%	2%	40%	14%	9%	3%	0%	-374%	0%	-22%

Table 11a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 5
No Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline			Alt 5						Difference		
		Total Discharge At Riverside Narrows			Recycled Water Export			Total Discharge At Riverside Narrows					
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
10/89	Oct	6,635	564	5	0	510	10	6,074	571	4	-560	7	0
11/89	Nov	7,229	559	6	0	510	10	6,669	564	6	-560	6	0
12/89	Dec	7,311	564	7	0	510	10	6,751	570	6	-560	6	0
1/90	Jan	9,380	560	6	0	510	10	8,820	564	6	-560	4	0
2/90	Feb	10,276	580	8	0	510	10	9,715	586	8	-560	5	0
3/90	Mar	7,663	574	6	0	510	10	7,103	581	5	-560	7	0
4/90	Apr	7,944	564	5	0	510	10	7,384	570	4	-560	6	0
5/90	May	7,278	563	5	0	510	10	6,718	569	4	-560	6	0
6/90	Jun	6,392	567	3	0	510	10	5,832	575	3	-560	7	-1
7/90	Jul	5,482	576	1	0	510	10	4,922	586	1	-560	10	0
8/90	Aug	5,827	564	4	0	510	10	5,267	572	3	-560	8	-1
9/90	Sep	5,680	569	6	0	510	10	5,120	578	6	-560	9	0
10/90	Oct	5,913	560	11	0	510	10	5,353	567	11	-560	7	0
11/90	Nov	6,032	557	6	0	510	10	5,472	564	6	-560	7	0
12/90	Dec	6,894	581	9	0	510	10	6,334	589	9	-560	8	0
1/91	Jan	8,080	567	4	0	510	10	7,520	572	3	-560	6	0
2/91	Feb	13,864	589	10	0	510	10	13,304	593	10	-560	4	0
3/91	Mar	29,244	233	3	0	510	10	28,684	228	3	-560	-5	0
4/91	Apr	7,869	560	2	0	510	10	7,309	566	2	-560	5	-1
5/91	May	6,093	596	3	0	510	10	5,533	606	2	-560	11	-1
6/91	Jun	6,358	596	3	0	510	10	5,798	606	2	-560	10	-1
7/91	Jul	5,121	596	5	0	510	10	4,561	609	5	-560	13	-1
8/91	Aug	5,102	575	8	0	510	10	4,542	585	8	-560	10	0
9/91	Sep	4,893	593	8	0	510	10	4,333	606	8	-560	13	0
10/91	Oct	5,520	579	7	0	510	10	4,959	589	6	-560	10	0
11/91	Nov	6,179	575	5	0	510	10	5,619	584	4	-560	8	-1
12/91	Dec	7,570	574	7	0	510	10	7,010	581	6	-560	7	0
1/92	Jan	8,974	590	8	0	510	10	8,414	597	8	-560	7	0
2/92	Feb	24,183	503	7	0	510	10	23,623	503	7	-560	0	0
3/92	Mar	17,232	540	6	0	510	10	16,672	541	6	-560	2	0
4/92	Apr	7,017	583	10	0	510	10	6,457	591	10	-560	8	0
5/92	May	6,338	593	9	0	510	10	5,778	603	9	-560	10	0
6/92	Jun	5,724	557	8	0	510	10	5,164	564	8	-560	7	0
7/92	Jul	5,704	577	10	0	510	10	5,144	587	10	-560	9	0
8/92	Aug	5,121	580	8	0	510	10	4,560	591	8	-560	11	0
9/92	Sep	5,074	575	7	0	510	10	4,514	585	7	-560	10	0
10/92	Oct	5,691	579	6	0	510	10	5,131	588	6	-560	10	0
11/92	Nov	5,810	567	6	0	510	10	5,249	575	5	-560	8	0
12/92	Dec	17,108	444	7	0	510	10	16,547	442	7	-560	-2	0
1/93	Jan	115,487	340	4	0	510	10	114,927	339	4	-560	-1	0
2/93	Feb	49,253	254	4	0	510	10	48,692	251	4	-560	-3	0
3/93	Mar	36,933	279	4	0	510	10	36,372	276	4	-560	-3	0
4/93	Apr	26,995	323	6	0	510	10	26,434	319	6	-560	-4	0
5/93	May	17,936	384	6	0	510	10	17,376	381	6	-560	-3	0
6/93	Jun	9,287	532	9	0	510	10	8,727	535	9	-560	3	0
7/93	Jul	5,318	624	8	0	510	10	4,758	640	8	-560	16	0
8/93	Aug	4,466	639	10	0	510	10	3,906	660	10	-560	21	0
9/93	Sep	4,954	617	9	0	510	10	4,394	633	9	-560	16	0
10/93	Oct	5,112	610	8	0	510	10	4,552	625	8	-560	15	0

Table 11a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 5
No Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline			Alt 5						Difference		
		Total Discharge At Riverside Narrows			Recycled Water Export			Total Discharge At Riverside Narrows					
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
11/93	Nov	4,957	527	9	0	510	10	4,397	532	9	-560	5	0
12/93	Dec	6,121	591	8	0	510	10	5,560	601	8	-560	10	0
1/94	Jan	6,647	519	7	0	510	10	6,086	522	7	-560	3	0
2/94	Feb	12,178	385	8	0	510	10	11,617	380	8	-560	-5	0
3/94	Mar	11,720	637	8	0	510	10	11,160	644	8	-560	7	0
4/94	Apr	6,682	560	8	0	510	10	6,121	567	8	-560	6	0
5/94	May	5,992	611	9	0	510	10	5,432	623	9	-560	12	0
6/94	Jun	4,985	601	10	0	510	10	4,425	615	10	-560	14	0
7/94	Jul	4,832	617	10	0	510	10	4,272	633	10	-560	17	0
8/94	Aug	4,630	604	9	0	510	10	4,070	620	9	-560	16	0
9/94	Sep	4,586	599	10	0	510	10	4,026	615	10	-560	15	0
10/94	Oct	6,258	574	8	0	510	10	5,698	582	8	-560	8	0
11/94	Nov	7,893	519	9	0	510	10	7,332	522	9	-560	2	0
12/94	Dec	8,761	542	8	0	510	10	8,201	545	8	-560	4	0
1/95	Jan	52,989	295	4	0	510	10	52,429	293	4	-560	-2	0
2/95	Feb	22,910	306	6	0	510	10	22,350	302	6	-560	-5	0
3/95	Mar	113,440	163	4	0	510	10	112,879	162	4	-560	-2	0
4/95	Apr	19,494	372	7	0	510	10	18,934	368	7	-560	-3	0
5/95	May	16,281	408	7	0	510	10	15,721	405	7	-560	-3	0
6/95	Jun	11,158	493	9	0	510	10	10,598	494	9	-560	0	0
7/95	Jul	6,105	598	8	0	510	10	5,545	609	8	-560	11	0
8/95	Aug	5,508	621	10	0	510	10	4,948	636	10	-560	15	0
9/95	Sep	5,124	635	10	0	510	10	4,564	653	10	-560	18	0
10/95	Oct	5,908	623	9	0	510	10	5,348	636	9	-560	14	0
11/95	Nov	6,123	612	8	0	510	10	5,562	625	8	-560	12	0
12/95	Dec	6,302	577	7	0	510	10	5,741	586	7	-560	9	0
1/96	Jan	10,430	506	8	0	510	10	9,869	507	8	-560	1	0
2/96	Feb	24,759	229	5	0	510	10	24,198	223	5	-560	-6	0
3/96	Mar	13,771	358	8	0	510	10	13,210	352	7	-560	-6	0
4/96	Apr	7,803	594	9	0	510	10	7,243	602	8	-560	8	0
5/96	May	7,614	629	8	0	510	10	7,053	640	8	-560	11	0
6/96	Jun	6,770	625	8	0	510	10	6,209	637	8	-560	12	0
7/96	Jul	6,523	614	8	0	510	10	5,962	626	8	-560	12	0
8/96	Aug	6,164	585	9	0	510	10	5,604	595	9	-560	10	0
9/96	Sep	6,610	532	9	0	510	10	6,050	536	9	-560	4	0
10/96	Oct	8,145	592	9	0	510	10	7,585	600	9	-560	8	0
11/96	Nov	13,604	569	7	0	510	10	13,044	572	7	-560	3	0
12/96	Dec	11,007	494	8	0	510	10	10,447	494	8	-560	0	0
1/97	Jan	38,267	506	5	0	510	10	37,706	506	5	-560	0	0
2/97	Feb	8,446	582	10	0	510	10	7,886	588	10	-560	7	0
3/97	Mar	7,767	601	9	0	510	10	7,207	610	9	-560	9	0
4/97	Apr	7,740	605	9	0	510	10	7,180	614	8	-560	9	0
5/97	May	6,861	586	9	0	510	10	6,300	595	9	-560	9	0
6/97	Jun	6,581	604	10	0	510	10	6,021	615	10	-560	11	0
7/97	Jul	6,135	617	7	0	510	10	5,574	630	7	-560	13	0
8/97	Aug	6,016	621	10	0	510	10	5,456	634	10	-560	13	0
9/97	Sep	6,389	609	10	0	510	10	5,829	620	10	-560	11	0
10/97	Oct	6,270	602	12	0	510	10	5,710	613	12	-560	11	0
11/97	Nov	8,034	471	9	0	510	10	7,473	470	9	-560	-1	0

Table 11a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 5
No Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge At Riverside Narrows			Alt 5 Recycled Water Export			Alt 5 Total Discharge At Riverside Narrows			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
12/97	Dec	12,818	584	4	0	510	10	12,258	588	3	-560	4	0
1/98	Jan	12,873	575	9	0	510	10	12,312	579	9	-560	4	0
2/98	Feb	74,803	214	4	0	510	10	74,243	212	4	-560	-2	0
3/98	Mar	17,115	495	7	0	510	10	16,555	495	7	-560	0	0
4/98	Apr	20,838	390	6	0	510	10	20,278	387	5	-560	-3	0
5/98	May	35,188	260	3	0	510	10	34,628	256	3	-560	-4	0
6/98	Jun	13,896	417	6	0	510	10	13,336	414	5	-560	-3	0
7/98	Jul	7,278	586	9	0	510	10	6,718	594	9	-560	8	0
8/98	Aug	9,029	543	11	0	510	10	8,468	547	11	-560	4	0
9/98	Sep	8,625	482	9	0	510	10	8,065	481	9	-560	-1	0
10/98	Oct	7,252	582	10	0	510	10	6,692	590	10	-560	8	0
11/98	Nov	7,604	548	9	0	510	10	7,044	552	9	-560	5	0
12/98	Dec	7,719	579	9	0	510	10	7,158	586	9	-560	7	0
1/99	Jan	8,709	468	7	0	510	10	8,149	467	6	-560	-2	0
2/99	Feb	8,206	567	8	0	510	10	7,646	573	8	-560	6	0
3/99	Mar	7,840	587	9	0	510	10	7,280	594	9	-560	7	0
4/99	Apr	8,935	496	8	0	510	10	8,374	496	8	-560	0	0
5/99	May	6,863	639	10	0	510	10	6,303	652	10	-560	13	0
6/99	Jun	7,977	584	11	0	510	10	7,417	591	11	-560	7	0
7/99	Jul	7,046	534	10	0	510	10	6,486	538	10	-560	4	0
8/99	Aug	6,823	611	12	0	510	10	6,263	622	12	-560	11	0
9/99	Sep	6,345	612	12	0	510	10	5,785	624	12	-560	12	0
Average		12,538	534	7	0	510	10	11,978	540	7	-560	6	0
Max		115,487	639	12				114,927	660	12	-560	21	0
Min		4,466	163	1				3,906	162	1	-560	-6	-1
StDev		16,829	105	2				16,829	110	2	0	6	0
Coef of Var		134%	20%	31%				140%	20%	33%	0%	96%	-113%

Table 11b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 5
No Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 5 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
10/89	Oct	21,580	626	7	14,677	647	5.5	-6,903	21	-1.2
11/89	Nov	23,014	610	8	16,111	623	7.4	-6,903	12	-0.7
12/89	Dec	24,040	630	8	17,137	650	7.5	-6,903	20	-0.6
1/90	Jan	28,605	586	8	21,702	587	7.7	-6,903	1	-0.6
2/90	Feb	38,419	516	6	31,516	501	5.1	-6,903	-15	-0.9
3/90	Mar	23,466	602	6	16,563	610	3.8	-6,903	8	-1.7
4/90	Apr	22,662	623	7	15,759	641	5.2	-6,903	18	-1.4
5/90	May	22,436	620	7	15,533	636	6.6	-6,903	17	-0.9
6/90	Jun	20,098	624	8	13,195	645	7.0	-6,903	22	-0.7
7/90	Jul	18,425	638	7	11,523	671	5.9	-6,903	33	-0.9
8/90	Aug	19,244	620	7	12,341	641	6.2	-6,903	21	-0.9
9/90	Sep	18,728	626	7	11,825	652	6.1	-6,903	26	-1.0
10/90	Oct	20,052	636	7	13,149	664	6.6	-6,903	28	-0.8
11/90	Nov	21,996	620	8	15,094	638	7.5	-6,903	17	-0.4
12/90	Dec	22,409	641	8	15,506	668	6.6	-6,903	26	-0.9
1/91	Jan	28,328	598	5	21,425	603	3.6	-6,903	5	-1.5
2/91	Feb	35,568	604	11	28,665	609	10.6	-6,903	5	0.0
3/91	Mar	79,700	378	5	72,797	359	4.1	-6,903	-19	-0.5
4/91	Apr	22,848	548	5	15,945	533	2.7	-6,903	-15	-2.0
5/91	May	21,876	578	7	14,973	577	6.8	-6,903	-2	-0.6
6/91	Jun	21,008	621	7	14,105	640	5.7	-6,903	19	-1.1
7/91	Jul	19,067	617	7	12,164	636	6.4	-6,903	20	-0.7
8/91	Aug	18,622	610	7	11,719	627	6.4	-6,903	17	-0.7
9/91	Sep	17,971	610	7	11,068	628	6.4	-6,903	18	-0.7
10/91	Oct	18,405	621	7	11,502	644	5.8	-6,903	23	-1.1
11/91	Nov	20,861	638	7	13,958	665	6.6	-6,903	27	-0.8
12/91	Dec	24,800	615	8	17,897	627	7.5	-6,903	13	-0.6
1/92	Jan	31,054	542	9	24,152	531	8.6	-6,903	-11	-0.4
2/92	Feb	60,156	387	7	53,253	362	6.7	-6,903	-25	-0.4
3/92	Mar	53,778	465	9	46,875	448	8.4	-6,903	-17	-0.2
4/92	Apr	23,274	536	6	16,371	516	4.2	-6,903	-20	-1.7
5/92	May	22,119	628	7	15,217	649	6.6	-6,903	21	-0.8
6/92	Jun	19,743	630	8	12,840	656	6.8	-6,903	26	-0.7
7/92	Jul	19,443	632	8	12,540	659	8.0	-6,903	27	-0.3
8/92	Aug	19,107	593	9	12,204	599	8.6	-6,903	6	0.1
9/92	Sep	18,799	628	9	11,896	654	8.8	-6,903	27	0.1
10/92	Oct	21,423	646	8	14,520	676	7.8	-6,903	30	-0.3
11/92	Nov	21,410	635	8	14,507	660	7.0	-6,903	25	-0.6
12/92	Dec	45,118	480	6	38,215	462	5.7	-6,903	-18	-0.7
1/93	Jan	230,590	273	5	223,687	264	4.4	-6,903	-10	-0.2
2/93	Feb	158,366	353	6	151,464	342	5.5	-6,903	-10	-0.2
3/93	Mar	64,847	462	5	57,944	448	4.8	-6,903	-14	-0.6
4/93	Apr	42,981	511	7	36,079	497	6.2	-6,903	-14	-0.7
5/93	May	32,021	563	7	25,118	558	5.9	-6,903	-5	-0.9
6/93	Jun	26,449	619	7	19,546	632	5.3	-6,903	13	-1.3
7/93	Jul	20,510	654	9	13,607	690	8.9	-6,903	36	0.1
8/93	Aug	18,271	659	8	11,368	706	7.5	-6,903	47	-0.3
9/93	Sep	17,717	656	8	10,814	703	7.6	-6,903	47	-0.3
10/93	Oct	19,962	653	7	13,059	691	6.7	-6,903	38	-0.6
11/93	Nov	25,664	639	8	18,761	661	8.4	-6,903	21	0.0

Table 11b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 5
No Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 5 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
12/93	Dec	24,945	587	8	18,042	589	7.8	-6,903	2	-0.3
1/94	Jan	25,053	632	8	18,150	651	8.0	-6,903	19	-0.4
2/94	Feb	40,056	493	6	33,153	474	5.7	-6,903	-19	-0.8
3/94	Mar	34,963	657	8	28,060	675	7.0	-6,903	18	-0.7
4/94	Apr	24,562	633	7	17,659	653	6.5	-6,903	20	-0.8
5/94	May	22,354	640	7	15,451	666	5.6	-6,903	26	-1.1
6/94	Jun	19,259	645	6	12,356	680	4.5	-6,903	35	-1.4
7/94	Jul	18,492	649	7	11,589	688	5.8	-6,903	40	-0.9
8/94	Aug	17,602	636	8	10,699	672	7.4	-6,903	35	-0.3
9/94	Sep	18,004	630	8	11,101	659	7.6	-6,903	30	-0.2
10/94	Oct	21,008	621	8	14,105	640	7.9	-6,903	19	-0.4
11/94	Nov	22,201	628	9	15,298	649	8.8	-6,903	21	-0.4
12/94	Dec	23,647	639	8	16,744	662	7.5	-6,903	23	-0.8
1/95	Jan	117,657	374	6	110,754	361	5.9	-6,903	-13	-0.3
2/95	Feb	45,505	514	6	38,602	502	5.4	-6,903	-12	-0.7
3/95	Mar	153,220	343	5	146,318	332	4.6	-6,903	-11	-0.3
4/95	Apr	48,469	533	5	41,567	525	4.2	-6,903	-8	-0.9
5/95	May	35,974	577	6	29,071	576	4.7	-6,903	-1	-1.1
6/95	Jun	31,454	568	6	24,551	564	4.4	-6,903	-4	-1.3
7/95	Jul	18,486	612	6	11,583	630	4.8	-6,903	18	-1.6
8/95	Aug	19,159	647	8	12,256	684	7.9	-6,903	37	-0.3
9/95	Sep	19,132	642	8	12,230	676	7.4	-6,903	34	-0.4
10/95	Oct	20,298	634	8	13,395	661	7.6	-6,903	27	-0.4
11/95	Nov	21,630	636	8	14,727	661	7.9	-6,903	25	-0.4
12/95	Dec	23,943	597	9	17,040	603	8.4	-6,903	6	-0.2
1/96	Jan	27,719	619	9	20,816	631	8.8	-6,903	12	-0.4
2/96	Feb	62,517	379	5	55,614	353	4.8	-6,903	-25	-0.6
3/96	Mar	33,841	542	6	26,938	532	4.8	-6,903	-10	-1.1
4/96	Apr	24,348	662	8	17,445	693	7.0	-6,903	32	-0.9
5/96	May	22,502	676	9	15,599	718	8.8	-6,903	42	-0.4
6/96	Jun	20,143	658	9	13,241	698	8.8	-6,903	40	-0.2
7/96	Jul	18,996	666	9	12,093	714	8.6	-6,903	48	-0.3
8/96	Aug	19,808	636	9	12,905	665	9.0	-6,903	29	0.0
9/96	Sep	19,986	625	9	13,083	648	8.9	-6,903	23	-0.2
10/96	Oct	22,392	628	9	15,489	649	9.0	-6,903	21	-0.4
11/96	Nov	30,451	549	5	23,548	540	3.0	-6,903	-10	-1.7
12/96	Dec	32,820	540	4	25,917	529	2.8	-6,903	-11	-1.6
1/97	Jan	61,885	401	4	54,982	378	3.0	-6,903	-23	-0.8
2/97	Feb	25,729	600	8	18,826	606	7.1	-6,903	7	-0.9
3/97	Mar	24,391	624	9	17,488	641	9.0	-6,903	17	-0.3
4/97	Apr	22,597	621	9	15,694	638	8.9	-6,903	17	-0.4
5/97	May	21,451	629	9	14,548	651	8.1	-6,903	22	-0.5
6/97	Jun	20,838	617	9	13,935	634	8.4	-6,903	17	-0.3
7/97	Jul	19,134	631	8	12,231	659	7.5	-6,903	28	-0.5
8/97	Aug	18,574	646	8	11,671	684	7.2	-6,903	38	-0.7
9/97	Sep	19,594	637	6	12,692	668	4.5	-6,903	30	-1.7
10/97	Oct	20,694	621	10	13,791	641	10.9	-6,903	20	0.5
11/97	Nov	25,807	570	7	18,904	566	5.5	-6,903	-4	-1.3
12/97	Dec	36,532	496	3	29,629	476	1.7	-6,903	-20	-1.5
1/98	Jan	37,962	471	6	31,059	446	5.4	-6,903	-25	-0.9

Table 11b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 5
No Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 5 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
2/98	Feb	188,541	288	3	181,639	277	2.8	-6,903	-11	-0.3
3/98	Mar	48,221	490	5	41,318	475	4.3	-6,903	-15	-0.9
4/98	Apr	40,920	507	5	34,017	492	4.2	-6,903	-15	-1.0
5/98	May	67,078	393	4	60,175	371	3.0	-6,903	-22	-0.7
6/98	Jun	31,108	509	6	24,205	489	4.5	-6,903	-21	-1.2
7/98	Jul	21,686	612	7	14,783	626	5.0	-6,903	14	-1.5
8/98	Aug	22,403	608	9	15,500	620	8.2	-6,903	12	-0.8
9/98	Sep	22,490	606	9	15,587	616	7.6	-6,903	10	-0.9
10/98	Oct	22,477	625	8	15,574	644	7.7	-6,903	19	-0.7
11/98	Nov	24,648	617	8	17,745	630	6.9	-6,903	13	-0.9
12/98	Dec	25,148	642	9	18,245	665	9.0	-6,903	23	-0.3
1/99	Jan	29,359	583	8	22,456	583	8.0	-6,903	0	-0.5
2/99	Feb	26,040	589	9	19,137	591	8.0	-6,903	2	-0.6
3/99	Mar	24,969	582	9	18,066	582	8.7	-6,903	0	-0.4
4/99	Apr	28,272	576	8	21,369	575	6.7	-6,903	-2	-0.9
5/99	May	23,931	631	8	17,028	651	7.4	-6,903	20	-0.6
6/99	Jun	22,083	636	9	15,180	660	8.5	-6,903	24	-0.7
7/99	Jul	21,339	626	9	14,436	646	8.0	-6,903	21	-0.6
8/99	Aug	19,817	626	9	12,915	649	8.4	-6,903	23	-0.4
9/99	Sep	19,706	626	9	12,803	649	8.6	-6,903	24	-0.3
Average		33,125	583	7.3	26,223	595	6.6	-6,903	12	-0.7
Max		230,590	676	10.6	223,687	718	10.9	-6,903	48	0.5
Min		17,602	273	3.0	10,699	264	1.7	-6,903	-25	-2.0
StDev		31,822	84	1.5	31,822	100	1.8	0.0	18.9	0.5
Coef of Var		96%	14%	21%	121%	17%	27%	0%	164%	-66%
					For August Data Only					
Average		19,261	628	8.1	12,358	655	7.7	-6,903	26	-0.4
Max		22,403	659	9.0	15,500	706	9.0	-6,903	47	0.1
Min		17,602	593	7.1	10,699	599	6.2	-6,903	6	-0.9
StDev		1,296	21	0.7	1,296	34	0.9	0	13	0.3
Coef of Var		7%	3%	9%	10%	5%	12%	0%	49%	-73%

Table 11c
Annual Flow and TDS Impacts of Exporting Recycled Water from RIX
Year 2010 Alternative 5
No Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Water Year	Baseline Total Discharge Below Prado Dam				Alternative 5 Total Discharge Below Prado Dam				Difference			
	Annual Average		Five-year average		Annual Average		Five-year average		Annual Average		Five-year average	
	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)
89-90	280,718	603	353,507	540	197,883	612	270,672	527	-82,835	9	-82,835	-13
90-91	329,445	551	356,250	535	246,611	541	273,415	521	-82,835	-10	-82,835	-14
91-92	331,539	541	358,587	531	248,704	527	275,752	515	-82,835	-14	-82,835	-15
92-93	699,704	416	385,839	517	616,869	394	303,004	499	-82,835	-22	-82,835	-18
93-94	290,916	617	386,464	518	208,081	631	303,629	501	-82,835	14	-82,835	-17
94-95	555,913	472	441,503	496	473,078	453	358,668	476	-82,835	-19	-82,835	-20
95-96	315,732	578	438,761	499	232,897	576	355,926	480	-82,835	-1	-82,835	-19
96-97	319,856	566	436,424	503	237,021	560	353,589	484	-82,835	-6	-82,835	-19
97-98	563,443	435	409,172	513	480,608	410	326,337	496	-82,835	-25	-82,835	-17
98-99	287,788	611	408,546	512	204,953	623	325,711	495	-82,835	12	-82,835	-18
Average	397,505	539	397,505	516	314,670	533	314,670	499	-82,835	-6	-82,835	-17
Max	699,704	617	441,503	540	616,869	631	358,668	527	-82,835	14	-82,835	-13
Min	280,718	416	353,507	496	197,883	394	270,672	476	-82,835	-25	-82,835	-20
StDev	150,071	73	34,675	15	150,071	87	34,675	17	0	14	0	2
Coef of Var	38%	14%	9%	3%	48%	16%	11%	3%	0%	-226%	0%	-13%

Table 12a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 5
No Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge At Riverside Narrows			Alt5 Recycled Water Export			Alt5 Total Discharge At Riverside Narrows			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
10/89	Oct	9,380	547	6	0	510	10	8,446	553	6	-934	6	0
11/89	Nov	9,975	544	7	0	510	10	9,041	549	7	-934	6	0
12/89	Dec	10,056	548	7	0	510	10	9,123	554	7	-934	6	0
1/90	Jan	12,125	547	7	0	510	10	11,192	552	7	-934	5	0
2/90	Feb	13,021	564	8	0	510	10	12,087	570	8	-934	6	0
3/90	Mar	10,408	556	7	0	510	10	9,474	562	6	-934	6	0
4/90	Apr	10,689	549	6	0	510	10	9,755	555	6	-934	6	0
5/90	May	10,023	547	6	0	510	10	9,090	553	6	-934	6	0
6/90	Jun	9,138	548	5	0	510	10	8,204	555	5	-934	7	-1
7/90	Jul	8,227	552	4	0	510	10	7,294	560	3	-934	8	-1
8/90	Aug	8,573	545	6	0	510	10	7,639	552	5	-934	7	-1
9/90	Sep	8,425	548	8	0	510	10	7,492	555	7	-934	7	0
10/90	Oct	8,658	542	10	0	510	10	7,725	549	10	-934	6	0
11/90	Nov	8,777	541	8	0	510	10	7,844	547	7	-934	6	0
12/90	Dec	9,639	559	9	0	510	10	8,706	567	9	-934	7	0
1/91	Jan	10,825	551	5	0	510	10	9,892	557	5	-934	6	0
2/91	Feb	16,610	575	10	0	510	10	15,676	580	10	-934	5	0
3/91	Mar	31,989	256	4	0	510	10	31,055	249	3	-934	-7	0
4/91	Apr	10,615	546	4	0	510	10	9,681	551	4	-934	5	-1
5/91	May	8,839	567	5	0	510	10	7,905	576	4	-934	9	-1
6/91	Jun	9,104	568	5	0	510	10	8,170	577	4	-934	9	-1
7/91	Jul	7,867	564	7	0	510	10	6,933	574	7	-934	10	0
8/91	Aug	7,847	550	9	0	510	10	6,914	558	8	-934	8	0
9/91	Sep	7,638	561	9	0	510	10	6,704	571	9	-934	10	0
10/91	Oct	8,265	554	8	0	510	10	7,331	562	7	-934	8	0
11/91	Nov	8,925	553	6	0	510	10	7,991	561	6	-934	7	0
12/91	Dec	10,316	556	7	0	510	10	9,382	562	7	-934	7	0
1/92	Jan	11,719	570	8	0	510	10	10,786	577	8	-934	7	0
2/92	Feb	26,929	503	7	0	510	10	25,995	503	7	-934	0	0
3/92	Mar	19,977	535	6	0	510	10	19,043	537	6	-934	2	0
4/92	Apr	9,763	561	10	0	510	10	8,829	568	10	-934	7	0
5/92	May	9,083	566	9	0	510	10	8,150	575	9	-934	9	0
6/92	Jun	8,469	540	9	0	510	10	7,535	546	9	-934	6	0
7/92	Jul	8,449	554	10	0	510	10	7,516	561	10	-934	8	0
8/92	Aug	7,866	553	9	0	510	10	6,932	562	9	-934	9	0
9/92	Sep	7,819	550	8	0	510	10	6,885	558	8	-934	8	0
10/92	Oct	8,437	555	7	0	510	10	7,503	563	7	-934	8	0
11/92	Nov	8,555	547	7	0	510	10	7,621	554	7	-934	7	0
12/92	Dec	19,853	452	7	0	510	10	18,919	450	7	-934	-2	0
1/93	Jan	118,232	343	4	0	510	10	117,299	342	4	-934	-1	0
2/93	Feb	51,998	267	4	0	510	10	51,064	263	4	-934	-4	0
3/93	Mar	39,678	295	4	0	510	10	38,744	290	4	-934	-5	0
4/93	Apr	29,740	339	7	0	510	10	28,806	334	7	-934	-5	0
5/93	May	20,682	400	7	0	510	10	19,748	396	7	-934	-4	0
6/93	Jun	12,032	526	9	0	510	10	11,099	529	9	-934	3	0
7/93	Jul	8,063	584	9	0	510	10	7,130	596	9	-934	12	0
8/93	Aug	7,212	588	10	0	510	10	6,278	602	10	-934	15	0
9/93	Sep	7,700	577	9	0	510	10	6,766	589	9	-934	12	0
10/93	Oct	7,858	573	9	0	510	10	6,924	585	8	-934	11	0

Table 12a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 5
No Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline			Alt5						Difference		
		Total Discharge At Riverside Narrows			Recycled Water Export			Total Discharge At Riverside Narrows					
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
11/93	Nov	7,702	519	10	0	510	10	6,768	523	10	-934	4	0
12/93	Dec	8,866	564	9	0	510	10	7,932	573	9	-934	9	0
1/94	Jan	9,392	515	8	0	510	10	8,458	518	8	-934	3	0
2/94	Feb	14,923	407	8	0	510	10	13,989	401	8	-934	-6	0
3/94	Mar	14,466	612	8	0	510	10	13,532	620	8	-934	8	0
4/94	Apr	9,427	544	9	0	510	10	8,493	550	9	-934	6	0
5/94	May	8,738	577	9	0	510	10	7,804	588	9	-934	10	0
6/94	Jun	7,731	567	10	0	510	10	6,797	577	10	-934	11	0
7/94	Jul	7,578	576	10	0	510	10	6,644	588	10	-934	12	0
8/94	Aug	7,376	567	10	0	510	10	6,442	578	9	-934	11	0
9/94	Sep	7,331	564	10	0	510	10	6,398	575	10	-934	11	0
10/94	Oct	9,004	553	9	0	510	10	8,070	560	9	-934	7	0
11/94	Nov	10,638	516	9	0	510	10	9,704	518	9	-934	2	0
12/94	Dec	11,506	533	9	0	510	10	10,573	537	9	-934	4	0
1/95	Jan	55,734	306	5	0	510	10	54,800	302	5	-934	-3	0
2/95	Feb	25,655	327	7	0	510	10	24,721	321	6	-934	-6	0
3/95	Mar	116,185	171	4	0	510	10	115,251	169	4	-934	-3	0
4/95	Apr	22,239	388	8	0	510	10	21,305	384	8	-934	-4	0
5/95	May	19,027	422	7	0	510	10	18,093	418	7	-934	-4	0
6/95	Jun	13,904	496	9	0	510	10	12,970	496	9	-934	0	0
7/95	Jul	8,850	569	9	0	510	10	7,917	578	9	-934	9	0
8/95	Aug	8,253	583	10	0	510	10	7,319	594	10	-934	12	0
9/95	Sep	7,870	590	10	0	510	10	6,936	603	10	-934	13	0
10/95	Oct	8,654	585	9	0	510	10	7,720	597	9	-934	12	0
11/95	Nov	8,868	579	9	0	510	10	7,934	590	9	-934	10	0
12/95	Dec	9,047	555	8	0	510	10	8,113	563	8	-934	8	0
1/96	Jan	13,175	505	9	0	510	10	12,241	507	9	-934	1	0
2/96	Feb	27,504	257	6	0	510	10	26,570	248	6	-934	-8	0
3/96	Mar	16,516	382	8	0	510	10	15,582	376	8	-934	-6	0
4/96	Apr	10,548	570	9	0	510	10	9,615	578	9	-934	8	0
5/96	May	10,359	596	9	0	510	10	9,425	606	9	-934	10	0
6/96	Jun	9,515	590	9	0	510	10	8,581	601	8	-934	11	0
7/96	Jul	9,268	582	9	0	510	10	8,334	592	8	-934	10	0
8/96	Aug	8,909	560	9	0	510	10	7,976	569	9	-934	8	0
9/96	Sep	9,356	524	9	0	510	10	8,422	528	9	-934	4	0
10/96	Oct	10,890	570	9	0	510	10	9,956	578	9	-934	8	0
11/96	Nov	16,349	558	8	0	510	10	15,416	562	8	-934	4	0
12/96	Dec	13,753	496	9	0	510	10	12,819	496	9	-934	0	0
1/97	Jan	41,012	506	5	0	510	10	40,078	507	5	-934	0	0
2/97	Feb	11,191	563	10	0	510	10	10,258	570	10	-934	7	0
3/97	Mar	10,513	576	9	0	510	10	9,579	584	9	-934	8	0
4/97	Apr	10,486	579	9	0	510	10	9,552	588	9	-934	9	0
5/97	May	9,606	563	9	0	510	10	8,672	571	9	-934	8	0
6/97	Jun	9,326	575	10	0	510	10	8,392	584	10	-934	9	0
7/97	Jul	8,880	582	8	0	510	10	7,946	593	8	-934	11	0
8/97	Aug	8,762	584	10	0	510	10	7,828	596	10	-934	11	0
9/97	Sep	9,134	578	10	0	510	10	8,201	588	10	-934	10	0
10/97	Oct	9,016	573	11	0	510	10	8,082	582	11	-934	10	0
11/97	Nov	10,779	480	9	0	510	10	9,845	479	9	-934	-1	0

Table 12a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 5
No Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline			Alt5						Difference		
		Total Discharge At Riverside Narrows			Recycled Water Export			Total Discharge At Riverside Narrows					
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
12/97	Dec	15,564	570	5	0	510	10	14,630	575	4	-934	5	0
1/98	Jan	15,618	562	9	0	510	10	14,684	567	9	-934	5	0
2/98	Feb	77,548	225	4	0	510	10	76,614	221	4	-934	-3	0
3/98	Mar	19,861	497	8	0	510	10	18,927	497	8	-934	0	0
4/98	Apr	23,583	403	6	0	510	10	22,650	400	6	-934	-4	0
5/98	May	37,933	278	3	0	510	10	37,000	272	3	-934	-5	0
6/98	Jun	16,641	432	6	0	510	10	15,708	428	6	-934	-3	0
7/98	Jul	10,024	564	9	0	510	10	9,090	572	9	-934	8	0
8/98	Aug	11,774	534	10	0	510	10	10,840	538	10	-934	4	0
9/98	Sep	11,371	487	9	0	510	10	10,437	487	9	-934	0	0
10/98	Oct	9,998	561	10	0	510	10	9,064	568	10	-934	7	0
11/98	Nov	10,350	536	9	0	510	10	9,416	541	9	-934	5	0
12/98	Dec	10,464	560	9	0	510	10	9,530	567	9	-934	7	0
1/99	Jan	11,454	477	7	0	510	10	10,521	476	7	-934	-1	0
2/99	Feb	10,952	552	8	0	510	10	10,018	557	8	-934	6	0
3/99	Mar	10,585	565	9	0	510	10	9,652	573	9	-934	7	0
4/99	Apr	11,680	498	9	0	510	10	10,746	499	9	-934	1	0
5/99	May	9,609	600	10	0	510	10	8,675	612	10	-934	12	0
6/99	Jun	10,723	564	11	0	510	10	9,789	571	11	-934	7	0
7/99	Jul	9,791	526	10	0	510	10	8,858	529	10	-934	4	0
8/99	Aug	9,568	580	11	0	510	10	8,635	590	11	-934	10	0
9/99	Sep	9,091	580	12	0	510	10	8,157	590	12	-934	10	0
Average		15,284	519	8	0	510	10	14,350	524	8	-934	5	0
Max		118,232	612	12				117,299	620	12	-934	15	0
Min		7,212	171	3				6,278	169	3	-934	-8	-1
StDev		16,829	90	2				16,829	94	2	0	5	0
Coef of Var		110%	17%	24%				117%	18%	25%	0%	101%	-105%

Table 12b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 5
No Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 5 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
10/89	Oct	33,103	599	8	21,438	613	6.6	-11,665	15	-1.1
11/89	Nov	34,537	589	9	22,872	599	8.0	-11,665	9	-0.6
12/89	Dec	35,563	604	9	23,898	619	8.1	-11,665	16	-0.6
1/90	Jan	40,128	575	9	28,463	576	8.2	-11,665	1	-0.5
2/90	Feb	49,942	523	7	38,276	508	6.0	-11,665	-15	-0.9
3/90	Mar	34,988	584	7	23,323	590	5.5	-11,665	6	-1.5
4/90	Apr	34,185	598	8	22,520	611	6.5	-11,665	14	-1.1
5/90	May	33,959	595	8	22,294	608	7.4	-11,665	12	-0.8
6/90	Jun	31,621	596	8	19,956	610	7.6	-11,665	14	-0.8
7/90	Jul	29,948	603	8	18,283	623	6.6	-11,665	20	-1.2
8/90	Aug	30,767	593	8	19,102	606	7.0	-11,665	13	-1.0
9/90	Sep	30,251	596	8	18,586	612	7.0	-11,665	15	-1.1
10/90	Oct	31,575	603	8	19,910	622	7.4	-11,665	19	-1.0
11/90	Nov	33,519	595	9	21,854	608	7.9	-11,665	13	-0.7
12/90	Dec	33,932	609	8	22,266	629	7.5	-11,665	20	-0.9
1/91	Jan	39,851	584	6	28,186	589	5.0	-11,665	5	-1.4
2/91	Feb	47,091	590	10	35,426	596	10.6	-11,665	6	0.1
3/91	Mar	91,223	400	5	79,558	375	4.6	-11,665	-25	-0.7
4/91	Apr	34,371	548	6	22,706	536	4.6	-11,665	-12	-1.7
5/91	May	33,399	568	8	21,734	566	7.4	-11,665	-2	-0.8
6/91	Jun	32,531	595	8	20,866	608	6.7	-11,665	13	-1.1
7/91	Jul	30,590	591	8	18,925	602	7.0	-11,665	12	-1.1
8/91	Aug	30,145	586	8	18,480	596	7.1	-11,665	9	-1.1
9/91	Sep	29,494	586	8	17,829	595	7.0	-11,665	9	-1.2
10/91	Oct	29,927	592	8	18,262	606	6.8	-11,665	13	-1.2
11/91	Nov	32,384	606	8	20,719	625	7.3	-11,665	19	-0.9
12/91	Dec	36,323	593	9	24,658	604	8.1	-11,665	10	-0.6
1/92	Jan	42,577	544	9	30,912	533	9.0	-11,665	-11	-0.3
2/92	Feb	71,679	413	8	60,013	382	7.1	-11,665	-31	-0.5
3/92	Mar	65,301	479	9	53,636	459	8.6	-11,665	-20	-0.2
4/92	Apr	34,797	540	7	23,131	524	5.8	-11,665	-16	-1.5
5/92	May	33,642	600	8	21,977	616	7.4	-11,665	15	-0.9
6/92	Jun	31,266	600	8	19,600	617	7.5	-11,665	17	-1.0
7/92	Jul	30,966	600	9	19,301	618	8.3	-11,665	17	-0.7
8/92	Aug	30,630	576	9	18,965	578	8.5	-11,665	3	-0.6
9/92	Sep	30,322	597	9	18,657	613	8.6	-11,665	16	-0.5
10/92	Oct	32,946	612	9	21,281	634	8.0	-11,665	22	-0.7
11/92	Nov	32,933	604	8	21,268	622	7.5	-11,665	18	-0.9
12/92	Dec	56,641	494	7	44,976	474	6.4	-11,665	-20	-0.7
1/93	Jan	242,113	286	5	230,448	272	4.6	-11,665	-14	-0.3
2/93	Feb	169,889	366	6	158,224	351	5.7	-11,665	-15	-0.3
3/93	Mar	76,370	475	6	64,705	458	5.3	-11,665	-17	-0.7
4/93	Apr	54,504	518	7	42,839	504	6.8	-11,665	-14	-0.7
5/93	May	43,544	559	8	31,879	554	6.8	-11,665	-5	-0.8
6/93	Jun	37,972	597	8	26,307	609	6.6	-11,665	11	-1.1
7/93	Jul	32,033	616	9	20,367	641	8.7	-11,665	25	-0.5
8/93	Aug	29,794	616	9	18,129	645	7.6	-11,665	29	-1.0
9/93	Sep	29,240	613	9	17,575	641	7.8	-11,665	28	-0.9
10/93	Oct	31,485	614	8	19,819	640	7.2	-11,665	25	-1.0
11/93	Nov	37,187	611	9	25,522	629	8.4	-11,665	18	-0.6

Table 12b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 5
No Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 5 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
12/93	Dec	36,468	575	9	24,803	576	8.1	-11,665	1	-0.6
1/94	Jan	36,576	606	9	24,911	621	8.4	-11,665	16	-0.5
2/94	Feb	51,579	505	7	39,914	486	6.5	-11,665	-19	-0.8
3/94	Mar	46,486	630	8	34,821	649	7.6	-11,665	20	-0.6
4/94	Apr	36,085	606	8	24,420	622	7.3	-11,665	16	-0.9
5/94	May	33,877	609	8	22,212	628	6.6	-11,665	20	-1.2
6/94	Jun	30,782	609	7	19,117	631	5.8	-11,665	23	-1.6
7/94	Jul	30,015	610	8	18,350	634	6.7	-11,665	24	-1.4
8/94	Aug	29,125	601	9	17,460	621	7.6	-11,665	20	-1.0
9/94	Sep	29,527	598	9	17,861	615	7.7	-11,665	17	-1.0
10/94	Oct	32,531	595	9	20,866	608	8.3	-11,665	13	-0.6
11/94	Nov	33,724	601	9	22,059	616	9.2	-11,665	16	-0.3
12/94	Dec	35,170	609	9	23,505	627	8.3	-11,665	19	-0.6
1/95	Jan	129,180	389	6	117,515	371	6.1	-11,665	-18	-0.3
2/95	Feb	57,028	521	7	45,363	508	6.1	-11,665	-13	-0.8
3/95	Mar	164,743	357	5	153,078	341	4.9	-11,665	-16	-0.4
4/95	Apr	59,992	536	6	48,327	527	5.0	-11,665	-9	-1.0
5/95	May	47,497	570	7	35,832	570	5.7	-11,665	0	-1.0
6/95	Jun	42,977	563	7	31,311	560	5.7	-11,665	-3	-1.2
7/95	Jul	30,009	587	8	18,343	598	6.3	-11,665	10	-1.4
8/95	Aug	30,682	610	9	19,017	633	8.1	-11,665	24	-0.8
9/95	Sep	30,655	607	9	18,990	628	7.8	-11,665	22	-0.9
10/95	Oct	31,821	603	9	20,156	621	8.0	-11,665	18	-0.8
11/95	Nov	33,153	605	9	21,488	623	8.2	-11,665	18	-0.6
12/95	Dec	35,466	581	9	23,801	586	8.6	-11,665	5	-0.5
1/96	Jan	39,242	598	9	27,577	609	9.2	-11,665	11	-0.2
2/96	Feb	74,040	405	6	62,375	374	5.4	-11,665	-31	-0.7
3/96	Mar	45,364	544	7	33,699	534	5.9	-11,665	-10	-1.0
4/96	Apr	35,871	625	9	24,206	651	7.8	-11,665	26	-0.7
5/96	May	34,025	633	9	22,360	665	9.1	-11,665	32	-0.3
6/96	Jun	31,666	618	9	20,001	645	9.0	-11,665	27	-0.4
7/96	Jul	30,519	621	9	18,854	652	8.8	-11,665	31	-0.5
8/96	Aug	31,331	603	9	19,665	622	9.0	-11,665	19	-0.4
9/96	Sep	31,509	597	9	19,843	612	9.0	-11,665	15	-0.4
10/96	Oct	33,915	601	10	22,250	616	9.4	-11,665	15	-0.2
11/96	Nov	41,974	549	6	30,309	540	4.6	-11,665	-9	-1.5
12/96	Dec	44,343	542	6	32,677	532	4.3	-11,665	-10	-1.5
1/97	Jan	73,408	424	5	61,742	396	3.8	-11,665	-28	-1.0
2/97	Feb	37,252	584	9	25,587	589	8.0	-11,665	6	-0.7
3/97	Mar	35,914	600	10	24,249	613	9.3	-11,665	14	-0.2
4/97	Apr	34,120	596	10	22,455	609	9.3	-11,665	13	-0.3
5/97	May	32,974	601	9	21,308	616	8.5	-11,665	16	-0.6
6/97	Jun	32,361	592	9	20,695	604	8.7	-11,665	12	-0.5
7/97	Jul	30,657	600	9	18,992	617	8.0	-11,665	17	-0.8
8/97	Aug	30,097	608	9	18,432	632	7.9	-11,665	23	-0.9
9/97	Sep	31,117	604	8	19,452	624	6.1	-11,665	20	-1.5
10/97	Oct	32,217	595	10	20,552	608	10.4	-11,665	13	0.0
11/97	Nov	37,330	563	8	25,665	559	6.7	-11,665	-4	-1.0
12/97	Dec	48,055	508	5	36,390	488	3.2	-11,665	-20	-1.6
1/98	Jan	49,485	489	7	37,820	463	6.3	-11,665	-26	-0.9

Table 12b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 5
No Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 5 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
2/98	Feb	200,064	303	3	188,399	287	3.0	-11,665	-17	-0.4
3/98	Mar	59,744	501	6	48,078	484	5.1	-11,665	-17	-0.9
4/98	Apr	52,443	516	6	40,778	500	5.2	-11,665	-16	-1.0
5/98	May	78,601	415	5	66,936	388	3.7	-11,665	-27	-0.9
6/98	Jun	42,631	520	7	30,966	500	5.7	-11,665	-20	-1.1
7/98	Jul	33,209	590	8	21,544	599	6.5	-11,665	10	-1.3
8/98	Aug	33,926	587	9	22,261	596	9.0	-11,665	8	-0.4
9/98	Sep	34,013	586	9	22,348	593	8.5	-11,665	8	-0.5
10/98	Oct	34,000	599	9	22,334	613	8.4	-11,665	14	-0.6
11/98	Nov	36,171	595	8	24,506	606	7.7	-11,665	11	-0.7
12/98	Dec	36,671	612	10	25,006	631	9.3	-11,665	19	-0.2
1/99	Jan	40,882	573	9	29,217	573	8.4	-11,665	1	-0.4
2/99	Feb	37,563	576	9	25,897	578	8.5	-11,665	2	-0.5
3/99	Mar	36,492	571	9	24,826	571	9.1	-11,665	0	-0.3
4/99	Apr	39,795	568	8	28,129	567	7.6	-11,665	-1	-0.7
5/99	May	35,454	604	9	23,789	620	8.0	-11,665	16	-0.7
6/99	Jun	33,606	605	10	21,941	624	9.1	-11,665	18	-0.4
7/99	Jul	32,862	598	9	21,196	613	8.6	-11,665	15	-0.6
8/99	Aug	31,340	597	9	19,675	612	8.9	-11,665	15	-0.5
9/99	Sep	31,229	597	9	19,564	612	8.9	-11,665	15	-0.5
Average		44,648	566	8.1	32,983	572	7.3	-11,665	6	-0.8
Max		242,113	633	10.5	230,448	665	10.6	-11,665	32	0.1
Min		29,125	286	3.4	17,460	272	3.0	-11,665	-31	-1.7
StDev		31,822	67	1.3	31,822	81	1.5	0.0	15.7	0.4
Coef of Var		71%	12%	16%	96%	14%	21%	0%	247%	-48%
					For August Data Only					
Average		30,784	598	8.8	19,119	614	8.1	-11,665	16	-0.8
Max		33,926	616	9.4	22,261	645	9.0	-11,665	29	-0.4
Min		29,125	576	8.1	17,460	578	7.0	-11,665	3	-1.1
StDev		1,296	12	0.5	1,296	20	0.7	0	8	0.3
Coef of Var		4%	2%	5%	7%	3%	9%	0%	50%	-35%

Table 12c
Annual Flow and TDS Impacts of Exporting Recycled Water from RIX
Year 2040 Alternative 5
No Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Water Year	Baseline Total Discharge Below Prado Dam				Alternative 5 Total Discharge Below Prado Dam				Difference			
	Annual Average		Five-year average		Annual Average		Five-year average		Annual Average		Five-year average	
	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)
89-90	418,993	585	491,783	542	279,011	592	351,800	530	-139,983	7	-139,983	-12
90-91	467,721	550	494,526	538	327,738	541	354,543	525	-139,983	-9	-139,983	-13
91-92	469,815	543	496,863	535	329,832	531	356,880	521	-139,983	-12	-139,983	-14
92-93	837,979	438	524,115	525	697,997	411	384,132	508	-139,983	-27	-139,983	-17
93-94	429,192	595	524,740	526	289,209	606	384,757	509	-139,983	11	-139,983	-17
94-95	694,189	487	579,779	508	554,206	466	439,796	488	-139,983	-21	-139,983	-20
95-96	454,007	569	577,036	511	314,024	567	437,053	491	-139,983	-1	-139,983	-19
96-97	458,132	560	574,700	513	318,149	555	434,717	495	-139,983	-5	-139,983	-19
97-98	701,719	457	547,448	522	561,736	429	407,465	505	-139,983	-29	-139,983	-17
98-99	426,064	591	546,822	521	286,081	600	406,839	504	-139,983	9	-139,983	-17
Average	535,781	537	535,781	524	395,798	530	395,798	508	-139,983	-8	-139,983	-17
Max	837,979	595	579,779	542	697,997	606	439,796	530	-139,983	11	-139,983	-12
Min	418,993	438	491,783	508	279,011	411	351,800	488	-139,983	-29	-139,983	-20
StDev	150,071	57	34,675	12	150,071	71	34,675	14	0	15	0	3
Coef of Var	28%	11%	6%	2%	38%	13%	9%	3%	0%	-189%	0%	-17%

Table 13a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 6
No Export of San Bernardino Effluent and Intermediate Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge At Riverside Narrows			Alt 6 Recycled Water Export			Alt 6 Total Discharge At Riverside Narrows			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
10/89	Oct	6,635	564	5	0	510	10	6,355	567	5	-280	3	0
11/89	Nov	7,229	559	6	0	510	10	6,949	561	6	-280	3	0
12/89	Dec	7,311	564	7	0	510	10	7,031	567	6	-280	3	0
1/90	Jan	9,380	560	6	0	510	10	9,100	562	6	-280	2	0
2/90	Feb	10,276	580	8	0	510	10	9,996	583	8	-280	3	0
3/90	Mar	7,663	574	6	0	510	10	7,383	577	5	-280	3	0
4/90	Apr	7,944	564	5	0	510	10	7,664	567	4	-280	3	0
5/90	May	7,278	563	5	0	510	10	6,998	566	4	-280	3	0
6/90	Jun	6,392	567	3	0	510	10	6,112	571	3	-280	4	0
7/90	Jul	5,482	576	1	0	510	10	5,202	581	1	-280	5	0
8/90	Aug	5,827	564	4	0	510	10	5,547	568	3	-280	4	0
9/90	Sep	5,680	569	6	0	510	10	5,400	573	6	-280	4	0
10/90	Oct	5,913	560	11	0	510	10	5,633	564	11	-280	3	0
11/90	Nov	6,032	557	6	0	510	10	5,752	560	6	-280	3	0
12/90	Dec	6,894	581	9	0	510	10	6,614	585	9	-280	4	0
1/91	Jan	8,080	567	4	0	510	10	7,800	569	3	-280	3	0
2/91	Feb	13,864	589	10	0	510	10	13,584	591	10	-280	2	0
3/91	Mar	29,244	233	3	0	510	10	28,964	231	3	-280	-2	0
4/91	Apr	7,869	560	2	0	510	10	7,589	563	2	-280	3	0
5/91	May	6,093	596	3	0	510	10	5,813	601	2	-280	5	0
6/91	Jun	6,358	596	3	0	510	10	6,078	600	3	-280	5	0
7/91	Jul	5,121	596	5	0	510	10	4,841	602	5	-280	6	0
8/91	Aug	5,102	575	8	0	510	10	4,822	580	8	-280	5	0
9/91	Sep	4,893	593	8	0	510	10	4,613	599	8	-280	6	0
10/91	Oct	5,520	579	7	0	510	10	5,240	584	6	-280	5	0
11/91	Nov	6,179	575	5	0	510	10	5,899	579	4	-280	4	0
12/91	Dec	7,570	574	7	0	510	10	7,290	577	6	-280	3	0
1/92	Jan	8,974	590	8	0	510	10	8,694	594	8	-280	3	0
2/92	Feb	24,183	503	7	0	510	10	23,903	503	7	-280	0	0
3/92	Mar	17,232	540	6	0	510	10	16,952	541	6	-280	1	0
4/92	Apr	7,017	583	10	0	510	10	6,737	587	10	-280	4	0
5/92	May	6,338	593	9	0	510	10	6,058	598	9	-280	5	0
6/92	Jun	5,724	557	8	0	510	10	5,444	560	8	-280	3	0
7/92	Jul	5,704	577	10	0	510	10	5,424	582	10	-280	4	0
8/92	Aug	5,121	580	8	0	510	10	4,840	585	8	-280	5	0
9/92	Sep	5,074	575	7	0	510	10	4,794	579	7	-280	5	0
10/92	Oct	5,691	579	6	0	510	10	5,411	583	6	-280	5	0
11/92	Nov	5,810	567	6	0	510	10	5,530	571	6	-280	4	0
12/92	Dec	17,108	444	7	0	510	10	16,827	443	7	-280	-1	0
1/93	Jan	115,487	340	4	0	510	10	115,207	339	4	-280	0	0
2/93	Feb	49,253	254	4	0	510	10	48,972	253	4	-280	-1	0
3/93	Mar	36,933	279	4	0	510	10	36,652	277	4	-280	-2	0
4/93	Apr	26,995	323	6	0	510	10	26,715	321	6	-280	-2	0
5/93	May	17,936	384	6	0	510	10	17,656	383	6	-280	-2	0
6/93	Jun	9,287	532	9	0	510	10	9,007	533	9	-280	1	0
7/93	Jul	5,318	624	8	0	510	10	5,038	632	8	-280	7	0
8/93	Aug	4,466	639	10	0	510	10	4,186	649	10	-280	10	0
9/93	Sep	4,954	617	9	0	510	10	4,674	625	9	-280	8	0
10/93	Oct	5,112	610	8	0	510	10	4,832	617	8	-280	7	0

Table 13a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 6
No Export of San Bernardino Effluent and Intermediate Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline			Alt 6						Difference		
		Total Discharge At Riverside Narrows			Recycled Water Export			Total Discharge At Riverside Narrows					
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
11/93	Nov	4,957	527	9	0	510	10	4,677	529	9	-280	2	0
12/93	Dec	6,121	591	8	0	510	10	5,841	596	8	-280	5	0
1/94	Jan	6,647	519	7	0	510	10	6,366	520	7	-280	1	0
2/94	Feb	12,178	385	8	0	510	10	11,897	382	8	-280	-2	0
3/94	Mar	11,720	637	8	0	510	10	11,440	641	8	-280	4	0
4/94	Apr	6,682	560	8	0	510	10	6,401	563	8	-280	3	0
5/94	May	5,992	611	9	0	510	10	5,712	617	9	-280	6	0
6/94	Jun	4,985	601	10	0	510	10	4,705	607	10	-280	7	0
7/94	Jul	4,832	617	10	0	510	10	4,552	625	10	-280	8	0
8/94	Aug	4,630	604	9	0	510	10	4,350	612	9	-280	7	0
9/94	Sep	4,586	599	10	0	510	10	4,306	607	10	-280	7	0
10/94	Oct	6,258	574	8	0	510	10	5,978	578	8	-280	4	0
11/94	Nov	7,893	519	9	0	510	10	7,612	520	9	-280	1	0
12/94	Dec	8,761	542	8	0	510	10	8,481	544	8	-280	2	0
1/95	Jan	52,989	295	4	0	510	10	52,709	294	4	-280	-1	0
2/95	Feb	22,910	306	6	0	510	10	22,630	304	6	-280	-2	0
3/95	Mar	113,440	163	4	0	510	10	113,159	162	4	-280	-1	0
4/95	Apr	19,494	372	7	0	510	10	19,214	370	7	-280	-2	0
5/95	May	16,281	408	7	0	510	10	16,001	407	7	-280	-1	0
6/95	Jun	11,158	493	9	0	510	10	10,878	494	9	-280	0	0
7/95	Jul	6,105	598	8	0	510	10	5,825	603	8	-280	5	0
8/95	Aug	5,508	621	10	0	510	10	5,228	628	10	-280	7	0
9/95	Sep	5,124	635	10	0	510	10	4,844	644	10	-280	8	0
10/95	Oct	5,908	623	9	0	510	10	5,628	629	9	-280	7	0
11/95	Nov	6,123	612	8	0	510	10	5,843	618	8	-280	6	0
12/95	Dec	6,302	577	7	0	510	10	6,021	581	7	-280	4	0
1/96	Jan	10,430	506	8	0	510	10	10,149	506	8	-280	0	0
2/96	Feb	24,759	229	5	0	510	10	24,479	226	5	-280	-3	0
3/96	Mar	13,771	358	8	0	510	10	13,490	355	8	-280	-3	0
4/96	Apr	7,803	594	9	0	510	10	7,523	597	8	-280	4	0
5/96	May	7,614	629	8	0	510	10	7,334	634	8	-280	5	0
6/96	Jun	6,770	625	8	0	510	10	6,489	631	8	-280	6	0
7/96	Jul	6,523	614	8	0	510	10	6,242	620	8	-280	6	0
8/96	Aug	6,164	585	9	0	510	10	5,884	590	9	-280	5	0
9/96	Sep	6,610	532	9	0	510	10	6,330	534	9	-280	2	0
10/96	Oct	8,145	592	9	0	510	10	7,865	596	9	-280	4	0
11/96	Nov	13,604	569	7	0	510	10	13,324	570	7	-280	2	0
12/96	Dec	11,007	494	8	0	510	10	10,727	494	8	-280	0	0
1/97	Jan	38,267	506	5	0	510	10	37,986	506	5	-280	0	0
2/97	Feb	8,446	582	10	0	510	10	8,166	585	10	-280	3	0
3/97	Mar	7,767	601	9	0	510	10	7,487	605	9	-280	4	0
4/97	Apr	7,740	605	9	0	510	10	7,460	610	9	-280	4	0
5/97	May	6,861	586	9	0	510	10	6,581	590	9	-280	4	0
6/97	Jun	6,581	604	10	0	510	10	6,301	609	10	-280	5	0
7/97	Jul	6,135	617	7	0	510	10	5,854	623	7	-280	6	0
8/97	Aug	6,016	621	10	0	510	10	5,736	627	10	-280	6	0
9/97	Sep	6,389	609	10	0	510	10	6,109	614	10	-280	5	0
10/97	Oct	6,270	602	12	0	510	10	5,990	608	12	-280	5	0
11/97	Nov	8,034	471	9	0	510	10	7,754	471	9	-280	-1	0

Table 13a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 6
No Export of San Bernardino Effluent and Intermediate Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge At Riverside Narrows			Alt 6 Recycled Water Export			Alt 6 Total Discharge At Riverside Narrows			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
12/97	Dec	12,818	584	4	0	510	10	12,538	586	4	-280	2	0
1/98	Jan	12,873	575	9	0	510	10	12,593	577	9	-280	2	0
2/98	Feb	74,803	214	4	0	510	10	74,523	213	4	-280	-1	0
3/98	Mar	17,115	495	7	0	510	10	16,835	495	7	-280	0	0
4/98	Apr	20,838	390	6	0	510	10	20,558	388	5	-280	-1	0
5/98	May	35,188	260	3	0	510	10	34,908	258	3	-280	-2	0
6/98	Jun	13,896	417	6	0	510	10	13,616	416	6	-280	-1	0
7/98	Jul	7,278	586	9	0	510	10	6,998	590	9	-280	4	0
8/98	Aug	9,029	543	11	0	510	10	8,749	545	11	-280	2	0
9/98	Sep	8,625	482	9	0	510	10	8,345	482	9	-280	0	0
10/98	Oct	7,252	582	10	0	510	10	6,972	586	10	-280	4	0
11/98	Nov	7,604	548	9	0	510	10	7,324	550	9	-280	2	0
12/98	Dec	7,719	579	9	0	510	10	7,439	583	9	-280	3	0
1/99	Jan	8,709	468	7	0	510	10	8,429	467	6	-280	-1	0
2/99	Feb	8,206	567	8	0	510	10	7,926	570	8	-280	3	0
3/99	Mar	7,840	587	9	0	510	10	7,560	590	9	-280	4	0
4/99	Apr	8,935	496	8	0	510	10	8,654	496	8	-280	0	0
5/99	May	6,863	639	10	0	510	10	6,583	645	10	-280	6	0
6/99	Jun	7,977	584	11	0	510	10	7,697	587	11	-280	3	0
7/99	Jul	7,046	534	10	0	510	10	6,766	536	10	-280	2	0
8/99	Aug	6,823	611	12	0	510	10	6,543	616	12	-280	5	0
9/99	Sep	6,345	612	12	0	510	10	6,065	618	12	-280	6	0
Average		12,538	534	7	0	510	10	12,258	537	7	-280	3	0
Max		115,487	639	12				115,207	649	12	-280	10	0
Min		4,466	163	1				4,186	162	1	-280	-3	0
StDev		16,829	105	2				16,829	107	2	0	3	0
Coef of Var		134%	20%	31%				137%	20%	32%	0%	96%	-112%

Table 13b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 6
No Export of San Bernardino Effluent and Intermediate Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 6 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
10/89	Oct	21,580	626	7	18,129	634	6.2	-3,451	8	-0.5
11/89	Nov	23,014	610	8	19,563	615	7.7	-3,451	5	-0.3
12/89	Dec	24,040	630	8	20,589	639	7.9	-3,451	8	-0.3
1/90	Jan	28,605	586	8	25,153	586	8.1	-3,451	1	-0.2
2/90	Feb	38,419	516	6	34,967	509	5.7	-3,451	-7	-0.4
3/90	Mar	23,466	602	6	20,014	605	4.8	-3,451	3	-0.7
4/90	Apr	22,662	623	7	19,211	631	6.0	-3,451	7	-0.5
5/90	May	22,436	620	7	18,985	626	7.1	-3,451	7	-0.4
6/90	Jun	20,098	624	8	16,647	632	7.3	-3,451	9	-0.3
7/90	Jul	18,425	638	7	14,974	650	6.4	-3,451	13	-0.3
8/90	Aug	19,244	620	7	15,793	628	6.7	-3,451	8	-0.4
9/90	Sep	18,728	626	7	15,277	636	6.7	-3,451	10	-0.4
10/90	Oct	20,052	636	7	16,600	647	7.0	-3,451	11	-0.4
11/90	Nov	21,996	620	8	18,545	627	7.7	-3,451	7	-0.2
12/90	Dec	22,409	641	8	18,957	652	7.0	-3,451	11	-0.5
1/91	Jan	28,328	598	5	24,876	600	4.5	-3,451	2	-0.6
2/91	Feb	35,568	604	11	32,117	606	10.7	-3,451	2	0.1
3/91	Mar	79,700	378	5	76,249	369	4.4	-3,451	-9	-0.2
4/91	Apr	22,848	548	5	19,397	542	3.9	-3,451	-6	-0.8
5/91	May	21,876	578	7	18,425	578	7.2	-3,451	-1	-0.3
6/91	Jun	21,008	621	7	17,556	628	6.3	-3,451	8	-0.5
7/91	Jul	19,067	617	7	15,616	624	6.9	-3,451	8	-0.2
8/91	Aug	18,622	610	7	15,171	617	7.0	-3,451	6	-0.2
9/91	Sep	17,971	610	7	14,520	617	6.9	-3,451	7	-0.2
10/91	Oct	18,405	621	7	14,953	629	6.5	-3,451	9	-0.4
11/91	Nov	20,861	638	7	17,410	649	7.0	-3,451	11	-0.3
12/91	Dec	24,800	615	8	21,349	620	7.9	-3,451	5	-0.3
1/92	Jan	31,054	542	9	27,603	537	8.9	-3,451	-5	-0.1
2/92	Feb	60,156	387	7	56,704	375	6.9	-3,451	-12	-0.2
3/92	Mar	53,778	465	9	50,327	457	8.5	-3,451	-8	-0.1
4/92	Apr	23,274	536	6	19,822	528	5.1	-3,451	-8	-0.8
5/92	May	22,119	628	7	18,668	636	7.0	-3,451	9	-0.4
6/92	Jun	19,743	630	8	16,291	640	7.2	-3,451	10	-0.3
7/92	Jul	19,443	632	8	15,992	642	8.2	-3,451	11	-0.1
8/92	Aug	19,107	593	9	15,655	595	8.6	-3,451	2	0.1
9/92	Sep	18,799	628	9	15,347	638	8.8	-3,451	10	0.1
10/92	Oct	21,423	646	8	17,972	658	8.0	-3,451	12	-0.1
11/92	Nov	21,410	635	8	17,958	645	7.3	-3,451	10	-0.3
12/92	Dec	45,118	480	6	41,666	472	6.1	-3,451	-8	-0.3
1/93	Jan	230,590	273	5	227,138	269	4.5	-3,451	-5	-0.1
2/93	Feb	158,366	353	6	154,915	348	5.7	-3,451	-5	-0.1
3/93	Mar	64,847	462	5	61,396	456	5.1	-3,451	-7	-0.2
4/93	Apr	42,981	511	7	39,530	504	6.6	-3,451	-6	-0.3
5/93	May	32,021	563	7	28,569	561	6.5	-3,451	-2	-0.4
6/93	Jun	26,449	619	7	22,998	625	6.2	-3,451	6	-0.5
7/93	Jul	20,510	654	9	17,058	668	8.9	-3,451	15	0.1
8/93	Aug	18,271	659	8	14,819	677	7.7	-3,451	18	0.0
9/93	Sep	17,717	656	8	14,266	674	7.9	-3,451	18	0.0
10/93	Oct	19,962	653	7	16,510	668	7.1	-3,451	15	-0.2
11/93	Nov	25,664	639	8	22,213	648	8.5	-3,451	9	0.1

Table 13b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 6
No Export of San Bernardino Effluent and Intermediate Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 6 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
12/93	Dec	24,945	587	8	21,494	588	8.0	-3,451	1	-0.2
1/94	Jan	25,053	632	8	21,601	640	8.2	-3,451	8	-0.2
2/94	Feb	40,056	493	6	36,605	484	6.2	-3,451	-8	-0.3
3/94	Mar	34,963	657	8	31,512	665	7.4	-3,451	8	-0.2
4/94	Apr	24,562	633	7	21,110	642	6.9	-3,451	8	-0.4
5/94	May	22,354	640	7	18,902	651	6.1	-3,451	11	-0.5
6/94	Jun	19,259	645	6	15,808	659	5.4	-3,451	14	-0.5
7/94	Jul	18,492	649	7	15,040	664	6.5	-3,451	15	-0.2
8/94	Aug	17,602	636	8	14,151	650	7.7	-3,451	13	0.0
9/94	Sep	18,004	630	8	14,552	641	7.9	-3,451	11	0.0
10/94	Oct	21,008	621	8	17,556	628	8.1	-3,451	8	-0.3
11/94	Nov	22,201	628	9	18,750	637	9.1	-3,451	9	-0.1
12/94	Dec	23,647	639	8	20,196	648	8.1	-3,451	10	-0.3
1/95	Jan	117,657	374	6	114,205	368	6.0	-3,451	-6	-0.1
2/95	Feb	45,505	514	6	42,054	508	5.8	-3,451	-6	-0.3
3/95	Mar	153,220	343	5	149,769	338	4.8	-3,451	-6	-0.1
4/95	Apr	48,469	533	5	45,018	529	4.7	-3,451	-4	-0.4
5/95	May	35,974	577	6	32,523	577	5.3	-3,451	-1	-0.4
6/95	Jun	31,454	568	6	28,002	567	5.2	-3,451	-2	-0.5
7/95	Jul	18,486	612	6	15,034	619	5.7	-3,451	7	-0.7
8/95	Aug	19,159	647	8	15,707	662	8.1	-3,451	14	-0.1
9/95	Sep	19,132	642	8	15,681	655	7.7	-3,451	13	-0.1
10/95	Oct	20,298	634	8	16,847	645	7.8	-3,451	11	-0.2
11/95	Nov	21,630	636	8	18,179	646	8.1	-3,451	10	-0.2
12/95	Dec	23,943	597	9	20,492	600	8.5	-3,451	3	-0.2
1/96	Jan	27,719	619	9	24,267	624	9.1	-3,451	5	-0.1
2/96	Feb	62,517	379	5	59,066	367	5.2	-3,451	-12	-0.2
3/96	Mar	33,841	542	6	30,389	538	5.5	-3,451	-5	-0.4
4/96	Apr	24,348	662	8	20,897	675	7.5	-3,451	13	-0.3
5/96	May	22,502	676	9	19,051	693	9.0	-3,451	17	-0.2
6/96	Jun	20,143	658	9	16,692	674	8.9	-3,451	16	-0.2
7/96	Jul	18,996	666	9	15,545	684	8.6	-3,451	19	-0.2
8/96	Aug	19,808	636	9	16,356	647	8.9	-3,451	11	-0.1
9/96	Sep	19,986	625	9	16,534	634	8.8	-3,451	9	-0.2
10/96	Oct	22,392	628	9	18,941	636	9.3	-3,451	8	-0.1
11/96	Nov	30,451	549	5	27,000	545	4.0	-3,451	-4	-0.7
12/96	Dec	32,820	540	4	29,368	535	3.7	-3,451	-5	-0.7
1/97	Jan	61,885	401	4	58,433	390	3.5	-3,451	-11	-0.3
2/97	Feb	25,729	600	8	22,278	603	7.7	-3,451	3	-0.3
3/97	Mar	24,391	624	9	20,939	631	9.2	-3,451	7	-0.1
4/97	Apr	22,597	621	9	19,145	628	9.2	-3,451	7	-0.1
5/97	May	21,451	629	9	17,999	638	8.3	-3,451	9	-0.3
6/97	Jun	20,838	617	9	17,386	624	8.5	-3,451	7	-0.3
7/97	Jul	19,134	631	8	15,683	642	7.8	-3,451	11	-0.3
8/97	Aug	18,574	646	8	15,123	661	7.6	-3,451	15	-0.3
9/97	Sep	19,594	637	6	16,143	649	5.4	-3,451	12	-0.8
10/97	Oct	20,694	621	10	17,243	629	10.5	-3,451	8	0.1
11/97	Nov	25,807	570	7	22,356	568	6.3	-3,451	-2	-0.5
12/97	Dec	36,532	496	3	33,080	487	2.6	-3,451	-9	-0.6
1/98	Jan	37,962	471	6	34,511	460	5.9	-3,451	-11	-0.4

Table 13b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 6
No Export of San Bernardino Effluent and Intermediate Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 6 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
2/98	Feb	188,541	288	3	185,090	283	2.9	-3,451	-5	-0.1
3/98	Mar	48,221	490	5	44,769	483	4.8	-3,451	-7	-0.4
4/98	Apr	40,920	507	5	37,469	500	4.8	-3,451	-7	-0.4
5/98	May	67,078	393	4	63,626	383	3.4	-3,451	-10	-0.3
6/98	Jun	31,108	509	6	27,657	500	5.3	-3,451	-9	-0.5
7/98	Jul	21,686	612	7	18,235	618	5.9	-3,451	6	-0.7
8/98	Aug	22,403	608	9	18,952	613	8.8	-3,451	5	-0.2
9/98	Sep	22,490	606	9	19,038	610	8.2	-3,451	4	-0.3
10/98	Oct	22,477	625	8	19,025	632	8.1	-3,451	8	-0.3
11/98	Nov	24,648	617	8	21,196	622	7.4	-3,451	6	-0.4
12/98	Dec	25,148	642	9	21,697	651	9.2	-3,451	10	-0.1
1/99	Jan	29,359	583	8	25,908	583	8.3	-3,451	0	-0.2
2/99	Feb	26,040	589	9	22,588	590	8.4	-3,451	1	-0.2
3/99	Mar	24,969	582	9	21,517	582	9.0	-3,451	0	-0.2
4/99	Apr	28,272	576	8	24,820	576	7.3	-3,451	-1	-0.3
5/99	May	23,931	631	8	20,480	639	7.7	-3,451	8	-0.4
6/99	Jun	22,083	636	9	18,632	646	8.9	-3,451	10	-0.2
7/99	Jul	21,339	626	9	17,887	634	8.3	-3,451	8	-0.3
8/99	Aug	19,817	626	9	16,366	635	8.6	-3,451	9	-0.3
9/99	Sep	19,706	626	9	16,254	635	8.6	-3,451	9	-0.3
Average		33,125	583	7.3	29,674	588	7.0	-3,451	4	-0.3
Max		230,590	676	10.6	227,138	693	10.7	-3,451	19	0.1
Min		17,602	273	3.0	14,151	269	2.6	-3,451	-12	-0.8
StDev		31,822	84	1.5	31,822	91	1.6	0.0	7.9	0.2
Coef of Var		96%	14%	21%	107%	15%	23%	0%	179%	-68%
				For August Data Only						
Average		19,261	628	8.1	15,809	638	8.0	-3,451	10	-0.2
Max		22,403	659	9.0	18,952	677	8.9	-3,451	18	0.1
Min		17,602	593	7.1	14,151	595	6.7	-3,451	2	-0.4
StDev		1,296	21	0.7	1,296	26	0.8	0	5	0.2
Coef of Var		7%	3%	9%	8%	4%	10%	0%	48%	-97%

Table 13c
Annual Flow and TDS Impacts of Exporting Recycled Water from RIX
Year 2010 Alternative 6
No Export of San Bernardino Effluent and Intermediate Recycling at Other POTW's

Water Year	Baseline Total Discharge Below Prado Dam				Alternative 6 Total Discharge Below Prado Dam				Difference			
	Annual Average		Five-year average		Annual Average		Five-year average		Annual Average		Five-year average	
	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)
89-90	280,718	603	353,507	540	239,300	607	312,090	534	-41,417	4	-41,417	-6
90-91	329,445	551	356,250	535	288,028	547	314,833	529	-41,417	-4	-41,417	-6
91-92	331,539	541	358,587	531	290,121	535	317,169	524	-41,417	-6	-41,417	-7
92-93	699,704	416	385,839	517	658,286	406	344,421	509	-41,417	-10	-41,417	-8
93-94	290,916	617	386,464	518	249,498	623	345,047	510	-41,417	6	-41,417	-8
94-95	555,913	472	441,503	496	514,496	463	400,086	487	-41,417	-9	-41,417	-9
95-96	315,732	578	438,761	499	274,314	577	397,343	491	-41,417	-1	-41,417	-9
96-97	319,856	566	436,424	503	278,438	563	395,006	494	-41,417	-2	-41,417	-8
97-98	563,443	435	409,172	513	522,026	423	367,754	506	-41,417	-12	-41,417	-8
98-99	287,788	611	408,546	512	246,371	616	367,129	505	-41,417	5	-41,417	-8
Average	397,505	539	397,505	516	356,088	536	356,088	509	-41,417	-3	-41,417	-8
Max	699,704	617	441,503	540	658,286	623	400,086	534	-41,417	6	-41,417	-6
Min	280,718	416	353,507	496	239,300	406	312,090	487	-41,417	-12	-41,417	-9
StDev	150,071	73	34,675	15	150,071	79	34,675	16	0	6	0	1
Coef of Var	38%	14%	9%	3%	42%	15%	10%	3%	0%	-213%	0%	-14%

Table 14a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 6
No Export of San Bernardino Effluent and Intermediate Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge At Riverside Narrows			Alt 6 Recycled Water Export			Alt 6 Total Discharge At Riverside Narrows			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
10/89	Oct	9,380	547	6	0	510	10	8,913	550	6	-467	3	0
11/89	Nov	9,975	544	7	0	510	10	9,508	546	7	-467	3	0
12/89	Dec	10,056	548	7	0	510	10	9,589	551	7	-467	3	0
1/90	Jan	12,125	547	7	0	510	10	11,659	549	7	-467	2	0
2/90	Feb	13,021	564	8	0	510	10	12,554	567	8	-467	3	0
3/90	Mar	10,408	556	7	0	510	10	9,941	559	7	-467	3	0
4/90	Apr	10,689	549	6	0	510	10	10,222	552	6	-467	3	0
5/90	May	10,023	547	6	0	510	10	9,556	550	6	-467	3	0
6/90	Jun	9,138	548	5	0	510	10	8,671	552	5	-467	3	0
7/90	Jul	8,227	552	4	0	510	10	7,760	556	4	-467	4	0
8/90	Aug	8,573	545	6	0	510	10	8,106	548	5	-467	3	0
9/90	Sep	8,425	548	8	0	510	10	7,959	552	7	-467	3	0
10/90	Oct	8,658	542	10	0	510	10	8,192	545	10	-467	3	0
11/90	Nov	8,777	541	8	0	510	10	8,311	544	7	-467	3	0
12/90	Dec	9,639	559	9	0	510	10	9,173	563	9	-467	4	0
1/91	Jan	10,825	551	5	0	510	10	10,359	554	5	-467	3	0
2/91	Feb	16,610	575	10	0	510	10	16,143	577	10	-467	2	0
3/91	Mar	31,989	256	4	0	510	10	31,522	253	3	-467	-3	0
4/91	Apr	10,615	546	4	0	510	10	10,148	548	4	-467	3	0
5/91	May	8,839	567	5	0	510	10	8,372	572	5	-467	4	0
6/91	Jun	9,104	568	5	0	510	10	8,637	572	5	-467	4	0
7/91	Jul	7,867	564	7	0	510	10	7,400	569	7	-467	5	0
8/91	Aug	7,847	550	9	0	510	10	7,380	554	9	-467	4	0
9/91	Sep	7,638	561	9	0	510	10	7,171	566	9	-467	5	0
10/91	Oct	8,265	554	8	0	510	10	7,798	558	8	-467	4	0
11/91	Nov	8,925	553	6	0	510	10	8,458	557	6	-467	4	0
12/91	Dec	10,316	556	7	0	510	10	9,849	559	7	-467	3	0
1/92	Jan	11,719	570	8	0	510	10	11,252	574	8	-467	3	0
2/92	Feb	26,929	503	7	0	510	10	26,462	503	7	-467	0	0
3/92	Mar	19,977	535	6	0	510	10	19,510	536	6	-467	1	0
4/92	Apr	9,763	561	10	0	510	10	9,296	564	10	-467	4	0
5/92	May	9,083	566	9	0	510	10	8,616	570	9	-467	4	0
6/92	Jun	8,469	540	9	0	510	10	8,002	543	9	-467	3	0
7/92	Jul	8,449	554	10	0	510	10	7,982	557	10	-467	4	0
8/92	Aug	7,866	553	9	0	510	10	7,399	557	9	-467	4	0
9/92	Sep	7,819	550	8	0	510	10	7,352	554	8	-467	4	0
10/92	Oct	8,437	555	7	0	510	10	7,970	558	7	-467	4	0
11/92	Nov	8,555	547	7	0	510	10	8,088	550	7	-467	3	0
12/92	Dec	19,853	452	7	0	510	10	19,386	451	7	-467	-1	0
1/93	Jan	118,232	343	4	0	510	10	117,765	343	4	-467	-1	0
2/93	Feb	51,998	267	4	0	510	10	51,531	265	4	-467	-2	0
3/93	Mar	39,678	295	4	0	510	10	39,211	292	4	-467	-2	0
4/93	Apr	29,740	339	7	0	510	10	29,273	337	7	-467	-2	0
5/93	May	20,682	400	7	0	510	10	20,215	398	7	-467	-2	0
6/93	Jun	12,032	526	9	0	510	10	11,565	527	9	-467	1	0
7/93	Jul	8,063	584	9	0	510	10	7,596	589	9	-467	6	0
8/93	Aug	7,212	588	10	0	510	10	6,745	594	10	-467	7	0
9/93	Sep	7,700	577	9	0	510	10	7,233	583	9	-467	6	0
10/93	Oct	7,858	573	9	0	510	10	7,391	579	8	-467	5	0

Table 14a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 6
No Export of San Bernardino Effluent and Intermediate Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline			Alt 6						Difference		
		Total Discharge At Riverside Narrows			Recycled Water Export			Total Discharge At Riverside Narrows					
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
11/93	Nov	7,702	519	10	0	510	10	7,235	521	10	-467	2	0
12/93	Dec	8,866	564	9	0	510	10	8,399	568	9	-467	4	0
1/94	Jan	9,392	515	8	0	510	10	8,925	516	8	-467	1	0
2/94	Feb	14,923	407	8	0	510	10	14,456	404	8	-467	-3	0
3/94	Mar	14,466	612	8	0	510	10	13,999	616	8	-467	4	0
4/94	Apr	9,427	544	9	0	510	10	8,960	547	9	-467	3	0
5/94	May	8,738	577	9	0	510	10	8,271	582	9	-467	5	0
6/94	Jun	7,731	567	10	0	510	10	7,264	571	10	-467	5	0
7/94	Jul	7,578	576	10	0	510	10	7,111	582	10	-467	6	0
8/94	Aug	7,376	567	10	0	510	10	6,909	572	9	-467	5	0
9/94	Sep	7,331	564	10	0	510	10	6,865	569	10	-467	5	0
10/94	Oct	9,004	553	9	0	510	10	8,537	556	9	-467	3	0
11/94	Nov	10,638	516	9	0	510	10	10,171	517	9	-467	1	0
12/94	Dec	11,506	533	9	0	510	10	11,039	535	9	-467	2	0
1/95	Jan	55,734	306	5	0	510	10	55,267	304	5	-467	-2	0
2/95	Feb	25,655	327	7	0	510	10	25,188	324	7	-467	-3	0
3/95	Mar	116,185	171	4	0	510	10	115,718	170	4	-467	-1	0
4/95	Apr	22,239	388	8	0	510	10	21,772	386	8	-467	-2	0
5/95	May	19,027	422	7	0	510	10	18,560	420	7	-467	-2	0
6/95	Jun	13,904	496	9	0	510	10	13,437	496	9	-467	0	0
7/95	Jul	8,850	569	9	0	510	10	8,384	573	9	-467	4	0
8/95	Aug	8,253	583	10	0	510	10	7,786	588	10	-467	6	0
9/95	Sep	7,870	590	10	0	510	10	7,403	596	10	-467	6	0
10/95	Oct	8,654	585	9	0	510	10	8,187	591	9	-467	5	0
11/95	Nov	8,868	579	9	0	510	10	8,401	584	9	-467	5	0
12/95	Dec	9,047	555	8	0	510	10	8,580	559	8	-467	4	0
1/96	Jan	13,175	505	9	0	510	10	12,708	506	9	-467	1	0
2/96	Feb	27,504	257	6	0	510	10	27,037	253	6	-467	-4	0
3/96	Mar	16,516	382	8	0	510	10	16,049	379	8	-467	-3	0
4/96	Apr	10,548	570	9	0	510	10	10,081	574	9	-467	4	0
5/96	May	10,359	596	9	0	510	10	9,892	601	9	-467	5	0
6/96	Jun	9,515	590	9	0	510	10	9,048	596	9	-467	5	0
7/96	Jul	9,268	582	9	0	510	10	8,801	587	9	-467	5	0
8/96	Aug	8,909	560	9	0	510	10	8,443	564	9	-467	4	0
9/96	Sep	9,356	524	9	0	510	10	8,889	526	9	-467	2	0
10/96	Oct	10,890	570	9	0	510	10	10,423	574	9	-467	4	0
11/96	Nov	16,349	558	8	0	510	10	15,883	560	8	-467	2	0
12/96	Dec	13,753	496	9	0	510	10	13,286	496	9	-467	0	0
1/97	Jan	41,012	506	5	0	510	10	40,545	506	5	-467	0	0
2/97	Feb	11,191	563	10	0	510	10	10,725	566	10	-467	3	0
3/97	Mar	10,513	576	9	0	510	10	10,046	580	9	-467	4	0
4/97	Apr	10,486	579	9	0	510	10	10,019	583	9	-467	4	0
5/97	May	9,606	563	9	0	510	10	9,139	567	9	-467	4	0
6/97	Jun	9,326	575	10	0	510	10	8,859	579	10	-467	4	0
7/97	Jul	8,880	582	8	0	510	10	8,413	587	8	-467	5	0
8/97	Aug	8,762	584	10	0	510	10	8,295	590	10	-467	5	0
9/97	Sep	9,134	578	10	0	510	10	8,667	582	10	-467	5	0
10/97	Oct	9,016	573	11	0	510	10	8,549	577	11	-467	5	0
11/97	Nov	10,779	480	9	0	510	10	10,312	479	9	-467	0	0

Table 14a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 6
No Export of San Bernardino Effluent and Intermediate Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge At Riverside Narrows			Alt 6 Recycled Water Export			Alt 6 Total Discharge At Riverside Narrows			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
12/97	Dec	15,564	570	5	0	510	10	15,097	572	5	-467	2	0
1/98	Jan	15,618	562	9	0	510	10	15,151	565	9	-467	2	0
2/98	Feb	77,548	225	4	0	510	10	77,081	223	4	-467	-2	0
3/98	Mar	19,861	497	8	0	510	10	19,394	497	8	-467	0	0
4/98	Apr	23,583	403	6	0	510	10	23,116	401	6	-467	-2	0
5/98	May	37,933	278	3	0	510	10	37,466	275	3	-467	-3	0
6/98	Jun	16,641	432	6	0	510	10	16,175	430	6	-467	-2	0
7/98	Jul	10,024	564	9	0	510	10	9,557	568	9	-467	4	0
8/98	Aug	11,774	534	10	0	510	10	11,307	536	10	-467	2	0
9/98	Sep	11,371	487	9	0	510	10	10,904	487	9	-467	0	0
10/98	Oct	9,998	561	10	0	510	10	9,531	564	10	-467	3	0
11/98	Nov	10,350	536	9	0	510	10	9,883	538	9	-467	2	0
12/98	Dec	10,464	560	9	0	510	10	9,997	563	9	-467	3	0
1/99	Jan	11,454	477	7	0	510	10	10,988	476	7	-467	-1	0
2/99	Feb	10,952	552	8	0	510	10	10,485	554	8	-467	3	0
3/99	Mar	10,585	565	9	0	510	10	10,118	569	9	-467	3	0
4/99	Apr	11,680	498	9	0	510	10	11,213	498	9	-467	0	0
5/99	May	9,609	600	10	0	510	10	9,142	606	10	-467	6	0
6/99	Jun	10,723	564	11	0	510	10	10,256	567	11	-467	3	0
7/99	Jul	9,791	526	10	0	510	10	9,325	527	10	-467	2	0
8/99	Aug	9,568	580	11	0	510	10	9,102	585	11	-467	5	0
9/99	Sep	9,091	580	12	0	510	10	8,624	584	12	-467	5	0
Average		15,284	519	8	0	510	10	14,817	522	8	-467	2	0
Max		118,232	612	12				117,765	616	12	-467	7	0
Min		7,212	171	3				6,745	170	3	-467	-4	0
StDev		16,829	90	2				16,829	92	2	0	3	0
Coef of Var		110%	17%	24%				114%	18%	25%	0%	102%	-104%

Table 14b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 6
No Export of San Bernardino Effluent and Intermediate Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 6 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
10/89	Oct	33,103	599	8	27,271	604	7.3	-5,833	6	-0.4
11/89	Nov	34,537	589	9	28,705	593	8.4	-5,833	4	-0.3
12/89	Dec	35,563	604	9	29,730	610	8.5	-5,833	6	-0.2
1/90	Jan	40,128	575	9	34,295	575	8.5	-5,833	1	-0.2
2/90	Feb	49,942	523	7	44,109	517	6.6	-5,833	-6	-0.4
3/90	Mar	34,988	584	7	29,156	586	6.4	-5,833	2	-0.6
4/90	Apr	34,185	598	8	28,352	603	7.2	-5,833	5	-0.4
5/90	May	33,959	595	8	28,127	600	7.9	-5,833	5	-0.3
6/90	Jun	31,621	596	8	25,789	601	8.1	-5,833	6	-0.3
7/90	Jul	29,948	603	8	24,116	611	7.3	-5,833	8	-0.5
8/90	Aug	30,767	593	8	24,935	598	7.7	-5,833	5	-0.4
9/90	Sep	30,251	596	8	24,418	602	7.7	-5,833	6	-0.4
10/90	Oct	31,575	603	8	25,742	611	8.1	-5,833	7	-0.4
11/90	Nov	33,519	595	9	27,687	600	8.4	-5,833	5	-0.3
12/90	Dec	33,932	609	8	28,099	617	8.0	-5,833	8	-0.3
1/91	Jan	39,851	584	6	34,018	586	5.8	-5,833	2	-0.6
2/91	Feb	47,091	590	10	41,258	593	10.5	-5,833	3	0.1
3/91	Mar	91,223	400	5	85,390	388	5.0	-5,833	-12	-0.3
4/91	Apr	34,371	548	6	28,538	543	5.6	-5,833	-5	-0.7
5/91	May	33,399	568	8	27,567	567	7.9	-5,833	-1	-0.3
6/91	Jun	32,531	595	8	26,698	600	7.4	-5,833	5	-0.4
7/91	Jul	30,590	591	8	24,758	595	7.7	-5,833	5	-0.4
8/91	Aug	30,145	586	8	24,313	590	7.8	-5,833	4	-0.4
9/91	Sep	29,494	586	8	23,661	589	7.8	-5,833	4	-0.4
10/91	Oct	29,927	592	8	24,095	598	7.6	-5,833	5	-0.5
11/91	Nov	32,384	606	8	26,551	613	7.9	-5,833	7	-0.3
12/91	Dec	36,323	593	9	30,491	598	8.5	-5,833	4	-0.2
1/92	Jan	42,577	544	9	36,745	539	9.2	-5,833	-4	-0.1
2/92	Feb	71,679	413	8	65,846	399	7.3	-5,833	-14	-0.2
3/92	Mar	65,301	479	9	59,469	470	8.7	-5,833	-9	-0.1
4/92	Apr	34,797	540	7	28,964	533	6.7	-5,833	-6	-0.6
5/92	May	33,642	600	8	27,810	607	8.0	-5,833	6	-0.4
6/92	Jun	31,266	600	8	25,433	606	8.1	-5,833	6	-0.4
7/92	Jul	30,966	600	9	25,134	607	8.7	-5,833	7	-0.3
8/92	Aug	30,630	576	9	24,797	577	8.9	-5,833	1	-0.2
9/92	Sep	30,322	597	9	24,489	603	8.9	-5,833	6	-0.2
10/92	Oct	32,946	612	9	27,114	620	8.5	-5,833	9	-0.3
11/92	Nov	32,933	604	8	27,100	611	8.0	-5,833	7	-0.3
12/92	Dec	56,641	494	7	50,808	485	6.8	-5,833	-9	-0.3
1/93	Jan	242,113	286	5	236,280	279	4.7	-5,833	-7	-0.1
2/93	Feb	169,889	366	6	164,057	359	5.9	-5,833	-7	-0.1
3/93	Mar	76,370	475	6	70,538	467	5.7	-5,833	-8	-0.3
4/93	Apr	54,504	518	7	48,672	512	7.2	-5,833	-6	-0.3
5/93	May	43,544	559	8	37,711	557	7.2	-5,833	-2	-0.3
6/93	Jun	37,972	597	8	32,140	602	7.3	-5,833	5	-0.4
7/93	Jul	32,033	616	9	26,200	625	9.1	-5,833	10	-0.2
8/93	Aug	29,794	616	9	23,961	627	8.3	-5,833	11	-0.4
9/93	Sep	29,240	613	9	23,408	624	8.4	-5,833	10	-0.3
10/93	Oct	31,485	614	8	25,652	624	7.9	-5,833	10	-0.4
11/93	Nov	37,187	611	9	31,354	618	8.7	-5,833	7	-0.2

Table 14b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 6
No Export of San Bernardino Effluent and Intermediate Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 6 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
12/93	Dec	36,468	575	9	30,635	575	8.5	-5,833	1	-0.2
1/94	Jan	36,576	606	9	30,743	612	8.7	-5,833	6	-0.2
2/94	Feb	51,579	505	7	45,746	497	6.9	-5,833	-8	-0.3
3/94	Mar	46,486	630	8	40,654	638	8.0	-5,833	8	-0.2
4/94	Apr	36,085	606	8	30,252	613	7.8	-5,833	7	-0.3
5/94	May	33,877	609	8	28,044	616	7.3	-5,833	8	-0.5
6/94	Jun	30,782	609	7	24,950	617	6.8	-5,833	9	-0.6
7/94	Jul	30,015	610	8	24,182	619	7.5	-5,833	9	-0.5
8/94	Aug	29,125	601	9	23,293	609	8.3	-5,833	7	-0.4
9/94	Sep	29,527	598	9	23,694	604	8.4	-5,833	6	-0.3
10/94	Oct	32,531	595	9	26,698	600	8.7	-5,833	5	-0.2
11/94	Nov	33,724	601	9	27,892	607	9.4	-5,833	6	-0.1
12/94	Dec	35,170	609	9	29,338	616	8.7	-5,833	7	-0.2
1/95	Jan	129,180	389	6	123,347	381	6.3	-5,833	-9	-0.2
2/95	Feb	57,028	521	7	51,195	515	6.5	-5,833	-6	-0.3
3/95	Mar	164,743	357	5	158,911	350	5.0	-5,833	-8	-0.2
4/95	Apr	59,992	536	6	54,160	532	5.6	-5,833	-4	-0.4
5/95	May	47,497	570	7	41,665	570	6.3	-5,833	0	-0.4
6/95	Jun	42,977	563	7	37,144	561	6.4	-5,833	-1	-0.5
7/95	Jul	30,009	587	8	24,176	591	7.3	-5,833	4	-0.5
8/95	Aug	30,682	610	9	24,849	619	8.6	-5,833	9	-0.3
9/95	Sep	30,655	607	9	24,823	615	8.4	-5,833	8	-0.3
10/95	Oct	31,821	603	9	25,989	610	8.5	-5,833	7	-0.3
11/95	Nov	33,153	605	9	27,320	612	8.6	-5,833	7	-0.2
12/95	Dec	35,466	581	9	29,633	583	8.9	-5,833	2	-0.2
1/96	Jan	39,242	598	9	33,409	603	9.3	-5,833	5	-0.1
2/96	Feb	74,040	405	6	68,208	391	5.8	-5,833	-14	-0.3
3/96	Mar	45,364	544	7	39,531	540	6.5	-5,833	-4	-0.4
4/96	Apr	35,871	625	9	30,038	635	8.3	-5,833	10	-0.3
5/96	May	34,025	633	9	28,192	645	9.3	-5,833	13	-0.1
6/96	Jun	31,666	618	9	25,834	629	9.2	-5,833	11	-0.1
7/96	Jul	30,519	621	9	24,687	633	9.1	-5,833	12	-0.2
8/96	Aug	31,331	603	9	25,498	611	9.3	-5,833	7	-0.1
9/96	Sep	31,509	597	9	25,676	602	9.3	-5,833	6	-0.1
10/96	Oct	33,915	601	10	28,083	607	9.6	-5,833	6	-0.1
11/96	Nov	41,974	549	6	36,142	545	5.5	-5,833	-4	-0.6
12/96	Dec	44,343	542	6	38,510	538	5.2	-5,833	-4	-0.6
1/97	Jan	73,408	424	5	67,575	411	4.3	-5,833	-13	-0.4
2/97	Feb	37,252	584	9	31,419	586	8.4	-5,833	2	-0.3
3/97	Mar	35,914	600	10	30,081	605	9.5	-5,833	5	-0.1
4/97	Apr	34,120	596	10	28,287	601	9.4	-5,833	5	-0.1
5/97	May	32,974	601	9	27,141	607	8.9	-5,833	6	-0.2
6/97	Jun	32,361	592	9	26,528	597	9.1	-5,833	5	-0.2
7/97	Jul	30,657	600	9	24,825	606	8.5	-5,833	7	-0.3
8/97	Aug	30,097	608	9	24,265	617	8.4	-5,833	9	-0.3
9/97	Sep	31,117	604	8	25,285	612	7.1	-5,833	8	-0.6
10/97	Oct	32,217	595	10	26,385	600	10.4	-5,833	5	0.0
11/97	Nov	37,330	563	8	31,498	562	7.4	-5,833	-2	-0.4
12/97	Dec	48,055	508	5	42,222	499	4.1	-5,833	-9	-0.7
1/98	Jan	49,485	489	7	43,653	478	6.8	-5,833	-11	-0.4

Table 14b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 6
No Export of San Bernardino Effluent and Intermediate Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 6 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
2/98	Feb	200,064	303	3	194,232	295	3.2	-5,833	-8	-0.2
3/98	Mar	59,744	501	6	53,911	494	5.6	-5,833	-8	-0.4
4/98	Apr	52,443	516	6	46,611	509	5.8	-5,833	-7	-0.4
5/98	May	78,601	415	5	72,768	403	4.2	-5,833	-13	-0.4
6/98	Jun	42,631	520	7	36,799	511	6.3	-5,833	-8	-0.5
7/98	Jul	33,209	590	8	27,376	594	7.3	-5,833	4	-0.5
8/98	Aug	33,926	587	9	28,094	591	9.2	-5,833	3	-0.2
9/98	Sep	34,013	586	9	28,180	589	8.8	-5,833	3	-0.2
10/98	Oct	34,000	599	9	28,167	604	8.8	-5,833	6	-0.2
11/98	Nov	36,171	595	8	30,338	599	8.2	-5,833	4	-0.3
12/98	Dec	36,671	612	10	30,839	620	9.4	-5,833	8	-0.1
1/99	Jan	40,882	573	9	35,050	573	8.7	-5,833	0	-0.2
2/99	Feb	37,563	576	9	31,730	577	8.8	-5,833	1	-0.2
3/99	Mar	36,492	571	9	30,659	571	9.3	-5,833	0	-0.1
4/99	Apr	39,795	568	8	33,962	567	8.0	-5,833	-1	-0.3
5/99	May	35,454	604	9	29,622	610	8.5	-5,833	6	-0.3
6/99	Jun	33,606	605	10	27,774	613	9.4	-5,833	7	-0.1
7/99	Jul	32,862	598	9	27,029	604	8.9	-5,833	6	-0.2
8/99	Aug	31,340	597	9	25,508	603	9.2	-5,833	6	-0.2
9/99	Sep	31,229	597	9	25,396	603	9.2	-5,833	6	-0.2
Average		44,648	566	8.1	38,816	568	7.7	-5,833	2	-0.3
Max		242,113	633	10.5	236,280	645	10.5	-5,833	13	0.1
Min		29,125	286	3.4	23,293	279	3.2	-5,833	-14	-0.7
StDev		31,822	67	1.3	31,822	73	1.4	0.0	6.5	0.1
Coef of Var		71%	12%	16%	82%	13%	18%	0%	294%	-49%
				For August Data Only						
Average		30,784	598	8.8	24,951	604	8.6	-5,833	6	-0.3
Max		33,926	616	9.4	28,094	627	9.3	-5,833	11	-0.1
Min		29,125	576	8.1	23,293	577	7.7	-5,833	1	-0.4
StDev		1,296	12	0.5	1,296	15	0.6	0	3	0.1
Coef of Var		4%	2%	5%	5%	3%	7%	0%	49%	-37%

Table 14c
Annual Flow and TDS Impacts of Exporting Recycled Water from RIX
Year 2040 Alternative 6
No Export of San Bernardino Effluent and Intermediate Recycling at Other POTW's

Water Year	Baseline Total Discharge Below Prado Dam				Alternative 6 Total Discharge Below Prado Dam				Difference			
	Annual Average		Five-year average		Annual Average		Five-year average		Annual Average		Five-year average	
	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)
89-90	418,993	585	491,783	542	349,002	588	421,792	537	-69,991	3	-69,991	-5
90-91	467,721	550	494,526	538	397,730	547	424,534	533	-69,991	-4	-69,991	-5
91-92	469,815	543	496,863	535	399,823	538	426,871	529	-69,991	-5	-69,991	-6
92-93	837,979	438	524,115	525	767,988	426	454,123	518	-69,991	-12	-69,991	-7
93-94	429,192	595	524,740	526	359,200	599	454,749	519	-69,991	4	-69,991	-7
94-95	694,189	487	579,779	508	624,197	478	509,788	499	-69,991	-9	-69,991	-9
95-96	454,007	569	577,036	511	384,016	568	507,045	502	-69,991	-1	-69,991	-8
96-97	458,132	560	574,700	513	388,140	558	504,708	505	-69,991	-2	-69,991	-8
97-98	701,719	457	547,448	522	631,728	444	477,456	515	-69,991	-13	-69,991	-7
98-99	426,064	591	546,822	521	356,073	594	476,831	514	-69,991	4	-69,991	-7
Average	535,781	537	535,781	524	465,790	534	465,790	517	-69,991	-3	-69,991	-7
Max	837,979	595	579,779	542	767,988	599	509,788	537	-69,991	4	-69,991	-5
Min	418,993	438	491,783	508	349,002	426	421,792	499	-69,991	-13	-69,991	-9
StDev	150,071	57	34,675	12	150,071	63	34,675	13	0	6	0	1
Coef of Var	28%	11%	6%	2%	32%	12%	7%	2%	0%	-183%	0%	-18%

Table 15a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 7
18,000 acre-ft/yr Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline			Alt 6						Difference		
		Total Discharge At Riverside Narrows			Recycled Water Export			Total Discharge At Riverside Narrows					
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
10/89	Oct	6,635	564	5	1,500	510	10	4,574	591	3	-2,061	27	-2
11/89	Nov	7,229	559	6	1,500	510	10	5,169	580	4	-2,061	22	-2
12/89	Dec	7,311	564	7	1,500	510	10	5,250	588	5	-2,061	23	-1
1/90	Jan	9,380	560	6	1,500	510	10	7,319	575	5	-2,061	15	-1
2/90	Feb	10,276	580	8	1,500	510	10	8,215	599	7	-2,061	19	-1
3/90	Mar	7,663	574	6	1,500	510	10	5,602	600	4	-2,061	26	-2
4/90	Apr	7,944	564	5	1,500	510	10	5,883	585	3	-2,061	21	-2
5/90	May	7,278	563	5	1,500	510	10	5,217	586	2	-2,061	23	-2
6/90	Jun	6,392	567	3	1,500	510	10	4,332	597	1	-2,061	30	-2
7/90	Jul	5,482	576	1	1,500	510	10	3,421	619	1	-2,061	43	0
8/90	Aug	5,827	564	4	1,500	510	10	3,766	596	1	-2,061	32	-3
9/90	Sep	5,680	569	6	1,500	510	10	3,619	606	4	-2,061	37	-2
10/90	Oct	5,913	560	11	1,500	510	10	3,852	590	11	-2,061	30	0
11/90	Nov	6,032	557	6	1,500	510	10	3,971	584	5	-2,061	27	-2
12/90	Dec	6,894	581	9	1,500	510	10	4,833	614	9	-2,061	33	0
1/91	Jan	8,080	567	4	1,500	510	10	6,019	588	1	-2,061	21	-2
2/91	Feb	13,864	589	10	1,500	510	10	11,804	603	10	-2,061	15	0
3/91	Mar	29,244	233	3	1,500	510	10	27,183	213	2	-2,061	-21	-1
4/91	Apr	7,869	560	2	1,500	510	10	5,808	580	1	-2,061	20	-1
5/91	May	6,093	596	3	1,500	510	10	4,033	642	1	-2,061	47	-2
6/91	Jun	6,358	596	3	1,500	510	10	4,298	639	1	-2,061	44	-2
7/91	Jul	5,121	596	5	1,500	510	10	3,060	657	2	-2,061	61	-3
8/91	Aug	5,102	575	8	1,500	510	10	3,041	622	7	-2,061	48	-1
9/91	Sep	4,893	593	8	1,500	510	10	2,832	657	7	-2,061	64	-1
10/91	Oct	5,520	579	7	1,500	510	10	3,459	623	5	-2,061	44	-2
11/91	Nov	6,179	575	5	1,500	510	10	4,119	611	2	-2,061	35	-3
12/91	Dec	7,570	574	7	1,500	510	10	5,510	600	5	-2,061	26	-1
1/92	Jan	8,974	590	8	1,500	510	10	6,913	616	7	-2,061	26	-1
2/92	Feb	24,183	503	7	1,500	510	10	22,123	502	6	-2,061	0	0
3/92	Mar	17,232	540	6	1,500	510	10	15,171	544	5	-2,061	5	-1
4/92	Apr	7,017	583	10	1,500	510	10	4,957	615	10	-2,061	32	0
5/92	May	6,338	593	9	1,500	510	10	4,277	635	9	-2,061	43	0
6/92	Jun	5,724	557	8	1,500	510	10	3,663	586	7	-2,061	29	-1
7/92	Jul	5,704	577	10	1,500	510	10	3,643	618	10	-2,061	41	0
8/92	Aug	5,121	580	8	1,500	510	10	3,060	630	7	-2,061	51	-1
9/92	Sep	5,074	575	7	1,500	510	10	3,013	622	5	-2,061	48	-2
10/92	Oct	5,691	579	6	1,500	510	10	3,631	621	4	-2,061	42	-2
11/92	Nov	5,810	567	6	1,500	510	10	3,749	601	4	-2,061	34	-2
12/92	Dec	17,108	444	7	1,500	510	10	15,047	436	6	-2,061	-8	0
1/93	Jan	115,487	340	4	1,500	510	10	113,426	337	3	-2,061	-3	0
2/93	Feb	49,253	254	4	1,500	510	10	47,192	243	4	-2,061	-11	0
3/93	Mar	36,933	279	4	1,500	510	10	34,872	266	3	-2,061	-13	0
4/93	Apr	26,995	323	6	1,500	510	10	24,934	307	6	-2,061	-15	0
5/93	May	17,936	384	6	1,500	510	10	15,876	369	6	-2,061	-16	0
6/93	Jun	9,287	532	9	1,500	510	10	7,226	540	9	-2,061	8	0
7/93	Jul	5,318	624	8	1,500	510	10	3,257	700	7	-2,061	76	-1
8/93	Aug	4,466	639	10	1,500	510	10	2,406	754	10	-2,061	115	0
9/93	Sep	4,954	617	9	1,500	510	10	2,894	698	8	-2,061	80	-1
10/93	Oct	5,112	610	8	1,500	510	10	3,052	682	6	-2,061	71	-1

Table 15a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 7
18,000 acre-ft/yr Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline			Alt 6						Difference		
		Total Discharge At Riverside Narrows			Recycled Water Export			Total Discharge At Riverside Narrows					
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
11/93	Nov	4,957	527	9	1,500	510	10	2,896	543	9	-2,061	16	0
12/93	Dec	6,121	591	8	1,500	510	10	4,060	635	7	-2,061	44	-1
1/94	Jan	6,647	519	7	1,500	510	10	4,586	526	6	-2,061	7	-1
2/94	Feb	12,178	385	8	1,500	510	10	10,117	360	8	-2,061	-24	0
3/94	Mar	11,720	637	8	1,500	510	10	9,660	665	7	-2,061	28	0
4/94	Apr	6,682	560	8	1,500	510	10	4,621	585	7	-2,061	25	-1
5/94	May	5,992	611	9	1,500	510	10	3,932	666	8	-2,061	56	-1
6/94	Jun	4,985	601	10	1,500	510	10	2,925	668	9	-2,061	68	0
7/94	Jul	4,832	617	10	1,500	510	10	2,771	700	10	-2,061	83	0
8/94	Aug	4,630	604	9	1,500	510	10	2,570	684	9	-2,061	80	-1
9/94	Sep	4,586	599	10	1,500	510	10	2,525	677	9	-2,061	77	0
10/94	Oct	6,258	574	8	1,500	510	10	4,197	608	8	-2,061	34	-1
11/94	Nov	7,893	519	9	1,500	510	10	5,832	525	8	-2,061	5	0
12/94	Dec	8,761	542	8	1,500	510	10	6,700	553	8	-2,061	11	0
1/95	Jan	52,989	295	4	1,500	510	10	50,928	287	4	-2,061	-8	0
2/95	Feb	22,910	306	6	1,500	510	10	20,849	287	6	-2,061	-20	0
3/95	Mar	113,440	163	4	1,500	510	10	111,379	157	4	-2,061	-6	0
4/95	Apr	19,494	372	7	1,500	510	10	17,433	356	7	-2,061	-16	0
5/95	May	16,281	408	7	1,500	510	10	14,221	394	6	-2,061	-14	0
6/95	Jun	11,158	493	9	1,500	510	10	9,098	491	9	-2,061	-3	0
7/95	Jul	6,105	598	8	1,500	510	10	4,044	645	7	-2,061	47	-1
8/95	Aug	5,508	621	10	1,500	510	10	3,447	691	10	-2,061	70	0
9/95	Sep	5,124	635	10	1,500	510	10	3,063	723	11	-2,061	88	0
10/95	Oct	5,908	623	9	1,500	510	10	3,847	686	9	-2,061	63	0
11/95	Nov	6,123	612	8	1,500	510	10	4,062	667	7	-2,061	55	-1
12/95	Dec	6,302	577	7	1,500	510	10	4,241	613	6	-2,061	35	-1
1/96	Jan	10,430	506	8	1,500	510	10	8,369	506	8	-2,061	0	0
2/96	Feb	24,759	229	5	1,500	510	10	22,698	204	5	-2,061	-25	0
3/96	Mar	13,771	358	8	1,500	510	10	11,710	332	7	-2,061	-26	0
4/96	Apr	7,803	594	9	1,500	510	10	5,742	625	8	-2,061	32	-1
5/96	May	7,614	629	8	1,500	510	10	5,553	675	8	-2,061	46	-1
6/96	Jun	6,770	625	8	1,500	510	10	4,709	678	7	-2,061	53	-1
7/96	Jul	6,523	614	8	1,500	510	10	4,462	665	7	-2,061	51	-1
8/96	Aug	6,164	585	9	1,500	510	10	4,103	626	8	-2,061	41	-1
9/96	Sep	6,610	532	9	1,500	510	10	4,550	545	8	-2,061	13	-1
10/96	Oct	8,145	592	9	1,500	510	10	6,084	622	9	-2,061	30	0
11/96	Nov	13,604	569	7	1,500	510	10	11,543	580	7	-2,061	11	0
12/96	Dec	11,007	494	8	1,500	510	10	8,947	491	8	-2,061	-2	0
1/97	Jan	38,267	506	5	1,500	510	10	36,206	506	4	-2,061	0	0
2/97	Feb	8,446	582	10	1,500	510	10	6,385	607	10	-2,061	25	0
3/97	Mar	7,767	601	9	1,500	510	10	5,706	636	9	-2,061	35	0
4/97	Apr	7,740	605	9	1,500	510	10	5,680	642	8	-2,061	37	-1
5/97	May	6,861	586	9	1,500	510	10	4,800	621	9	-2,061	35	0
6/97	Jun	6,581	604	10	1,500	510	10	4,520	650	10	-2,061	46	0
7/97	Jul	6,135	617	7	1,500	510	10	4,074	674	5	-2,061	57	-2
8/97	Aug	6,016	621	10	1,500	510	10	3,956	681	9	-2,061	61	0
9/97	Sep	6,389	609	10	1,500	510	10	4,328	659	10	-2,061	50	0
10/97	Oct	6,270	602	12	1,500	510	10	4,210	650	13	-2,061	48	1
11/97	Nov	8,034	471	9	1,500	510	10	5,973	460	9	-2,061	-11	0

Table 15a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 7
18,000 acre-ft/yr Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge At Riverside Narrows			Alt 6 Recycled Water Export			Alt 6 Total Discharge At Riverside Narrows			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
12/97	Dec	12,818	584	4	1,500	510	10	10,758	599	2	-2,061	15	-1
1/98	Jan	12,873	575	9	1,500	510	10	10,812	588	9	-2,061	13	0
2/98	Feb	74,803	214	4	1,500	510	10	72,742	206	4	-2,061	-8	0
3/98	Mar	17,115	495	7	1,500	510	10	15,055	494	7	-2,061	-1	0
4/98	Apr	20,838	390	6	1,500	510	10	18,777	377	5	-2,061	-13	0
5/98	May	35,188	260	3	1,500	510	10	33,127	245	2	-2,061	-15	0
6/98	Jun	13,896	417	6	1,500	510	10	11,835	402	5	-2,061	-15	-1
7/98	Jul	7,278	586	9	1,500	510	10	5,218	619	9	-2,061	32	0
8/98	Aug	9,029	543	11	1,500	510	10	6,968	555	11	-2,061	11	0
9/98	Sep	8,625	482	9	1,500	510	10	6,565	475	9	-2,061	-7	0
10/98	Oct	7,252	582	10	1,500	510	10	5,192	613	10	-2,061	31	0
11/98	Nov	7,604	548	9	1,500	510	10	5,544	564	8	-2,061	16	-1
12/98	Dec	7,719	579	9	1,500	510	10	5,658	607	8	-2,061	27	0
1/99	Jan	8,709	468	7	1,500	510	10	6,648	457	6	-2,061	-11	-1
2/99	Feb	8,206	567	8	1,500	510	10	6,145	588	7	-2,061	21	-1
3/99	Mar	7,840	587	9	1,500	510	10	5,779	616	9	-2,061	29	0
4/99	Apr	8,935	496	8	1,500	510	10	6,874	494	8	-2,061	-3	0
5/99	May	6,863	639	10	1,500	510	10	4,803	696	10	-2,061	58	0
6/99	Jun	7,977	584	11	1,500	510	10	5,917	612	12	-2,061	28	0
7/99	Jul	7,046	534	10	1,500	510	10	4,985	546	10	-2,061	12	0
8/99	Aug	6,823	611	12	1,500	510	10	4,762	657	12	-2,061	46	1
9/99	Sep	6,345	612	12	1,500	510	10	4,284	664	13	-2,061	52	1
Average		12,538	534	7	1,500	510	10	10,478	561	7	-2,061	26	-1
Max		115,487	639	12				113,426	754	13	-2,061	115	1
Min		4,466	163	1				2,406	157	1	-2,061	-26	-3
StDev		16,829	105	2				16,829	128	3	0	28	1
Coef of Var		134%	20%	31%				161%	23%	41%	0%	107%	-108%

Table 15b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 7
18,000 acre-ft/yr Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 6 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
10/89	Oct	21,580	626	7	13,177	662	5.6	-8,403	36	-1.2
11/89	Nov	23,014	610	8	14,611	634	7.6	-8,403	24	-0.5
12/89	Dec	24,040	630	8	15,637	663	7.7	-8,403	33	-0.4
1/90	Jan	28,605	586	8	20,202	593	7.7	-8,403	7	-0.6
2/90	Feb	38,419	516	6	30,015	501	4.9	-8,403	-15	-1.2
3/90	Mar	23,466	602	6	15,062	620	3.6	-8,403	18	-1.9
4/90	Apr	22,662	623	7	14,259	655	5.1	-8,403	32	-1.4
5/90	May	22,436	620	7	14,033	650	6.7	-8,403	30	-0.8
6/90	Jun	20,098	624	8	11,695	663	7.3	-8,403	39	-0.4
7/90	Jul	18,425	638	7	10,022	695	6.6	-8,403	57	-0.1
8/90	Aug	19,244	620	7	10,841	659	6.5	-8,403	39	-0.6
9/90	Sep	18,728	626	7	10,325	672	6.1	-8,403	46	-0.9
10/90	Oct	20,052	636	7	11,649	684	6.8	-8,403	48	-0.7
11/90	Nov	21,996	620	8	13,593	652	7.8	-8,403	32	-0.2
12/90	Dec	22,409	641	8	14,005	684	6.7	-8,403	43	-0.8
1/91	Jan	28,328	598	5	19,924	611	3.4	-8,403	12	-1.6
2/91	Feb	35,568	604	11	27,165	614	10.7	-8,403	11	0.0
3/91	Mar	79,700	378	5	71,297	356	4.0	-8,403	-22	-0.6
4/91	Apr	22,848	548	5	14,445	535	2.7	-8,403	-12	-2.0
5/91	May	21,876	578	7	13,473	584	7.3	-8,403	6	-0.1
6/91	Jun	21,008	621	7	12,605	655	6.0	-8,403	34	-0.8
7/91	Jul	19,067	617	7	10,664	654	6.5	-8,403	37	-0.6
8/91	Aug	18,622	610	7	10,219	644	6.6	-8,403	34	-0.6
9/91	Sep	17,971	610	7	9,568	647	6.5	-8,403	36	-0.6
10/91	Oct	18,405	621	7	10,001	664	5.8	-8,403	43	-1.0
11/91	Nov	20,861	638	7	12,458	684	6.8	-8,403	46	-0.6
12/91	Dec	24,800	615	8	16,397	638	7.7	-8,403	23	-0.4
1/92	Jan	31,054	542	9	22,651	532	8.7	-8,403	-10	-0.3
2/92	Feb	60,156	387	7	51,752	358	6.6	-8,403	-30	-0.5
3/92	Mar	53,778	465	9	45,375	445	8.3	-8,403	-19	-0.3
4/92	Apr	23,274	536	6	14,870	517	4.0	-8,403	-19	-1.8
5/92	May	22,119	628	7	13,716	664	6.7	-8,403	36	-0.7
6/92	Jun	19,743	630	8	11,339	675	7.0	-8,403	45	-0.5
7/92	Jul	19,443	632	8	11,040	679	8.4	-8,403	48	0.1
8/92	Aug	19,107	593	9	10,703	611	9.0	-8,403	19	0.5
9/92	Sep	18,799	628	9	10,396	675	9.2	-8,403	47	0.6
10/92	Oct	21,423	646	8	13,020	696	8.1	-8,403	50	0.0
11/92	Nov	21,410	635	8	13,006	677	7.1	-8,403	42	-0.4
12/92	Dec	45,118	480	6	36,715	460	5.6	-8,403	-20	-0.8
1/93	Jan	230,590	273	5	222,186	262	4.4	-8,403	-11	-0.2
2/93	Feb	158,366	353	6	149,963	341	5.5	-8,403	-12	-0.2
3/93	Mar	64,847	462	5	56,444	447	4.6	-8,403	-16	-0.7
4/93	Apr	42,981	511	7	34,578	496	6.0	-8,403	-14	-0.8
5/93	May	32,021	563	7	23,617	561	5.7	-8,403	-2	-1.1
6/93	Jun	26,449	619	7	18,046	642	5.1	-8,403	23	-1.6
7/93	Jul	20,510	654	9	12,106	713	9.3	-8,403	59	0.5
8/93	Aug	18,271	659	8	9,868	736	7.8	-8,403	77	0.0
9/93	Sep	17,717	656	8	9,314	734	8.0	-8,403	78	0.1
10/93	Oct	19,962	653	7	11,558	714	6.8	-8,403	61	-0.4
11/93	Nov	25,664	639	8	17,261	674	8.7	-8,403	34	0.3

Table 15b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 7
18,000 acre-ft/yr Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 6 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
12/93	Dec	24,945	587	8	16,542	596	8.0	-8,403	9	-0.1
1/94	Jan	25,053	632	8	16,650	664	8.3	-8,403	32	-0.1
2/94	Feb	40,056	493	6	31,653	473	5.5	-8,403	-20	-1.0
3/94	Mar	34,963	657	8	26,560	685	6.8	-8,403	28	-0.8
4/94	Apr	24,562	633	7	16,158	667	6.6	-8,403	33	-0.7
5/94	May	22,354	640	7	13,950	683	5.6	-8,403	43	-1.0
6/94	Jun	19,259	645	6	10,856	704	4.4	-8,403	59	-1.5
7/94	Jul	18,492	649	7	10,089	715	5.8	-8,403	66	-0.9
8/94	Aug	17,602	636	8	9,199	698	7.7	-8,403	62	0.0
9/94	Sep	18,004	630	8	9,600	683	7.9	-8,403	53	0.1
10/94	Oct	21,008	621	8	12,605	655	8.2	-8,403	34	-0.1
11/94	Nov	22,201	628	9	13,798	665	9.1	-8,403	36	-0.1
12/94	Dec	23,647	639	8	15,244	677	7.6	-8,403	38	-0.8
1/95	Jan	117,657	374	6	109,254	359	5.9	-8,403	-15	-0.3
2/95	Feb	45,505	514	6	37,102	501	5.2	-8,403	-13	-0.9
3/95	Mar	153,220	343	5	144,817	330	4.6	-8,403	-13	-0.3
4/95	Apr	48,469	533	5	40,066	526	4.0	-8,403	-8	-1.1
5/95	May	35,974	577	6	27,571	580	4.4	-8,403	2	-1.3
6/95	Jun	31,454	568	6	23,050	568	4.0	-8,403	0	-1.7
7/95	Jul	18,486	612	6	10,082	648	4.7	-8,403	36	-1.7
8/95	Aug	19,159	647	8	10,756	708	8.2	-8,403	61	0.0
9/95	Sep	19,132	642	8	10,729	699	7.7	-8,403	57	-0.1
10/95	Oct	20,298	634	8	11,895	680	7.9	-8,403	46	-0.2
11/95	Nov	21,630	636	8	13,227	678	8.2	-8,403	42	-0.1
12/95	Dec	23,943	597	9	15,540	612	8.7	-8,403	15	0.1
1/96	Jan	27,719	619	9	19,315	641	8.7	-8,403	22	-0.5
2/96	Feb	62,517	379	5	54,114	349	4.7	-8,403	-30	-0.7
3/96	Mar	33,841	542	6	25,438	533	4.6	-8,403	-9	-1.4
4/96	Apr	24,348	662	8	15,945	710	7.1	-8,403	49	-0.7
5/96	May	22,502	676	9	14,099	740	9.1	-8,403	64	0.0
6/96	Jun	20,143	658	9	11,740	722	9.3	-8,403	64	0.2
7/96	Jul	18,996	666	9	10,593	742	9.0	-8,403	77	0.2
8/96	Aug	19,808	636	9	11,404	685	9.5	-8,403	49	0.4
9/96	Sep	19,986	625	9	11,582	666	9.3	-8,403	41	0.3
10/96	Oct	22,392	628	9	13,989	663	9.4	-8,403	35	-0.1
11/96	Nov	30,451	549	5	22,048	542	2.5	-8,403	-8	-2.1
12/96	Dec	32,820	540	4	24,416	530	2.3	-8,403	-10	-2.0
1/97	Jan	61,885	401	4	53,481	374	2.9	-8,403	-26	-1.0
2/97	Feb	25,729	600	8	17,326	615	7.2	-8,403	15	-0.8
3/97	Mar	24,391	624	9	15,987	653	9.3	-8,403	29	0.0
4/97	Apr	22,597	621	9	14,194	652	9.3	-8,403	31	0.0
5/97	May	21,451	629	9	13,047	667	8.4	-8,403	39	-0.2
6/97	Jun	20,838	617	9	12,434	649	8.8	-8,403	32	0.0
7/97	Jul	19,134	631	8	10,731	680	7.8	-8,403	49	-0.3
8/97	Aug	18,574	646	8	10,171	710	7.5	-8,403	64	-0.4
9/97	Sep	19,594	637	6	11,191	689	4.3	-8,403	51	-1.8
10/97	Oct	20,694	621	10	12,291	657	11.6	-8,403	36	1.2
11/97	Nov	25,807	570	7	17,404	571	5.5	-8,403	0	-1.3
12/97	Dec	36,532	496	3	28,128	474	1.4	-8,403	-22	-1.9
1/98	Jan	37,962	471	6	29,559	443	5.1	-8,403	-28	-1.2

Table 15b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 7
18,000 acre-ft/yr Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 6 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
2/98	Feb	188,541	288	3	180,138	275	2.7	-8,403	-13	-0.3
3/98	Mar	48,221	490	5	39,817	474	4.1	-8,403	-17	-1.1
4/98	Apr	40,920	507	5	32,517	491	4.0	-8,403	-16	-1.2
5/98	May	67,078	393	4	58,675	368	2.9	-8,403	-25	-0.9
6/98	Jun	31,108	509	6	22,705	487	4.2	-8,403	-22	-1.5
7/98	Jul	21,686	612	7	13,283	639	4.9	-8,403	27	-1.6
8/98	Aug	22,403	608	9	14,000	631	8.3	-8,403	23	-0.7
9/98	Sep	22,490	606	9	14,086	627	7.7	-8,403	22	-0.8
10/98	Oct	22,477	625	8	14,073	658	8.0	-8,403	33	-0.4
11/98	Nov	24,648	617	8	16,245	641	7.0	-8,403	25	-0.7
12/98	Dec	25,148	642	9	16,745	678	9.3	-8,403	37	0.0
1/99	Jan	29,359	583	8	20,956	588	8.1	-8,403	5	-0.4
2/99	Feb	26,040	589	9	17,636	598	8.2	-8,403	9	-0.4
3/99	Mar	24,969	582	9	16,565	589	9.0	-8,403	7	-0.1
4/99	Apr	28,272	576	8	19,868	579	6.7	-8,403	3	-1.0
5/99	May	23,931	631	8	15,528	665	7.6	-8,403	34	-0.5
6/99	Jun	22,083	636	9	13,680	677	8.8	-8,403	41	-0.3
7/99	Jul	21,339	626	9	12,935	662	8.3	-8,403	37	-0.3
8/99	Aug	19,817	626	9	11,414	667	8.8	-8,403	42	-0.1
9/99	Sep	19,706	626	9	11,303	668	9.1	-8,403	42	0.2
Average		33,125	583	7.3	24,722	606	6.7	-8,403	23	-0.6
Max		230,590	676	10.6	222,186	742	11.6	-8,403	78	1.2
Min		17,602	273	3.0	9,199	262	1.4	-8,403	-30	-2.1
StDev		31,822	84	1.5	31,822	108	2.0	0.0	28.0	0.6
Coef of Var		96%	14%	21%	129%	18%	30%	0%	121%	-108%
					For August Data Only					
Average		19,261	628	8.1	10,857	675	8.0	-8,403	47	-0.1
Max		22,403	659	9.0	14,000	736	9.5	-8,403	77	0.5
Min		17,602	593	7.1	9,199	611	6.5	-8,403	19	-0.7
StDev		1,296	21	0.7	1,296	39	1.0	0	19	0.4
Coef of Var		7%	3%	9%	12%	6%	12%	0%	40%	-290%

Table 15c
Annual Flow and TDS Impacts of Exporting Recycled Water from RIX
Year 2010 Alternative 7
18,000 acre-ft/yr Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Water Year	Baseline Total Discharge Below Prado Dam				Alternative 6 Total Discharge Below Prado Dam				Difference			
	Annual Average		Five-year average		Annual Average		Five-year average		Annual Average		Five-year average	
	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)
89-90	280,718	603	353,507	540	179,877	622	252,667	528	-100,840	19	-100,840	-12
90-91	329,445	551	356,250	535	228,605	544	255,410	521	-100,840	-8	-100,840	-14
91-92	331,539	541	358,587	531	230,699	528	257,747	515	-100,840	-12	-100,840	-15
92-93	699,704	416	385,839	517	598,863	391	284,999	499	-100,840	-26	-100,840	-18
93-94	290,916	617	386,464	518	190,076	642	285,624	500	-100,840	25	-100,840	-18
94-95	555,913	472	441,503	496	455,073	451	340,663	474	-100,840	-21	-100,840	-22
95-96	315,732	578	438,761	499	214,891	582	337,920	478	-100,840	4	-100,840	-21
96-97	319,856	566	436,424	503	219,015	564	335,584	483	-100,840	-2	-100,840	-20
97-98	563,443	435	409,172	513	462,603	406	308,332	495	-100,840	-29	-100,840	-18
98-99	287,788	611	408,546	512	186,948	634	307,706	494	-100,840	23	-100,840	-19
Average	397,505	539	397,505	516	296,665	536	296,665	499	-100,840	-3	-100,840	-18
Max	699,704	617	441,503	540	598,863	642	340,663	528	-100,840	25	-100,840	-12
Min	280,718	416	353,507	496	179,877	391	252,667	474	-100,840	-29	-100,840	-22
StDev	150,071	73	34,675	15	150,071	92	34,675	18	0	20	0	3
Coef of Var	38%	14%	9%	3%	51%	17%	12%	4%	0%	-745%	0%	-18%

Table 16a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 7
18,000 acre-ft/yr Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline			Alt 6						Difference		
		Total Discharge At Riverside Narrows			Recycled Water Export			Total Discharge At Riverside Narrows					
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
10/89	Oct	9,380	547	6	1,500	510	10	6,946	562	5	-2,434	16	-1
11/89	Nov	9,975	544	7	1,500	510	10	7,540	557	6	-2,434	13	-1
12/89	Dec	10,056	548	7	1,500	510	10	7,622	562	7	-2,434	15	-1
1/90	Jan	12,125	547	7	1,500	510	10	9,691	558	6	-2,434	11	-1
2/90	Feb	13,021	564	8	1,500	510	10	10,587	579	8	-2,434	14	0
3/90	Mar	10,408	556	7	1,500	510	10	7,974	572	6	-2,434	16	-1
4/90	Apr	10,689	549	6	1,500	510	10	8,255	563	5	-2,434	14	-1
5/90	May	10,023	547	6	1,500	510	10	7,589	561	5	-2,434	14	-1
6/90	Jun	9,138	548	5	1,500	510	10	6,704	565	4	-2,434	17	-2
7/90	Jul	8,227	552	4	1,500	510	10	5,793	573	1	-2,434	21	-3
8/90	Aug	8,573	545	6	1,500	510	10	6,138	562	4	-2,434	17	-2
9/90	Sep	8,425	548	8	1,500	510	10	5,991	567	7	-2,434	19	-1
10/90	Oct	8,658	542	10	1,500	510	10	6,224	558	11	-2,434	16	0
11/90	Nov	8,777	541	8	1,500	510	10	6,343	555	7	-2,434	15	-1
12/90	Dec	9,639	559	9	1,500	510	10	7,205	579	9	-2,434	19	0
1/91	Jan	10,825	551	5	1,500	510	10	8,391	565	4	-2,434	14	-1
2/91	Feb	16,610	575	10	1,500	510	10	14,175	587	10	-2,434	12	0
3/91	Mar	31,989	256	4	1,500	510	10	29,555	236	3	-2,434	-20	-1
4/91	Apr	10,615	546	4	1,500	510	10	8,180	559	2	-2,434	13	-2
5/91	May	8,839	567	5	1,500	510	10	6,405	592	3	-2,434	25	-2
6/91	Jun	9,104	568	5	1,500	510	10	6,669	592	3	-2,434	24	-2
7/91	Jul	7,867	564	7	1,500	510	10	5,432	592	6	-2,434	28	-1
8/91	Aug	7,847	550	9	1,500	510	10	5,413	572	8	-2,434	22	-1
9/91	Sep	7,638	561	9	1,500	510	10	5,204	588	8	-2,434	27	-1
10/91	Oct	8,265	554	8	1,500	510	10	5,831	576	7	-2,434	22	-1
11/91	Nov	8,925	553	6	1,500	510	10	6,490	573	5	-2,434	19	-1
12/91	Dec	10,316	556	7	1,500	510	10	7,881	572	7	-2,434	16	-1
1/92	Jan	11,719	570	8	1,500	510	10	9,285	588	8	-2,434	18	0
2/92	Feb	26,929	503	7	1,500	510	10	24,495	503	7	-2,434	0	0
3/92	Mar	19,977	535	6	1,500	510	10	17,543	539	6	-2,434	5	0
4/92	Apr	9,763	561	10	1,500	510	10	7,328	580	10	-2,434	19	0
5/92	May	9,083	566	9	1,500	510	10	6,649	590	9	-2,434	23	0
6/92	Jun	8,469	540	9	1,500	510	10	6,035	555	8	-2,434	15	-1
7/92	Jul	8,449	554	10	1,500	510	10	6,015	574	10	-2,434	21	0
8/92	Aug	7,866	553	9	1,500	510	10	5,432	576	9	-2,434	23	0
9/92	Sep	7,819	550	8	1,500	510	10	5,385	571	7	-2,434	22	-1
10/92	Oct	8,437	555	7	1,500	510	10	6,002	576	6	-2,434	21	-1
11/92	Nov	8,555	547	7	1,500	510	10	6,121	565	6	-2,434	18	-1
12/92	Dec	19,853	452	7	1,500	510	10	17,419	445	7	-2,434	-7	0
1/93	Jan	118,232	343	4	1,500	510	10	115,798	340	4	-2,434	-3	0
2/93	Feb	51,998	267	4	1,500	510	10	49,564	256	4	-2,434	-12	0
3/93	Mar	39,678	295	4	1,500	510	10	37,244	281	4	-2,434	-14	0
4/93	Apr	29,740	339	7	1,500	510	10	27,306	325	6	-2,434	-15	0
5/93	May	20,682	400	7	1,500	510	10	18,247	387	6	-2,434	-14	0
6/93	Jun	12,032	526	9	1,500	510	10	9,598	532	9	-2,434	6	0
7/93	Jul	8,063	584	9	1,500	510	10	5,629	619	8	-2,434	35	0
8/93	Aug	7,212	588	10	1,500	510	10	4,778	631	10	-2,434	43	0
9/93	Sep	7,700	577	9	1,500	510	10	5,265	612	9	-2,434	35	0
10/93	Oct	7,858	573	9	1,500	510	10	5,423	605	8	-2,434	32	-1

Table 16a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 7
18,000 acre-ft/yr Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline			Alt 6						Difference		
		Total Discharge At Riverside Narrows			Recycled Water Export			Total Discharge At Riverside Narrows					
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
11/93	Nov	7,702	519	10	1,500	510	10	5,268	527	9	-2,434	8	0
12/93	Dec	8,866	564	9	1,500	510	10	6,432	588	8	-2,434	23	0
1/94	Jan	9,392	515	8	1,500	510	10	6,958	519	8	-2,434	4	-1
2/94	Feb	14,923	407	8	1,500	510	10	12,489	388	8	-2,434	-19	0
3/94	Mar	14,466	612	8	1,500	510	10	12,031	634	8	-2,434	22	0
4/94	Apr	9,427	544	9	1,500	510	10	6,993	558	8	-2,434	14	0
5/94	May	8,738	577	9	1,500	510	10	6,303	606	9	-2,434	29	0
6/94	Jun	7,731	567	10	1,500	510	10	5,296	596	10	-2,434	30	0
7/94	Jul	7,578	576	10	1,500	510	10	5,143	611	10	-2,434	35	0
8/94	Aug	7,376	567	10	1,500	510	10	4,941	599	9	-2,434	32	0
9/94	Sep	7,331	564	10	1,500	510	10	4,897	595	10	-2,434	31	0
10/94	Oct	9,004	553	9	1,500	510	10	6,569	571	9	-2,434	19	0
11/94	Nov	10,638	516	9	1,500	510	10	8,204	519	9	-2,434	4	0
12/94	Dec	11,506	533	9	1,500	510	10	9,072	541	8	-2,434	8	0
1/95	Jan	55,734	306	5	1,500	510	10	53,300	297	4	-2,434	-9	0
2/95	Feb	25,655	327	7	1,500	510	10	23,221	309	6	-2,434	-18	0
3/95	Mar	116,185	171	4	1,500	510	10	113,751	164	4	-2,434	-7	0
4/95	Apr	22,239	388	8	1,500	510	10	19,805	374	7	-2,434	-14	0
5/95	May	19,027	422	7	1,500	510	10	16,593	410	7	-2,434	-12	0
6/95	Jun	13,904	496	9	1,500	510	10	11,470	494	9	-2,434	-1	0
7/95	Jul	8,850	569	9	1,500	510	10	6,416	594	8	-2,434	25	0
8/95	Aug	8,253	583	10	1,500	510	10	5,819	616	10	-2,434	34	0
9/95	Sep	7,870	590	10	1,500	510	10	5,435	629	10	-2,434	39	0
10/95	Oct	8,654	585	9	1,500	510	10	6,219	618	9	-2,434	32	0
11/95	Nov	8,868	579	9	1,500	510	10	6,434	608	8	-2,434	29	0
12/95	Dec	9,047	555	8	1,500	510	10	6,613	575	8	-2,434	20	-1
1/96	Jan	13,175	505	9	1,500	510	10	10,741	506	8	-2,434	1	0
2/96	Feb	27,504	257	6	1,500	510	10	25,070	233	6	-2,434	-24	0
3/96	Mar	16,516	382	8	1,500	510	10	14,082	362	8	-2,434	-21	0
4/96	Apr	10,548	570	9	1,500	510	10	8,114	591	9	-2,434	20	0
5/96	May	10,359	596	9	1,500	510	10	7,925	625	9	-2,434	29	0
6/96	Jun	9,515	590	9	1,500	510	10	7,081	621	8	-2,434	30	0
7/96	Jul	9,268	582	9	1,500	510	10	6,834	610	8	-2,434	28	0
8/96	Aug	8,909	560	9	1,500	510	10	6,475	582	9	-2,434	22	0
9/96	Sep	9,356	524	9	1,500	510	10	6,921	532	9	-2,434	8	0
10/96	Oct	10,890	570	9	1,500	510	10	8,456	590	9	-2,434	19	0
11/96	Nov	16,349	558	8	1,500	510	10	13,915	568	8	-2,434	10	0
12/96	Dec	13,753	496	9	1,500	510	10	11,318	495	8	-2,434	-1	0
1/97	Jan	41,012	506	5	1,500	510	10	38,578	506	5	-2,434	0	0
2/97	Feb	11,191	563	10	1,500	510	10	8,757	580	10	-2,434	17	0
3/97	Mar	10,513	576	9	1,500	510	10	8,078	598	9	-2,434	22	0
4/97	Apr	10,486	579	9	1,500	510	10	8,051	602	9	-2,434	23	0
5/97	May	9,606	563	9	1,500	510	10	7,172	583	9	-2,434	21	0
6/97	Jun	9,326	575	10	1,500	510	10	6,892	601	10	-2,434	26	0
7/97	Jul	8,880	582	8	1,500	510	10	6,446	613	7	-2,434	30	-1
8/97	Aug	8,762	584	10	1,500	510	10	6,328	616	10	-2,434	32	0
9/97	Sep	9,134	578	10	1,500	510	10	6,700	605	10	-2,434	27	0
10/97	Oct	9,016	573	11	1,500	510	10	6,582	598	12	-2,434	26	0
11/97	Nov	10,779	480	9	1,500	510	10	8,345	473	9	-2,434	-7	0

Table 16a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 7
18,000 acre-ft/yr Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline			Alt 6						Difference		
		Total Discharge At Riverside Narrows			Recycled Water Export			Total Discharge At Riverside Narrows					
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
12/97	Dec	15,564	570	5	1,500	510	10	13,129	582	4	-2,434	12	-1
1/98	Jan	15,618	562	9	1,500	510	10	13,184	574	9	-2,434	11	0
2/98	Feb	77,548	225	4	1,500	510	10	75,114	216	4	-2,434	-9	0
3/98	Mar	19,861	497	8	1,500	510	10	17,427	496	7	-2,434	-1	0
4/98	Apr	23,583	403	6	1,500	510	10	21,149	392	6	-2,434	-11	0
5/98	May	37,933	278	3	1,500	510	10	35,499	262	3	-2,434	-15	0
6/98	Jun	16,641	432	6	1,500	510	10	14,207	420	6	-2,434	-12	-1
7/98	Jul	10,024	564	9	1,500	510	10	7,589	584	9	-2,434	20	0
8/98	Aug	11,774	534	10	1,500	510	10	9,340	542	11	-2,434	8	0
9/98	Sep	11,371	487	9	1,500	510	10	8,937	483	9	-2,434	-4	0
10/98	Oct	9,998	561	10	1,500	510	10	7,563	579	10	-2,434	19	0
11/98	Nov	10,350	536	9	1,500	510	10	7,915	547	9	-2,434	10	0
12/98	Dec	10,464	560	9	1,500	510	10	8,030	577	9	-2,434	17	0
1/99	Jan	11,454	477	7	1,500	510	10	9,020	470	7	-2,434	-7	-1
2/99	Feb	10,952	552	8	1,500	510	10	8,517	566	8	-2,434	14	0
3/99	Mar	10,585	565	9	1,500	510	10	8,151	584	9	-2,434	19	0
4/99	Apr	11,680	498	9	1,500	510	10	9,246	497	9	-2,434	-1	0
5/99	May	9,609	600	10	1,500	510	10	7,174	634	10	-2,434	33	0
6/99	Jun	10,723	564	11	1,500	510	10	8,288	582	11	-2,434	18	0
7/99	Jul	9,791	526	10	1,500	510	10	7,357	533	10	-2,434	8	0
8/99	Aug	9,568	580	11	1,500	510	10	7,134	607	11	-2,434	27	0
9/99	Sep	9,091	580	12	1,500	510	10	6,656	608	12	-2,434	28	1
Average		15,284	519	8	1,500	510	10	12,850	532	8	-2,434	13	0
Max		118,232	612	12				115,798	634	12	-2,434	43	1
Min		7,212	171	3				4,778	164	1	-2,434	-24	-3
StDev		16,829	90	2				16,829	103	2	0	15	0
Coef of Var		110%	17%	24%				131%	19%	30%	0%	115%	-108%

Table 16b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 7
No Export of San Bernardino Effluent and Intermediate Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 6 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
10/89	Oct	33,103	599	8	19,938	621	6.4	-13,166	23	-1.3
11/89	Nov	34,537	589	9	21,372	605	7.9	-13,166	15	-0.8
12/89	Dec	35,563	604	9	22,397	627	8.0	-13,166	23	-0.7
1/90	Jan	40,128	575	9	26,962	580	8.2	-13,166	5	-0.5
2/90	Feb	49,942	523	7	36,776	508	5.9	-13,166	-15	-1.1
3/90	Mar	34,988	584	7	21,823	596	5.2	-13,166	12	-1.7
4/90	Apr	34,185	598	8	21,019	619	6.3	-13,166	21	-1.3
5/90	May	33,959	595	8	20,793	615	7.3	-13,166	19	-0.9
6/90	Jun	31,621	596	8	18,456	618	7.5	-13,166	22	-0.9
7/90	Jul	29,948	603	8	16,783	633	6.5	-13,166	30	-1.3
8/90	Aug	30,767	593	8	17,601	614	6.9	-13,166	21	-1.2
9/90	Sep	30,251	596	8	17,085	620	6.8	-13,166	24	-1.3
10/90	Oct	31,575	603	8	18,409	631	7.2	-13,166	28	-1.3
11/90	Nov	33,519	595	9	20,354	615	7.8	-13,166	20	-0.8
12/90	Dec	33,932	609	8	20,766	638	7.3	-13,166	28	-1.1
1/91	Jan	39,851	584	6	26,685	593	4.8	-13,166	9	-1.6
2/91	Feb	47,091	590	10	33,925	600	10.6	-13,166	10	0.1
3/91	Mar	91,223	400	5	78,057	372	4.5	-13,166	-28	-0.7
4/91	Apr	34,371	548	6	21,205	537	4.3	-13,166	-10	-2.0
5/91	May	33,399	568	8	20,234	570	7.3	-13,166	2	-0.9
6/91	Jun	32,531	595	8	19,365	615	6.5	-13,166	21	-1.2
7/91	Jul	30,590	591	8	17,425	610	7.0	-13,166	20	-1.1
8/91	Aug	30,145	586	8	16,979	603	7.1	-13,166	17	-1.2
9/91	Sep	29,494	586	8	16,328	603	7.0	-13,166	17	-1.2
10/91	Oct	29,927	592	8	16,762	614	6.6	-13,166	22	-1.4
11/91	Nov	32,384	606	8	19,218	634	7.2	-13,166	28	-1.0
12/91	Dec	36,323	593	9	23,157	610	8.0	-13,166	16	-0.7
1/92	Jan	42,577	544	9	29,412	534	8.9	-13,166	-9	-0.3
2/92	Feb	71,679	413	8	58,513	379	7.0	-13,166	-34	-0.5
3/92	Mar	65,301	479	9	52,135	458	8.5	-13,166	-21	-0.3
4/92	Apr	34,797	540	7	21,631	525	5.5	-13,166	-15	-1.8
5/92	May	33,642	600	8	20,477	624	7.2	-13,166	23	-1.1
6/92	Jun	31,266	600	8	18,100	625	7.3	-13,166	26	-1.1
7/92	Jul	30,966	600	9	17,801	627	8.1	-13,166	27	-0.8
8/92	Aug	30,630	576	9	17,464	584	8.5	-13,166	9	-0.6
9/92	Sep	30,322	597	9	17,156	622	8.7	-13,166	25	-0.5
10/92	Oct	32,946	612	9	19,781	643	8.0	-13,166	31	-0.7
11/92	Nov	32,933	604	8	19,767	631	7.3	-13,166	27	-1.0
12/92	Dec	56,641	494	7	43,475	473	6.3	-13,166	-21	-0.8
1/93	Jan	242,113	286	5	228,947	270	4.5	-13,166	-16	-0.3
2/93	Feb	169,889	366	6	156,724	349	5.7	-13,166	-17	-0.3
3/93	Mar	76,370	475	6	63,205	457	5.2	-13,166	-19	-0.8
4/93	Apr	54,504	518	7	41,339	504	6.7	-13,166	-15	-0.8
5/93	May	43,544	559	8	30,378	556	6.6	-13,166	-2	-1.0
6/93	Jun	37,972	597	8	24,807	615	6.4	-13,166	17	-1.3
7/93	Jul	32,033	616	9	18,867	651	8.8	-13,166	36	-0.5
8/93	Aug	29,794	616	9	16,628	657	7.8	-13,166	41	-0.9
9/93	Sep	29,240	613	9	16,074	653	7.9	-13,166	40	-0.9
10/93	Oct	31,485	614	8	18,319	650	7.2	-13,166	36	-1.1
11/93	Nov	37,187	611	9	24,021	636	8.4	-13,166	25	-0.5

Table 16b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 7
No Export of San Bernardino Effluent and Intermediate Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 6 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
12/93	Dec	36,468	575	9	23,302	580	8.0	-13,166	6	-0.7
1/94	Jan	36,576	606	9	23,410	629	8.3	-13,166	23	-0.6
2/94	Feb	51,579	505	7	38,413	485	6.3	-13,166	-20	-0.9
3/94	Mar	46,486	630	8	33,321	656	7.5	-13,166	26	-0.7
4/94	Apr	36,085	606	8	22,919	630	7.1	-13,166	24	-1.1
5/94	May	33,877	609	8	20,711	637	6.3	-13,166	28	-1.5
6/94	Jun	30,782	609	7	17,617	642	5.7	-13,166	33	-1.8
7/94	Jul	30,015	610	8	16,849	645	6.6	-13,166	35	-1.4
8/94	Aug	29,125	601	9	15,960	632	7.7	-13,166	30	-0.9
9/94	Sep	29,527	598	9	16,361	624	7.9	-13,166	27	-0.8
10/94	Oct	32,531	595	9	19,365	615	8.2	-13,166	21	-0.8
11/94	Nov	33,724	601	9	20,559	624	9.1	-13,166	23	-0.4
12/94	Dec	35,170	609	9	22,005	635	8.2	-13,166	27	-0.7
1/95	Jan	129,180	389	6	116,014	370	6.1	-13,166	-20	-0.4
2/95	Feb	57,028	521	7	43,862	507	6.0	-13,166	-13	-0.9
3/95	Mar	164,743	357	5	151,578	339	4.8	-13,166	-18	-0.4
4/95	Apr	59,992	536	6	46,827	528	4.9	-13,166	-8	-1.1
5/95	May	47,497	570	7	34,331	572	5.5	-13,166	2	-1.2
6/95	Jun	42,977	563	7	29,811	562	5.5	-13,166	-1	-1.4
7/95	Jul	30,009	587	8	16,843	605	6.0	-13,166	18	-1.8
8/95	Aug	30,682	610	9	17,516	644	8.0	-13,166	34	-0.9
9/95	Sep	30,655	607	9	17,490	638	7.7	-13,166	32	-1.0
10/95	Oct	31,821	603	9	18,656	630	7.9	-13,166	27	-0.9
11/95	Nov	33,153	605	9	19,987	632	8.1	-13,166	27	-0.8
12/95	Dec	35,466	581	9	22,300	591	8.5	-13,166	10	-0.5
1/96	Jan	39,242	598	9	26,076	615	9.1	-13,166	17	-0.3
2/96	Feb	74,040	405	6	60,875	370	5.3	-13,166	-35	-0.8
3/96	Mar	45,364	544	7	32,198	535	5.7	-13,166	-9	-1.2
4/96	Apr	35,871	625	9	22,705	660	7.7	-13,166	35	-0.9
5/96	May	34,025	633	9	20,859	676	9.1	-13,166	43	-0.4
6/96	Jun	31,666	618	9	18,501	656	8.9	-13,166	38	-0.4
7/96	Jul	30,519	621	9	17,354	664	8.7	-13,166	43	-0.6
8/96	Aug	31,331	603	9	18,165	632	8.9	-13,166	28	-0.5
9/96	Sep	31,509	597	9	18,343	620	8.9	-13,166	23	-0.5
10/96	Oct	33,915	601	10	20,750	624	9.4	-13,166	23	-0.3
11/96	Nov	41,974	549	6	28,809	542	4.3	-13,166	-7	-1.8
12/96	Dec	44,343	542	6	31,177	533	4.1	-13,166	-9	-1.8
1/97	Jan	73,408	424	5	60,242	393	3.7	-13,166	-31	-1.1
2/97	Feb	37,252	584	9	24,086	594	7.9	-13,166	11	-0.8
3/97	Mar	35,914	600	10	22,748	620	9.3	-13,166	20	-0.3
4/97	Apr	34,120	596	10	20,954	616	9.2	-13,166	20	-0.3
5/97	May	32,974	601	9	19,808	624	8.4	-13,166	24	-0.7
6/97	Jun	32,361	592	9	19,195	611	8.6	-13,166	19	-0.6
7/97	Jul	30,657	600	9	17,491	626	7.8	-13,166	27	-0.9
8/97	Aug	30,097	608	9	16,932	643	7.6	-13,166	34	-1.1
9/97	Sep	31,117	604	8	17,952	633	5.8	-13,166	29	-1.9
10/97	Oct	32,217	595	10	19,052	616	10.3	-13,166	21	0.0
11/97	Nov	37,330	563	8	24,165	562	6.5	-13,166	-1	-1.2
12/97	Dec	48,055	508	5	34,889	487	3.0	-13,166	-21	-1.8
1/98	Jan	49,485	489	7	36,320	461	6.1	-13,166	-27	-1.0

Table 16b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 7
No Export of San Bernardino Effluent and Intermediate Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 6 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
2/98	Feb	200,064	303	3	186,899	285	3.0	-13,166	-18	-0.5
3/98	Mar	59,744	501	6	46,578	483	5.0	-13,166	-18	-1.1
4/98	Apr	52,443	516	6	39,277	500	5.0	-13,166	-16	-1.2
5/98	May	78,601	415	5	65,435	386	3.6	-13,166	-30	-1.0
6/98	Jun	42,631	520	7	29,466	500	5.5	-13,166	-20	-1.3
7/98	Jul	33,209	590	8	20,043	606	6.2	-13,166	17	-1.5
8/98	Aug	33,926	587	9	20,761	602	8.9	-13,166	15	-0.5
9/98	Sep	34,013	586	9	20,847	599	8.4	-13,166	14	-0.7
10/98	Oct	34,000	599	9	20,834	620	8.2	-13,166	22	-0.8
11/98	Nov	36,171	595	8	23,005	612	7.6	-13,166	17	-0.9
12/98	Dec	36,671	612	10	23,506	639	9.3	-13,166	27	-0.3
1/99	Jan	40,882	573	9	27,716	577	8.4	-13,166	4	-0.5
2/99	Feb	37,563	576	9	24,397	582	8.5	-13,166	6	-0.5
3/99	Mar	36,492	571	9	23,326	575	9.0	-13,166	4	-0.4
4/99	Apr	39,795	568	8	26,629	570	7.5	-13,166	2	-0.8
5/99	May	35,454	604	9	22,289	627	7.9	-13,166	23	-0.8
6/99	Jun	33,606	605	10	20,441	632	9.0	-13,166	26	-0.5
7/99	Jul	32,862	598	9	19,696	621	8.4	-13,166	23	-0.7
8/99	Aug	31,340	597	9	18,175	621	8.7	-13,166	24	-0.7
9/99	Sep	31,229	597	9	18,063	620	8.7	-13,166	24	-0.7
Average		44,648	566	8.1	31,483	578	7.2	-13,166	12	-0.9
Max		242,113	633	10.5	228,947	676	10.6	-13,166	43	0.1
Min		29,125	286	3.4	15,960	270	3.0	-13,166	-35	-2.0
StDev		31,822	67	1.3	31,822	85	1.6	0.0	19.8	0.4
Coef of Var		71%	12%	16%	101%	15%	22%	0%	167%	-48%
				For August Data Only						
Average		30,784	598	8.8	17,618	623	8.0	-13,166	25	-0.8
Max		33,926	616	9.4	20,761	657	8.9	-13,166	41	-0.5
Min		29,125	576	8.1	15,960	584	6.9	-13,166	9	-1.2
StDev		1,296	12	0.5	1,296	22	0.7	0	10	0.3
Coef of Var		4%	2%	5%	7%	4%	9%	0%	40%	-33%

Table 16c
Annual Flow and TDS Impacts of Exporting Recycled Water from RIX
Year 2040 Alternative 7
18,000 acre-ft/yr Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Water Year	Baseline Total Discharge Below Prado Dam				Alternative 6 Total Discharge Below Prado Dam				Difference			
	Annual Average		Five-year average		Annual Average		Five-year average		Annual Average		Five-year average	
	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)
89-90	418,993	585	491,783	542	261,005	597	333,795	531	-157,988	12	-157,988	-11
90-91	467,721	550	494,526	538	309,733	543	336,538	526	-157,988	-7	-157,988	-12
91-92	469,815	543	496,863	535	311,826	532	338,874	522	-157,988	-11	-157,988	-14
92-93	837,979	438	524,115	525	679,991	409	366,126	508	-157,988	-29	-157,988	-17
93-94	429,192	595	524,740	526	271,203	612	366,752	509	-157,988	18	-157,988	-17
94-95	694,189	487	579,779	508	536,201	465	421,791	487	-157,988	-23	-157,988	-21
95-96	454,007	569	577,036	511	296,019	571	419,048	491	-157,988	2	-157,988	-20
96-97	458,132	560	574,700	513	300,143	558	416,712	494	-157,988	-2	-157,988	-19
97-98	701,719	457	547,448	522	543,731	426	389,459	505	-157,988	-31	-157,988	-17
98-99	426,064	591	546,822	521	268,076	606	388,834	504	-157,988	15	-157,988	-18
Average	535,781	537	535,781	524	377,793	532	377,793	508	-157,988	-6	-157,988	-17
Max	837,979	595	579,779	542	679,991	612	421,791	531	-157,988	18	-157,988	-11
Min	418,993	438	491,783	508	261,005	409	333,795	487	-157,988	-31	-157,988	-21
StDev	150,071	57	34,675	12	150,071	74	34,675	15	0	18	0	3
Coef of Var	28%	11%	6%	2%	40%	14%	9%	3%	0%	-319%	0%	-21%

Table 17a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 8
18,000 acre-ft/yr Export of San Bernardino Effluent and Intermediate Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline			Alt 6						Difference		
		Total Discharge At Riverside Narrows			Recycled Water Export			Total Discharge At Riverside Narrows					
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
10/89	Oct	6,635	564	5	1,500	510	10	4,854	585	3	-1,781	21	-2
11/89	Nov	7,229	559	6	1,500	510	10	5,449	575	5	-1,781	17	-1
12/89	Dec	7,311	564	7	1,500	510	10	5,530	583	5	-1,781	18	-1
1/90	Jan	9,380	560	6	1,500	510	10	7,600	572	5	-1,781	12	-1
2/90	Feb	10,276	580	8	1,500	510	10	8,495	596	7	-1,781	15	0
3/90	Mar	7,663	574	6	1,500	510	10	5,882	595	4	-1,781	20	-1
4/90	Apr	7,944	564	5	1,500	510	10	6,163	581	3	-1,781	17	-2
5/90	May	7,278	563	5	1,500	510	10	5,497	581	3	-1,781	18	-2
6/90	Jun	6,392	567	3	1,500	510	10	4,612	591	1	-1,781	23	-2
7/90	Jul	5,482	576	1	1,500	510	10	3,701	609	1	-1,781	33	0
8/90	Aug	5,827	564	4	1,500	510	10	4,047	589	1	-1,781	25	-3
9/90	Sep	5,680	569	6	1,500	510	10	3,900	598	5	-1,781	29	-2
10/90	Oct	5,913	560	11	1,500	510	10	4,132	583	11	-1,781	23	0
11/90	Nov	6,032	557	6	1,500	510	10	4,252	578	5	-1,781	21	-1
12/90	Dec	6,894	581	9	1,500	510	10	5,113	607	9	-1,781	26	0
1/91	Jan	8,080	567	4	1,500	510	10	6,300	584	2	-1,781	17	-2
2/91	Feb	13,864	589	10	1,500	510	10	12,084	601	10	-1,781	12	0
3/91	Mar	29,244	233	3	1,500	510	10	27,463	215	3	-1,781	-18	0
4/91	Apr	7,869	560	2	1,500	510	10	6,089	576	1	-1,781	16	-1
5/91	May	6,093	596	3	1,500	510	10	4,313	632	1	-1,781	37	-2
6/91	Jun	6,358	596	3	1,500	510	10	4,578	630	1	-1,781	35	-2
7/91	Jul	5,121	596	5	1,500	510	10	3,341	643	3	-1,781	47	-2
8/91	Aug	5,102	575	8	1,500	510	10	3,321	611	7	-1,781	36	-1
9/91	Sep	4,893	593	8	1,500	510	10	3,112	642	7	-1,781	49	-1
10/91	Oct	5,520	579	7	1,500	510	10	3,739	613	5	-1,781	34	-2
11/91	Nov	6,179	575	5	1,500	510	10	4,399	603	2	-1,781	28	-2
12/91	Dec	7,570	574	7	1,500	510	10	5,790	595	6	-1,781	21	-1
1/92	Jan	8,974	590	8	1,500	510	10	7,193	611	7	-1,781	21	-1
2/92	Feb	24,183	503	7	1,500	510	10	22,403	502	6	-1,781	0	0
3/92	Mar	17,232	540	6	1,500	510	10	15,451	543	5	-1,781	4	0
4/92	Apr	7,017	583	10	1,500	510	10	5,237	608	10	-1,781	26	0
5/92	May	6,338	593	9	1,500	510	10	4,557	627	9	-1,781	34	0
6/92	Jun	5,724	557	8	1,500	510	10	3,943	579	7	-1,781	23	-1
7/92	Jul	5,704	577	10	1,500	510	10	3,923	609	10	-1,781	32	0
8/92	Aug	5,121	580	8	1,500	510	10	3,340	619	8	-1,781	39	-1
9/92	Sep	5,074	575	7	1,500	510	10	3,293	611	6	-1,781	37	-2
10/92	Oct	5,691	579	6	1,500	510	10	3,911	612	4	-1,781	33	-2
11/92	Nov	5,810	567	6	1,500	510	10	4,029	593	4	-1,781	27	-2
12/92	Dec	17,108	444	7	1,500	510	10	15,327	437	6	-1,781	-7	0
1/93	Jan	115,487	340	4	1,500	510	10	113,706	337	3	-1,781	-3	0
2/93	Feb	49,253	254	4	1,500	510	10	47,472	244	4	-1,781	-9	0
3/93	Mar	36,933	279	4	1,500	510	10	35,152	267	3	-1,781	-12	0
4/93	Apr	26,995	323	6	1,500	510	10	25,214	309	6	-1,781	-13	0
5/93	May	17,936	384	6	1,500	510	10	16,156	371	6	-1,781	-13	0
6/93	Jun	9,287	532	9	1,500	510	10	7,506	538	9	-1,781	6	0
7/93	Jul	5,318	624	8	1,500	510	10	3,537	684	7	-1,781	59	-1
8/93	Aug	4,466	639	10	1,500	510	10	2,686	726	10	-1,781	87	0
9/93	Sep	4,954	617	9	1,500	510	10	3,174	679	8	-1,781	62	-1
10/93	Oct	5,112	610	8	1,500	510	10	3,332	666	7	-1,781	55	-1

Table 17a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 8
18,000 acre-ft/yr Export of San Bernardino Effluent and Intermediate Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline			Alt 6						Difference		
		Total Discharge At Riverside Narrows			Recycled Water Export			Total Discharge At Riverside Narrows					
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
11/93	Nov	4,957	527	9	1,500	510	10	3,176	538	9	-1,781	11	0
12/93	Dec	6,121	591	8	1,500	510	10	4,340	626	7	-1,781	35	-1
1/94	Jan	6,647	519	7	1,500	510	10	4,866	524	7	-1,781	5	-1
2/94	Feb	12,178	385	8	1,500	510	10	10,397	364	8	-1,781	-21	0
3/94	Mar	11,720	637	8	1,500	510	10	9,940	660	7	-1,781	23	0
4/94	Apr	6,682	560	8	1,500	510	10	4,901	579	7	-1,781	19	-1
5/94	May	5,992	611	9	1,500	510	10	4,212	655	8	-1,781	44	-1
6/94	Jun	4,985	601	10	1,500	510	10	3,205	653	10	-1,781	52	0
7/94	Jul	4,832	617	10	1,500	510	10	3,052	681	10	-1,781	64	0
8/94	Aug	4,630	604	9	1,500	510	10	2,850	665	9	-1,781	61	0
9/94	Sep	4,586	599	10	1,500	510	10	2,806	658	9	-1,781	59	0
10/94	Oct	6,258	574	8	1,500	510	10	4,478	601	8	-1,781	27	-1
11/94	Nov	7,893	519	9	1,500	510	10	6,112	523	8	-1,781	4	0
12/94	Dec	8,761	542	8	1,500	510	10	6,980	551	8	-1,781	9	0
1/95	Jan	52,989	295	4	1,500	510	10	51,208	288	4	-1,781	-7	0
2/95	Feb	22,910	306	6	1,500	510	10	21,129	289	6	-1,781	-17	0
3/95	Mar	113,440	163	4	1,500	510	10	111,659	158	4	-1,781	-5	0
4/95	Apr	19,494	372	7	1,500	510	10	17,713	358	7	-1,781	-14	0
5/95	May	16,281	408	7	1,500	510	10	14,501	396	6	-1,781	-12	0
6/95	Jun	11,158	493	9	1,500	510	10	9,378	491	9	-1,781	-3	0
7/95	Jul	6,105	598	8	1,500	510	10	4,325	635	8	-1,781	37	-1
8/95	Aug	5,508	621	10	1,500	510	10	3,727	676	10	-1,781	55	0
9/95	Sep	5,124	635	10	1,500	510	10	3,344	704	11	-1,781	68	0
10/95	Oct	5,908	623	9	1,500	510	10	4,128	673	9	-1,781	50	0
11/95	Nov	6,123	612	8	1,500	510	10	4,342	656	7	-1,781	43	-1
12/95	Dec	6,302	577	7	1,500	510	10	4,521	605	6	-1,781	28	-1
1/96	Jan	10,430	506	8	1,500	510	10	8,649	506	8	-1,781	0	0
2/96	Feb	24,759	229	5	1,500	510	10	22,978	208	5	-1,781	-22	0
3/96	Mar	13,771	358	8	1,500	510	10	11,990	336	7	-1,781	-22	0
4/96	Apr	7,803	594	9	1,500	510	10	6,022	619	8	-1,781	26	0
5/96	May	7,614	629	8	1,500	510	10	5,833	666	8	-1,781	37	0
6/96	Jun	6,770	625	8	1,500	510	10	4,989	667	7	-1,781	42	-1
7/96	Jul	6,523	614	8	1,500	510	10	4,742	654	7	-1,781	40	-1
8/96	Aug	6,164	585	9	1,500	510	10	4,383	617	8	-1,781	32	0
9/96	Sep	6,610	532	9	1,500	510	10	4,830	542	8	-1,781	9	0
10/96	Oct	8,145	592	9	1,500	510	10	6,364	616	9	-1,781	24	0
11/96	Nov	13,604	569	7	1,500	510	10	11,823	578	7	-1,781	9	0
12/96	Dec	11,007	494	8	1,500	510	10	9,227	491	8	-1,781	-2	0
1/97	Jan	38,267	506	5	1,500	510	10	36,486	506	4	-1,781	0	0
2/97	Feb	8,446	582	10	1,500	510	10	6,666	602	10	-1,781	20	0
3/97	Mar	7,767	601	9	1,500	510	10	5,987	629	9	-1,781	28	0
4/97	Apr	7,740	605	9	1,500	510	10	5,960	635	8	-1,781	29	0
5/97	May	6,861	586	9	1,500	510	10	5,080	614	9	-1,781	28	0
6/97	Jun	6,581	604	10	1,500	510	10	4,800	641	10	-1,781	36	0
7/97	Jul	6,135	617	7	1,500	510	10	4,354	662	6	-1,781	45	-1
8/97	Aug	6,016	621	10	1,500	510	10	4,236	669	9	-1,781	48	0
9/97	Sep	6,389	609	10	1,500	510	10	4,608	649	10	-1,781	39	0
10/97	Oct	6,270	602	12	1,500	510	10	4,490	640	12	-1,781	38	1
11/97	Nov	8,034	471	9	1,500	510	10	6,253	461	9	-1,781	-10	0

Table 17a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 8
18,000 acre-ft/yr Export of San Bernardino Effluent and Intermediate Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge At Riverside Narrows			Alt 6 Recycled Water Export			Alt 6 Total Discharge At Riverside Narrows			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
12/97	Dec	12,818	584	4	1,500	510	10	11,038	596	3	-1,781	12	-1
1/98	Jan	12,873	575	9	1,500	510	10	11,092	586	9	-1,781	11	0
2/98	Feb	74,803	214	4	1,500	510	10	73,022	207	4	-1,781	-7	0
3/98	Mar	17,115	495	7	1,500	510	10	15,335	494	7	-1,781	-1	0
4/98	Apr	20,838	390	6	1,500	510	10	19,057	379	5	-1,781	-11	0
5/98	May	35,188	260	3	1,500	510	10	33,407	247	2	-1,781	-13	0
6/98	Jun	13,896	417	6	1,500	510	10	12,116	404	5	-1,781	-13	-1
7/98	Jul	7,278	586	9	1,500	510	10	5,498	612	9	-1,781	26	0
8/98	Aug	9,029	543	11	1,500	510	10	7,248	552	11	-1,781	9	0
9/98	Sep	8,625	482	9	1,500	510	10	6,845	476	9	-1,781	-6	0
10/98	Oct	7,252	582	10	1,500	510	10	5,472	606	10	-1,781	24	0
11/98	Nov	7,604	548	9	1,500	510	10	5,824	560	8	-1,781	12	0
12/98	Dec	7,719	579	9	1,500	510	10	5,938	601	8	-1,781	22	0
1/99	Jan	8,709	468	7	1,500	510	10	6,929	458	6	-1,781	-10	-1
2/99	Feb	8,206	567	8	1,500	510	10	6,426	584	7	-1,781	17	-1
3/99	Mar	7,840	587	9	1,500	510	10	6,059	610	9	-1,781	23	0
4/99	Apr	8,935	496	8	1,500	510	10	7,154	493	8	-1,781	-3	0
5/99	May	6,863	639	10	1,500	510	10	5,083	685	10	-1,781	46	0
6/99	Jun	7,977	584	11	1,500	510	10	6,197	606	12	-1,781	22	0
7/99	Jul	7,046	534	10	1,500	510	10	5,265	543	10	-1,781	9	0
8/99	Aug	6,823	611	12	1,500	510	10	5,043	648	12	-1,781	37	1
9/99	Sep	6,345	612	12	1,500	510	10	4,565	653	13	-1,781	41	1
Average		12,538	534	7	1,500	510	10	10,758	555	7	-1,781	20	-1
Max		115,487	639	12				113,706	726	13	-1,781	87	1
Min		4,466	163	1				2,686	158	1	-1,781	-22	-3
StDev		16,829	105	2				16,829	123	3	0	22	1
Coef of Var		134%	20%	31%				156%	22%	40%	0%	109%	-110%

Table 17b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 8
18,000 acre-ft/yr Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 6 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
10/89	Oct	21,580	626	7	16,628	645	6.2	-4,952	20	-0.5
11/89	Nov	23,014	610	8	18,062	624	7.8	-4,952	14	-0.2
12/89	Dec	24,040	630	8	19,088	649	7.9	-4,952	18	-0.2
1/90	Jan	28,605	586	8	23,653	591	8.0	-4,952	5	-0.3
2/90	Feb	38,419	516	6	33,467	509	5.5	-4,952	-7	-0.6
3/90	Mar	23,466	602	6	18,514	613	4.6	-4,952	11	-1.0
4/90	Apr	22,662	623	7	17,710	641	5:8	-4,952	18	-0.7
5/90	May	22,436	620	7	17,484	636	7.1	-4,952	17	-0.4
6/90	Jun	20,098	624	8	15,146	644	7.5	-4,952	21	-0.1
7/90	Jul	18,425	638	7	13,474	666	7.0	-4,952	28	0.3
8/90	Aug	19,244	620	7	14,292	640	6.9	-4,952	21	-0.2
9/90	Sep	18,728	626	7	13,776	650	6.8	-4,952	24	-0.3
10/90	Oct	20,052	636	7	15,100	660	7.2	-4,952	25	-0.2
11/90	Nov	21,996	620	8	17,045	638	7.9	-4,952	17	0.0
12/90	Dec	22,409	641	8	17,457	664	7.1	-4,952	23	-0.4
1/91	Jan	28,328	598	5	23,376	606	4.2	-4,952	8	-0.9
2/91	Feb	35,568	604	11	30,616	611	10.7	-4,952	7	0.1
3/91	Mar	79,700	378	5	74,748	366	4.3	-4,952	-12	-0.3
4/91	Apr	22,848	548	5	17,896	544	3.8	-4,952	-3	-0.9
5/91	May	21,876	578	7	16,924	584	7.5	-4,952	5	0.1
6/91	Jun	21,008	621	7	16,056	639	6.5	-4,952	19	-0.3
7/91	Jul	19,067	617	7	14,116	636	7.0	-4,952	20	-0.1
8/91	Aug	18,622	610	7	13,670	629	7.1	-4,952	18	0.0
9/91	Sep	17,971	610	7	13,019	630	7.1	-4,952	19	0.0
10/91	Oct	18,405	621	7	13,453	643	6.6	-4,952	22	-0.3
11/91	Nov	20,861	638	7	15,909	662	7.2	-4,952	24	-0.2
12/91	Dec	24,800	615	8	19,848	628	7.9	-4,952	14	-0.3
1/92	Jan	31,054	542	9	26,103	539	8.9	-4,952	-3	-0.2
2/92	Feb	60,156	387	7	55,204	372	6.9	-4,952	-16	-0.2
3/92	Mar	53,778	465	9	48,826	455	8.5	-4,952	-10	-0.1
4/92	Apr	23,274	536	6	18,322	529	4.9	-4,952	-7	-0.9
5/92	May	22,119	628	7	17,168	648	7.1	-4,952	20	-0.3
6/92	Jun	19,743	630	8	14,791	654	7.4	-4,952	23	-0.1
7/92	Jul	19,443	632	8	14,491	656	8.4	-4,952	24	0.1
8/92	Aug	19,107	593	9	14,155	604	8.9	-4,952	11	0.4
9/92	Sep	18,799	628	9	13,847	652	9.1	-4,952	24	0.5
10/92	Oct	21,423	646	8	16,471	672	8.2	-4,952	26	0.1
11/92	Nov	21,410	635	8	16,458	657	7.5	-4,952	22	-0.1
12/92	Dec	45,118	480	6	40,166	471	6.0	-4,952	-10	-0.4
1/93	Jan	230,590	273	5	225,638	267	4.5	-4,952	-6	-0.1
2/93	Feb	158,366	353	6	153,415	346	5.6	-4,952	-7	-0.1
3/93	Mar	64,847	462	5	59,895	454	5.0	-4,952	-8	-0.3
4/93	Apr	42,981	511	7	38,030	504	6.5	-4,952	-6	-0.4
5/93	May	32,021	563	7	27,069	563	6.3	-4,952	0	-0.5
6/93	Jun	26,449	619	7	21,497	633	5.9	-4,952	14	-0.8
7/93	Jul	20,510	654	9	15,558	684	9.2	-4,952	30	0.4
8/93	Aug	18,271	659	8	13,319	696	8.0	-4,952	37	0.2
9/93	Sep	17,717	656	8	12,765	693	8.2	-4,952	37	0.3
10/93	Oct	19,962	653	7	15,010	684	7.3	-4,952	31	0.0
11/93	Nov	25,664	639	8	20,712	658	8.7	-4,952	19	0.3

Table 17b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 8
18,000 acre-ft/yr Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 6 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
12/93	Dec	24,945	587	8	19,993	594	8.1	-4,952	7	0.0
1/94	Jan	25,053	632	8	20,101	650	8.3	-4,952	18	-0.1
2/94	Feb	40,056	493	6	35,104	483	6.0	-4,952	-9	-0.5
3/94	Mar	34,963	657	8	30,011	673	7.3	-4,952	16	-0.4
4/94	Apr	24,562	633	7	19,610	652	7.0	-4,952	18	-0.3
5/94	May	22,354	640	7	17,402	663	6.2	-4,952	23	-0.4
6/94	Jun	19,259	645	6	14,307	675	5.4	-4,952	29	-0.5
7/94	Jul	18,492	649	7	13,540	681	6.6	-4,952	32	-0.1
8/94	Aug	17,602	636	8	12,650	666	8.0	-4,952	30	0.2
9/94	Sep	18,004	630	8	13,052	656	8.1	-4,952	26	0.3
10/94	Oct	21,008	621	8	16,056	639	8.3	-4,952	19	0.0
11/94	Nov	22,201	628	9	17,249	648	9.0	-4,952	20	-0.2
12/94	Dec	23,647	639	8	18,696	660	7.9	-4,952	21	-0.4
1/95	Jan	117,657	374	6	112,705	366	6.0	-4,952	-8	-0.2
2/95	Feb	45,505	514	6	40,553	508	5.7	-4,952	-6	-0.4
3/95	Mar	153,220	343	5	148,269	336	4.7	-4,952	-7	-0.2
4/95	Apr	48,469	533	5	43,518	530	4.5	-4,952	-3	-0.5
5/95	May	35,974	577	6	31,022	580	5.1	-4,952	3	-0.6
6/95	Jun	31,454	568	6	26,502	570	4.9	-4,952	2	-0.8
7/95	Jul	18,486	612	6	13,534	631	5.7	-4,952	19	-0.7
8/95	Aug	19,159	647	8	14,207	678	8.3	-4,952	30	0.2
9/95	Sep	19,132	642	8	14,181	671	8.0	-4,952	29	0.2
10/95	Oct	20,298	634	8	15,346	658	8.1	-4,952	24	0.0
11/95	Nov	21,630	636	8	16,678	658	8.3	-4,952	22	0.0
12/95	Dec	23,943	597	9	18,991	607	8.7	-4,952	10	0.1
1/96	Jan	27,719	619	9	22,767	632	9.1	-4,952	13	-0.2
2/96	Feb	62,517	379	5	57,565	363	5.1	-4,952	-16	-0.4
3/96	Mar	33,841	542	6	28,889	539	5.3	-4,952	-3	-0.7
4/96	Apr	24,348	662	8	19,396	687	7.4	-4,952	26	-0.5
5/96	May	22,502	676	9	17,550	709	9.0	-4,952	33	-0.1
6/96	Jun	20,143	658	9	15,192	690	9.1	-4,952	32	0.1
7/96	Jul	18,996	666	9	14,044	703	8.9	-4,952	37	0.1
8/96	Aug	19,808	636	9	14,856	661	9.3	-4,952	25	0.2
9/96	Sep	19,986	625	9	15,034	646	9.2	-4,952	21	0.1
10/96	Oct	22,392	628	9	17,440	647	9.3	-4,952	19	-0.2
11/96	Nov	30,451	549	5	25,499	547	3.6	-4,952	-2	-1.0
12/96	Dec	32,820	540	4	27,868	537	3.4	-4,952	-4	-1.0
1/97	Jan	61,885	401	4	56,933	387	3.3	-4,952	-14	-0.5
2/97	Feb	25,729	600	8	20,777	609	7.5	-4,952	9	-0.5
3/97	Mar	24,391	624	9	19,439	641	9.2	-4,952	16	-0.1
4/97	Apr	22,597	621	9	17,645	638	9.2	-4,952	17	-0.1
5/97	May	21,451	629	9	16,499	650	8.4	-4,952	21	-0.1
6/97	Jun	20,838	617	9	15,886	635	8.8	-4,952	18	0.0
7/97	Jul	19,134	631	8	14,182	656	8.0	-4,952	25	0.0
8/97	Aug	18,574	646	8	13,622	678	7.8	-4,952	31	-0.1
9/97	Sep	19,594	637	6	14,643	664	5.4	-4,952	26	-0.8
10/97	Oct	20,694	621	10	15,742	640	10.9	-4,952	19	0.6
11/97	Nov	25,807	570	7	20,855	573	6.0	-4,952	2	-0.8
12/97	Dec	36,532	496	3	31,580	486	2.3	-4,952	-10	-0.9
1/98	Jan	37,962	471	6	33,010	457	5.8	-4,952	-13	-0.6

Table 17b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2010 Alternative 8
18,000 acre-ft/yr Export of San Bernardino Effluent and Maximum Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 6 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
2/98	Feb	188,541	288	3	183,590	281	2.8	-4,952	-7	-0.2
3/98	Mar	48,221	490	5	43,269	482	4.6	-4,952	-8	-0.5
4/98	Apr	40,920	507	5	35,968	500	4.6	-4,952	-7	-0.6
5/98	May	67,078	393	4	62,126	379	3.3	-4,952	-13	-0.5
6/98	Jun	31,108	509	6	26,156	500	5.0	-4,952	-10	-0.7
7/98	Jul	21,686	612	7	16,734	627	5.7	-4,952	15	-0.8
8/98	Aug	22,403	608	9	17,451	622	8.6	-4,952	14	-0.4
9/98	Sep	22,490	606	9	17,538	618	8.1	-4,952	13	-0.4
10/98	Oct	22,477	625	8	17,525	643	8.1	-4,952	18	-0.3
11/98	Nov	24,648	617	8	19,696	631	7.3	-4,952	14	-0.5
12/98	Dec	25,148	642	9	20,196	662	9.2	-4,952	20	-0.1
1/99	Jan	29,359	583	8	24,407	587	8.3	-4,952	5	-0.2
2/99	Feb	26,040	589	9	21,088	595	8.3	-4,952	7	-0.3
3/99	Mar	24,969	582	9	20,017	588	8.9	-4,952	5	-0.2
4/99	Apr	28,272	576	8	23,320	580	7.1	-4,952	3	-0.5
5/99	May	23,931	631	8	18,979	650	7.8	-4,952	19	-0.3
6/99	Jun	22,083	636	9	17,131	658	8.8	-4,952	22	-0.4
7/99	Jul	21,339	626	9	16,387	645	8.4	-4,952	20	-0.2
8/99	Aug	19,817	626	9	14,866	648	8.8	-4,952	22	-0.1
9/99	Sep	19,706	626	9	14,754	648	9.0	-4,952	22	0.1
Average		33,125	583	7.3	28,174	596	7.1	-4,952	13	-0.2
Max		230,590	676	10.6	225,638	709	10.9	-4,952	37	0.6
Min		17,602	273	3.0	12,650	267	2.3	-4,952	-16	-1.0
StDev		31,822	84	1.5	31,822	96	1.7	0.0	13.9	0.3
Coef of Var		96%	14%	21%	113%	16%	25%	0%	111%	-135%
					For August Data Only					
Average		19,261	628	8.1	14,309	652	8.2	-4,952	24	0.1
Max		22,403	659	9.0	17,451	696	9.3	-4,952	37	0.4
Min		17,602	593	7.1	12,650	604	6.9	-4,952	11	-0.4
StDev		1,296	21	0.7	1,296	29	0.8	0	8	0.2
Coef of Var		7%	3%	9%	9%	4%	9%	0%	34%	485%

Table 17c
Annual Flow and TDS Impacts of Exporting Recycled Water from RIX
Year 2010 Alternative 8
18,000 acre-ft/yr Export of San Bernardino Effluent and Intermediate Recycling at Other POTW's

Water Year	Baseline Total Discharge Below Prado Dam				Alternative 6 Total Discharge Below Prado Dam				Difference			
	Annual Average		Five-year average		Annual Average		Five-year average		Annual Average		Five-year average	
	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)
89-90	280,718	603	353,507	540	221,295	615	294,085	535	-59,423	12	-59,423	-4
90-91	329,445	551	356,250	535	270,023	549	296,827	530	-59,423	-2	-59,423	-5
91-92	331,539	541	358,587	531	272,116	537	299,164	525	-59,423	-4	-59,423	-6
92-93	699,704	416	385,839	517	640,281	403	326,416	509	-59,423	-13	-59,423	-8
93-94	290,916	617	386,464	518	231,493	631	327,042	510	-59,423	15	-59,423	-8
94-95	555,913	472	441,503	496	496,490	462	382,081	486	-59,423	-11	-59,423	-10
95-96	315,732	578	438,761	499	256,309	582	379,338	490	-59,423	4	-59,423	-10
96-97	319,856	566	436,424	503	260,433	567	377,001	494	-59,423	1	-59,423	-9
97-98	563,443	435	409,172	513	504,021	420	349,749	505	-59,423	-15	-59,423	-8
98-99	287,788	611	408,546	512	228,365	624	349,124	504	-59,423	13	-59,423	-8
Average	397,505	539	397,505	516	338,083	539	338,083	509	-59,423	0	-59,423	-8
Max	699,704	617	441,503	540	640,281	631	382,081	535	-59,423	15	-59,423	-4
Min	280,718	416	353,507	496	221,295	403	294,085	486	-59,423	-15	-59,423	-10
StDev	150,071	73	34,675	15	150,071	84	34,675	17	0	11	0	2
Coef of Var	38%	14%	9%	3%	44%	16%	10%	3%	0%	-153180%	0%	-26%

Table 18a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 8
18,000 acre-ft/yr Export of San Bernardino Effluent and Intermediate Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge At Riverside Narrows			Alt 6 Recycled Water Export			Alt 6 Total Discharge At Riverside Narrows			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
10/89	Oct	9,380	547	6	1,500	510	10	7,413	558	5	-1,967	11	-1
11/89	Nov	9,975	544	7	1,500	510	10	8,007	553	6	-1,967	9	-1
12/89	Dec	10,056	548	7	1,500	510	10	8,089	558	7	-1,967	10	-1
1/90	Jan	12,125	547	7	1,500	510	10	10,158	555	7	-1,967	8	-1
2/90	Feb	13,021	564	8	1,500	510	10	11,054	575	8	-1,967	11	0
3/90	Mar	10,408	556	7	1,500	510	10	8,441	568	6	-1,967	12	-1
4/90	Apr	10,689	549	6	1,500	510	10	8,722	559	5	-1,967	10	-1
5/90	May	10,023	547	6	1,500	510	10	8,056	557	5	-1,967	10	-1
6/90	Jun	9,138	548	5	1,500	510	10	7,170	560	4	-1,967	12	-1
7/90	Jul	8,227	552	4	1,500	510	10	6,260	567	2	-1,967	15	-2
8/90	Aug	8,573	545	6	1,500	510	10	6,605	557	4	-1,967	12	-1
9/90	Sep	8,425	548	8	1,500	510	10	6,458	561	7	-1,967	13	-1
10/90	Oct	8,658	542	10	1,500	510	10	6,691	553	11	-1,967	11	0
11/90	Nov	8,777	541	8	1,500	510	10	6,810	551	7	-1,967	10	-1
12/90	Dec	9,639	559	9	1,500	510	10	7,672	573	9	-1,967	14	0
1/91	Jan	10,825	551	5	1,500	510	10	8,858	561	4	-1,967	10	-1
2/91	Feb	16,610	575	10	1,500	510	10	14,642	584	10	-1,967	9	0
3/91	Mar	31,989	256	4	1,500	510	10	30,022	240	3	-1,967	-16	0
4/91	Apr	10,615	546	4	1,500	510	10	8,647	555	3	-1,967	9	-1
5/91	May	8,839	567	5	1,500	510	10	6,871	585	3	-1,967	18	-1
6/91	Jun	9,104	568	5	1,500	510	10	7,136	586	4	-1,967	17	-1
7/91	Jul	7,867	564	7	1,500	510	10	5,899	584	6	-1,967	20	-1
8/91	Aug	7,847	550	9	1,500	510	10	5,880	565	8	-1,967	15	0
9/91	Sep	7,638	561	9	1,500	510	10	5,671	580	9	-1,967	19	0
10/91	Oct	8,265	554	8	1,500	510	10	6,298	570	7	-1,967	15	-1
11/91	Nov	8,925	553	6	1,500	510	10	6,957	567	5	-1,967	14	-1
12/91	Dec	10,316	556	7	1,500	510	10	8,348	568	7	-1,967	12	-1
1/92	Jan	11,719	570	8	1,500	510	10	9,752	583	8	-1,967	13	0
2/92	Feb	26,929	503	7	1,500	510	10	24,961	503	7	-1,967	0	0
3/92	Mar	19,977	535	6	1,500	510	10	18,010	538	6	-1,967	3	0
4/92	Apr	9,763	561	10	1,500	510	10	7,795	575	10	-1,967	14	0
5/92	May	9,083	566	9	1,500	510	10	7,116	583	9	-1,967	17	0
6/92	Jun	8,469	540	9	1,500	510	10	6,502	550	8	-1,967	10	0
7/92	Jul	8,449	554	10	1,500	510	10	6,482	568	10	-1,967	15	0
8/92	Aug	7,866	553	9	1,500	510	10	5,899	570	9	-1,967	16	0
9/92	Sep	7,819	550	8	1,500	510	10	5,852	565	8	-1,967	15	-1
10/92	Oct	8,437	555	7	1,500	510	10	6,469	570	7	-1,967	15	-1
11/92	Nov	8,555	547	7	1,500	510	10	6,588	559	6	-1,967	12	-1
12/92	Dec	19,853	452	7	1,500	510	10	17,886	446	7	-1,967	-6	0
1/93	Jan	118,232	343	4	1,500	510	10	116,265	341	4	-1,967	-3	0
2/93	Feb	51,998	267	4	1,500	510	10	50,031	258	4	-1,967	-9	0
3/93	Mar	39,678	295	4	1,500	510	10	37,711	284	4	-1,967	-11	0
4/93	Apr	29,740	339	7	1,500	510	10	27,773	328	6	-1,967	-12	0
5/93	May	20,682	400	7	1,500	510	10	18,714	389	6	-1,967	-11	0
6/93	Jun	12,032	526	9	1,500	510	10	10,065	530	9	-1,967	4	0
7/93	Jul	8,063	584	9	1,500	510	10	6,096	609	8	-1,967	25	0
8/93	Aug	7,212	588	10	1,500	510	10	5,244	619	10	-1,967	31	0
9/93	Sep	7,700	577	9	1,500	510	10	5,732	602	9	-1,967	25	0
10/93	Oct	7,858	573	9	1,500	510	10	5,890	596	8	-1,967	23	0

Table 18a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 8
18,000 acre-ft/yr Export of San Bernardino Effluent and Intermediate Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline			Alt 6						Difference		
		Total Discharge At Riverside Narrows			Recycled Water Export			Total Discharge At Riverside Narrows					
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
11/93	Nov	7,702	519	10	1,500	510	10	5,735	524	9	-1,967	5	0
12/93	Dec	8,866	564	9	1,500	510	10	6,899	581	8	-1,967	17	0
1/94	Jan	9,392	515	8	1,500	510	10	7,425	517	8	-1,967	3	0
2/94	Feb	14,923	407	8	1,500	510	10	12,956	392	8	-1,967	-15	0
3/94	Mar	14,466	612	8	1,500	510	10	12,498	629	8	-1,967	17	0
4/94	Apr	9,427	544	9	1,500	510	10	7,460	554	8	-1,967	10	0
5/94	May	8,738	577	9	1,500	510	10	6,770	598	9	-1,967	21	0
6/94	Jun	7,731	567	10	1,500	510	10	5,763	587	10	-1,967	21	0
7/94	Jul	7,578	576	10	1,500	510	10	5,610	601	10	-1,967	25	0
8/94	Aug	7,376	567	10	1,500	510	10	5,408	590	9	-1,967	23	0
9/94	Sep	7,331	564	10	1,500	510	10	5,364	585	10	-1,967	22	0
10/94	Oct	9,004	553	9	1,500	510	10	7,036	566	9	-1,967	13	0
11/94	Nov	10,638	516	9	1,500	510	10	8,671	518	9	-1,967	2	0
12/94	Dec	11,506	533	9	1,500	510	10	9,539	539	9	-1,967	6	0
1/95	Jan	55,734	306	5	1,500	510	10	53,767	298	4	-1,967	-7	0
2/95	Feb	25,655	327	7	1,500	510	10	23,688	313	6	-1,967	-15	0
3/95	Mar	116,185	171	4	1,500	510	10	114,218	165	4	-1,967	-6	0
4/95	Apr	22,239	388	8	1,500	510	10	20,272	377	7	-1,967	-11	0
5/95	May	19,027	422	7	1,500	510	10	17,059	412	7	-1,967	-10	0
6/95	Jun	13,904	496	9	1,500	510	10	11,936	494	9	-1,967	-2	0
7/95	Jul	8,850	569	9	1,500	510	10	6,883	587	8	-1,967	18	0
8/95	Aug	8,253	583	10	1,500	510	10	6,286	607	10	-1,967	24	0
9/95	Sep	7,870	590	10	1,500	510	10	5,902	618	10	-1,967	28	0
10/95	Oct	8,654	585	9	1,500	510	10	6,686	609	9	-1,967	24	0
11/95	Nov	8,868	579	9	1,500	510	10	6,901	600	8	-1,967	21	0
12/95	Dec	9,047	555	8	1,500	510	10	7,080	569	8	-1,967	14	0
1/96	Jan	13,175	505	9	1,500	510	10	11,208	506	9	-1,967	0	0
2/96	Feb	27,504	257	6	1,500	510	10	25,537	237	6	-1,967	-19	0
3/96	Mar	16,516	382	8	1,500	510	10	14,549	366	8	-1,967	-17	0
4/96	Apr	10,548	570	9	1,500	510	10	8,581	585	9	-1,967	15	0
5/96	May	10,359	596	9	1,500	510	10	8,392	617	9	-1,967	21	0
6/96	Jun	9,515	590	9	1,500	510	10	7,548	613	8	-1,967	22	0
7/96	Jul	9,268	582	9	1,500	510	10	7,301	602	8	-1,967	21	0
8/96	Aug	8,909	560	9	1,500	510	10	6,942	576	9	-1,967	16	0
9/96	Sep	9,356	524	9	1,500	510	10	7,388	529	9	-1,967	5	0
10/96	Oct	10,890	570	9	1,500	510	10	8,923	584	9	-1,967	14	0
11/96	Nov	16,349	558	8	1,500	510	10	14,382	565	8	-1,967	7	0
12/96	Dec	13,753	496	9	1,500	510	10	11,785	494	8	-1,967	-2	0
1/97	Jan	41,012	506	5	1,500	510	10	39,045	506	5	-1,967	0	0
2/97	Feb	11,191	563	10	1,500	510	10	9,224	575	10	-1,967	12	0
3/97	Mar	10,513	576	9	1,500	510	10	8,545	592	9	-1,967	16	0
4/97	Apr	10,486	579	9	1,500	510	10	8,518	596	9	-1,967	17	0
5/97	May	9,606	563	9	1,500	510	10	7,639	578	9	-1,967	15	0
6/97	Jun	9,326	575	10	1,500	510	10	7,359	594	10	-1,967	19	0
7/97	Jul	8,880	582	8	1,500	510	10	6,913	604	7	-1,967	22	-1
8/97	Aug	8,762	584	10	1,500	510	10	6,794	607	10	-1,967	23	0
9/97	Sep	9,134	578	10	1,500	510	10	7,167	597	10	-1,967	20	0
10/97	Oct	9,016	573	11	1,500	510	10	7,048	591	12	-1,967	19	0
11/97	Nov	10,779	480	9	1,500	510	10	8,812	474	9	-1,967	-6	0

Table 18a
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 8
18,000 acre-ft/yr Export of San Bernardino Effluent and Intermediate Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline			Alt 6						Difference		
		Total Discharge At Riverside Narrows			Recycled Water Export			Total Discharge At Riverside Narrows					
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
12/97	Dec	15,564	570	5	1,500	510	10	13,596	579	4	-1,967	9	-1
1/98	Jan	15,618	562	9	1,500	510	10	13,651	571	9	-1,967	8	0
2/98	Feb	77,548	225	4	1,500	510	10	75,581	217	4	-1,967	-7	0
3/98	Mar	19,861	497	8	1,500	510	10	17,893	496	7	-1,967	-1	0
4/98	Apr	23,583	403	6	1,500	510	10	21,616	394	6	-1,967	-9	0
5/98	May	37,933	278	3	1,500	510	10	35,966	265	3	-1,967	-12	0
6/98	Jun	16,641	432	6	1,500	510	10	14,674	422	6	-1,967	-10	0
7/98	Jul	10,024	564	9	1,500	510	10	8,056	578	9	-1,967	14	0
8/98	Aug	11,774	534	10	1,500	510	10	9,807	540	11	-1,967	6	0
9/98	Sep	11,371	487	9	1,500	510	10	9,403	484	9	-1,967	-4	0
10/98	Oct	9,998	561	10	1,500	510	10	8,030	574	10	-1,967	14	0
11/98	Nov	10,350	536	9	1,500	510	10	8,382	543	9	-1,967	7	0
12/98	Dec	10,464	560	9	1,500	510	10	8,497	572	9	-1,967	13	0
1/99	Jan	11,454	477	7	1,500	510	10	9,487	471	7	-1,967	-6	-1
2/99	Feb	10,952	552	8	1,500	510	10	8,984	562	8	-1,967	10	0
3/99	Mar	10,585	565	9	1,500	510	10	8,618	579	9	-1,967	14	0
4/99	Apr	11,680	498	9	1,500	510	10	9,713	497	9	-1,967	-1	0
5/99	May	9,609	600	10	1,500	510	10	7,641	625	10	-1,967	24	0
6/99	Jun	10,723	564	11	1,500	510	10	8,755	577	11	-1,967	13	0
7/99	Jul	9,791	526	10	1,500	510	10	7,824	531	10	-1,967	5	0
8/99	Aug	9,568	580	11	1,500	510	10	7,601	600	11	-1,967	19	0
9/99	Sep	9,091	580	12	1,500	510	10	7,123	600	12	-1,967	21	0
Average		15,284	519	8	1,500	510	10	13,317	528	8	-1,967	9	0
Max		118,232	612	12				116,265	629	12	-1,967	31	0
Min		7,212	171	3				5,244	165	2	-1,967	-19	-2
StDev		16,829	90	2				16,829	99	2	0	11	0
Coef of Var		110%	17%	24%				126%	19%	28%	0%	123%	-107%

Table 18b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 8
No Export of San Bernardino Effluent and Intermediate Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 6 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
10/89	Oct	33,103	599	8	25,770	610	7.2	-7,333	11	-0.6
11/89	Nov	34,537	589	9	27,204	598	8.3	-7,333	8	-0.3
12/89	Dec	35,563	604	9	28,230	615	8.4	-7,333	12	-0.3
1/90	Jan	40,128	575	9	32,795	578	8.5	-7,333	4	-0.2
2/90	Feb	49,942	523	7	42,608	517	6.4	-7,333	-6	-0.5
3/90	Mar	34,988	584	7	27,655	591	6.2	-7,333	7	-0.7
4/90	Apr	34,185	598	8	26,852	608	7.1	-7,333	11	-0.6
5/90	May	33,959	595	8	26,626	605	7.8	-7,333	10	-0.4
6/90	Jun	31,621	596	8	24,288	607	8.0	-7,333	11	-0.4
7/90	Jul	29,948	603	8	22,615	617	7.2	-7,333	14	-0.6
8/90	Aug	30,767	593	8	23,434	603	7.6	-7,333	11	-0.5
9/90	Sep	30,251	596	8	22,918	608	7.6	-7,333	12	-0.6
10/90	Oct	31,575	603	8	24,242	617	7.9	-7,333	13	-0.5
11/90	Nov	33,519	595	9	26,186	605	8.3	-7,333	10	-0.3
12/90	Dec	33,932	609	8	26,598	623	7.9	-7,333	14	-0.5
1/91	Jan	39,851	584	6	32,518	589	5.7	-7,333	6	-0.7
2/91	Feb	47,091	590	10	39,758	596	10.6	-7,333	6	0.1
3/91	Mar	91,223	400	5	83,890	386	4.9	-7,333	-14	-0.4
4/91	Apr	34,371	548	6	27,038	545	5.5	-7,333	-3	-0.9
5/91	May	33,399	568	8	26,066	570	7.8	-7,333	3	-0.4
6/91	Jun	32,531	595	8	25,198	605	7.2	-7,333	10	-0.5
7/91	Jul	30,590	591	8	23,257	601	7.6	-7,333	10	-0.5
8/91	Aug	30,145	586	8	22,812	595	7.7	-7,333	9	-0.6
9/91	Sep	29,494	586	8	22,161	595	7.6	-7,333	9	-0.6
10/91	Oct	29,927	592	8	22,594	603	7.4	-7,333	11	-0.6
11/91	Nov	32,384	606	8	25,051	619	7.8	-7,333	14	-0.4
12/91	Dec	36,323	593	9	28,990	602	8.4	-7,333	9	-0.3
1/92	Jan	42,577	544	9	35,244	540	9.1	-7,333	-3	-0.1
2/92	Feb	71,679	413	8	64,346	396	7.3	-7,333	-17	-0.3
3/92	Mar	65,301	479	9	57,968	469	8.7	-7,333	-10	-0.1
4/92	Apr	34,797	540	7	27,463	535	6.5	-7,333	-5	-0.8
5/92	May	33,642	600	8	26,309	612	7.8	-7,333	12	-0.5
6/92	Jun	31,266	600	8	23,933	612	7.9	-7,333	13	-0.5
7/92	Jul	30,966	600	9	23,633	613	8.6	-7,333	13	-0.4
8/92	Aug	30,630	576	9	23,297	581	8.8	-7,333	5	-0.3
9/92	Sep	30,322	597	9	22,989	610	8.9	-7,333	12	-0.3
10/92	Oct	32,946	612	9	25,613	627	8.4	-7,333	15	-0.3
11/92	Nov	32,933	604	8	25,600	617	7.9	-7,333	13	-0.4
12/92	Dec	56,641	494	7	49,308	484	6.7	-7,333	-10	-0.4
1/93	Jan	242,113	286	5	234,780	278	4.7	-7,333	-9	-0.2
2/93	Feb	169,889	366	6	162,556	357	5.9	-7,333	-9	-0.2
3/93	Mar	76,370	475	6	69,037	466	5.6	-7,333	-9	-0.4
4/93	Apr	54,504	518	7	47,171	512	7.1	-7,333	-6	-0.4
5/93	May	43,544	559	8	36,211	559	7.2	-7,333	0	-0.4
6/93	Jun	37,972	597	8	30,639	607	7.1	-7,333	9	-0.6
7/93	Jul	32,033	616	9	24,699	632	9.0	-7,333	17	-0.2
8/93	Aug	29,794	616	9	22,461	635	8.1	-7,333	19	-0.5
9/93	Sep	29,240	613	9	21,907	631	8.3	-7,333	18	-0.4
10/93	Oct	31,485	614	8	24,152	631	7.8	-7,333	17	-0.5
11/93	Nov	37,187	611	9	29,854	624	8.6	-7,333	13	-0.3

Table 18b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 8
No Export of San Bernardino Effluent and Intermediate Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 6 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
12/93	Dec	36,468	575	9	29,135	579	8.4	-7,333	4	-0.3
1/94	Jan	36,576	606	9	29,243	617	8.6	-7,333	12	-0.3
2/94	Feb	51,579	505	7	44,246	496	6.8	-7,333	-9	-0.4
3/94	Mar	46,486	630	8	39,153	643	7.9	-7,333	13	-0.3
4/94	Apr	36,085	606	8	28,752	618	7.7	-7,333	12	-0.5
5/94	May	33,877	609	8	26,544	622	7.2	-7,333	14	-0.6
6/94	Jun	30,782	609	7	23,449	624	6.6	-7,333	16	-0.8
7/94	Jul	30,015	610	8	22,682	626	7.3	-7,333	16	-0.7
8/94	Aug	29,125	601	9	21,792	616	8.1	-7,333	14	-0.5
9/94	Sep	29,527	598	9	22,194	611	8.2	-7,333	13	-0.5
10/94	Oct	32,531	595	9	25,198	605	8.6	-7,333	10	-0.3
11/94	Nov	33,724	601	9	26,391	613	9.3	-7,333	12	-0.1
12/94	Dec	35,170	609	9	27,837	622	8.6	-7,333	13	-0.3
1/95	Jan	129,180	389	6	121,847	379	6.3	-7,333	-10	-0.2
2/95	Feb	57,028	521	7	49,695	515	6.4	-7,333	-6	-0.4
3/95	Mar	164,743	357	5	157,410	348	5.0	-7,333	-9	-0.2
4/95	Apr	59,992	536	6	52,659	533	5.5	-7,333	-3	-0.5
5/95	May	47,497	570	7	40,164	572	6.2	-7,333	2	-0.6
6/95	Jun	42,977	563	7	35,643	564	6.2	-7,333	1	-0.6
7/95	Jul	30,009	587	8	22,676	597	7.1	-7,333	9	-0.7
8/95	Aug	30,682	610	9	23,349	626	8.5	-7,333	16	-0.4
9/95	Sep	30,655	607	9	23,322	622	8.2	-7,333	15	-0.5
10/95	Oct	31,821	603	9	24,488	616	8.4	-7,333	13	-0.4
11/95	Nov	33,153	605	9	25,820	618	8.6	-7,333	13	-0.3
12/95	Dec	35,466	581	9	28,133	587	8.8	-7,333	6	-0.2
1/96	Jan	39,242	598	9	31,909	607	9.3	-7,333	9	-0.1
2/96	Feb	74,040	405	6	66,707	388	5.7	-7,333	-17	-0.4
3/96	Mar	45,364	544	7	38,031	541	6.4	-7,333	-3	-0.6
4/96	Apr	35,871	625	9	28,538	642	8.2	-7,333	17	-0.4
5/96	May	34,025	633	9	26,692	653	9.3	-7,333	20	-0.2
6/96	Jun	31,666	618	9	24,333	636	9.2	-7,333	18	-0.2
7/96	Jul	30,519	621	9	23,186	641	9.0	-7,333	20	-0.2
8/96	Aug	31,331	603	9	23,997	617	9.2	-7,333	14	-0.2
9/96	Sep	31,509	597	9	24,176	608	9.2	-7,333	11	-0.2
10/96	Oct	33,915	601	10	26,582	612	9.5	-7,333	12	-0.1
11/96	Nov	41,974	549	6	34,641	547	5.3	-7,333	-2	-0.8
12/96	Dec	44,343	542	6	37,010	539	5.0	-7,333	-3	-0.8
1/97	Jan	73,408	424	5	66,075	409	4.2	-7,333	-15	-0.5
2/97	Feb	37,252	584	9	29,919	590	8.3	-7,333	6	-0.3
3/97	Mar	35,914	600	10	28,581	610	9.4	-7,333	10	-0.1
4/97	Apr	34,120	596	10	26,787	607	9.4	-7,333	10	-0.1
5/97	May	32,974	601	9	25,641	612	8.8	-7,333	12	-0.3
6/97	Jun	32,361	592	9	25,028	602	9.0	-7,333	10	-0.3
7/97	Jul	30,657	600	9	23,324	613	8.4	-7,333	13	-0.4
8/97	Aug	30,097	608	9	22,764	624	8.3	-7,333	16	-0.4
9/97	Sep	31,117	604	8	23,784	618	6.9	-7,333	14	-0.8
10/97	Oct	32,217	595	10	24,884	605	10.4	-7,333	11	0.0
11/97	Nov	37,330	563	8	29,997	564	7.2	-7,333	1	-0.5
12/97	Dec	48,055	508	5	40,722	499	3.9	-7,333	-9	-0.9
1/98	Jan	49,485	489	7	42,152	477	6.7	-7,333	-12	-0.5

Table 18b
Flow, TDS and TIN Impacts of Exporting Recycled Water From RIX
Year 2040 Alternative 8
No Export of San Bernardino Effluent and Intermediate Recycling at Other POTW's

Hydrologic Month and Year	Month	Baseline Total Discharge Below Prado Dam			Alternative 6 Total Discharge Below Prado Dam			Difference		
		Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)	Volume (af/m)	TDS (mg/L)	TIN (mg/L)
2/98	Feb	200,064	303	3	192,731	294	3.2	-7,333	-10	-0.2
3/98	Mar	59,744	501	6	52,411	493	5.5	-7,333	-8	-0.5
4/98	Apr	52,443	516	6	45,110	509	5.6	-7,333	-7	-0.6
5/98	May	78,601	415	5	71,268	401	4.1	-7,333	-15	-0.5
6/98	Jun	42,631	520	7	35,298	511	6.2	-7,333	-8	-0.6
7/98	Jul	33,209	590	8	25,876	598	7.1	-7,333	9	-0.6
8/98	Aug	33,926	587	9	26,593	595	9.2	-7,333	8	-0.2
9/98	Sep	34,013	586	9	26,680	593	8.7	-7,333	7	-0.3
10/98	Oct	34,000	599	9	26,667	610	8.7	-7,333	11	-0.3
11/98	Nov	36,171	595	8	28,838	604	8.1	-7,333	9	-0.4
12/98	Dec	36,671	612	10	29,338	626	9.4	-7,333	13	-0.1
1/99	Jan	40,882	573	9	33,549	576	8.7	-7,333	3	-0.2
2/99	Feb	37,563	576	9	30,229	580	8.8	-7,333	4	-0.2
3/99	Mar	36,492	571	9	29,158	574	9.2	-7,333	3	-0.2
4/99	Apr	39,795	568	8	32,462	570	7.9	-7,333	2	-0.4
5/99	May	35,454	604	9	28,121	616	8.4	-7,333	12	-0.4
6/99	Jun	33,606	605	10	26,273	619	9.3	-7,333	13	-0.2
7/99	Jul	32,862	598	9	25,528	610	8.9	-7,333	11	-0.3
8/99	Aug	31,340	597	9	24,007	609	9.1	-7,333	12	-0.3
9/99	Sep	31,229	597	9	23,896	608	9.1	-7,333	12	-0.3
Average		44,648	566	8.1	37,315	572	7.7	-7,333	6	-0.4
Max		242,113	633	10.5	234,780	653	10.6	-7,333	20	0.1
Min		29,125	286	3.4	21,792	278	3.2	-7,333	-17	-0.9
StDev		31,822	67	1.3	31,822	76	1.4	0.0	9.4	0.2
Coef of Var		71%	12%	16%	85%	13%	19%	0%	152%	-48%
					For August Data Only					
Average		30,784	598	8.8	23,451	610	8.5	-7,333	12	-0.4
Max		33,926	616	9.4	26,593	635	9.2	-7,333	19	-0.2
Min		29,125	576	8.1	21,792	581	7.6	-7,333	5	-0.6
StDev		1,296	12	0.5	1,296	17	0.6	0	4	0.1
Coef of Var		4%	2%	5%	6%	3%	7%	0%	34%	-35%

Table 18c
Annual Flow and TDS Impacts of Exporting Recycled Water from RIX
Year 2040 Alternative 8
18,000 acre-ft/yr Export of San Bernardino Effluent and Intermediate Recycling at Other POTW's

Water Year	Baseline Total Discharge Below Prado Dam				Alternative 6 Total Discharge Below Prado Dam				Difference			
	Annual Average		Five-year average		Annual Average		Five-year average		Annual Average		Five-year average	
	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)	Volume (af/yr)	TDS (mg/L)
89-90	418,993	585	491,783	542	330,997	592	403,786	538	-87,997	7	-87,997	-4
90-91	467,721	550	494,526	538	379,725	548	406,529	534	-87,997	-2	-87,997	-4
91-92	469,815	543	496,863	535	381,818	539	408,866	530	-87,997	-4	-87,997	-5
92-93	837,979	438	524,115	525	749,983	424	436,118	518	-87,997	-14	-87,997	-7
93-94	429,192	595	524,740	526	341,195	604	436,743	519	-87,997	9	-87,997	-7
94-95	694,189	487	579,779	508	606,192	477	491,782	499	-87,997	-10	-87,997	-9
95-96	454,007	569	577,036	511	366,011	571	489,040	502	-87,997	2	-87,997	-9
96-97	458,132	560	574,700	513	370,135	561	486,703	505	-87,997	0	-87,997	-8
97-98	701,719	457	547,448	522	613,722	443	459,451	515	-87,997	-15	-87,997	-7
98-99	426,064	591	546,822	521	338,067	599	458,825	514	-87,997	8	-87,997	-7
Average	535,781	537	535,781	524	447,784	536	447,784	518	-87,997	-2	-87,997	-7
Max	837,979	595	579,779	542	749,983	604	491,782	538	-87,997	9	-87,997	-4
Min	418,993	438	491,783	508	330,997	424	403,786	499	-87,997	-15	-87,997	-9
StDev	150,071	57	34,675	12	150,071	65	34,675	13	0	9	0	2
Coef of Var	28%	11%	6%	2%	34%	12%	8%	3%	0%	-497%	0%	-27%

Table 19
Summary of Discharge Changes
Average for the Ten-Year Time History

Alternatives	At the MWD Crossing				At below Prado Dam			
	2010	Difference	2040	Difference	2010	Difference	2040	Difference
Baseline	150,462		183,406		397,505		535,781	
Alternative 1 Maximum Export of San Bernardino Effluent and No Recycling at other POTW's	127,042	-23,419	138,136	-45,270	374,086	-23,419	490,511	-45,270
Alternative 2 Intermediate Export of San Bernardino Effluent and No Recycling at other POTW's	138,696	-11,766	160,771	-22,635	385,740	-11,766	513,146	-22,635
Alternative 3 -- Maximum Export of San Bernardino Effluent and Maximum Recycling by Other POTW's	120,319	-30,143	126,930	-56,476	291,251	-106,254	350,528	-185,253
Alternative 4 -- Intermediate Export of San Bernardino Effluent and Maximum Recycling by Other POTW's	131,973	-18,489	149,565	-33,841	302,905	-94,601	373,163	-162,618
Alternative 5 -- No Export of San Bernardino Effluent and Maximum Recycling by Other POTW's	143,739	-6,723	172,201	-11,205	314,670	-82,835	395,798	-139,983
Alternative 6 -- No Export of San Bernardino Effluent and Intermediate Recycling by Other POTW's	147,100	-3,362	177,803	-5,603	356,088	-41,417	465,790	-69,991
Alternative 7 -- 18,000 acre-ft/yr Export of San Bernardino Effluent and Maximum Recycling by Other POTW's	125,733	-24,729	154,195	-29,211	0	-397,505	0	-535,781
Alternative 8-- 18,000 acre-ft/yr Export of San Bernardino Effluent and Intermediate Recycling by Other POTW's	129,095	-21,367	159,798	-23,608	256,309	-141,197	366,011	-169,771

Table 20
Summary of TDS Impacts
Average for the Ten-Year Time History

Alternatives	At the MWD Crossing				At below Prado Dam			
	2010	Difference	2040	Difference	2010	Difference	2040	Difference
Baseline	534		519		539		537	
Alternative 1 Maximum Export of San Bernardino Effluent and No Recycling at other POTW's	557	22	541	22	542	3	541	4
Alternative 2 Intermediate Export of San Bernardino Effluent and No Recycling at other POTW's	543	9	527	8	541	2	539	2
Alternative 3 -- Maximum Export of San Bernardino Effluent and Maximum Recycling by Other POTW's	570	36	557	38	538	-1	536	-2
Alternative 4 -- Intermediate Export of San Bernardino Effluent and Maximum Recycling by Other POTW's	552	18	535	16	535	-4	532	-5
Alternative 5 -- No Export of San Bernardino Effluent and Maximum Recycling by Other POTW's	540	6	524	5	533	-6	530	-8
Alternative 6 -- No Export of San Bernardino Effluent and Intermediate Recycling by Other POTW's	537	3	522	2	536	-3	534	-3
Alternative 7 -- 18,000 acre-ft/yr Export San Bernardino Effluent and Maximum Recycling by Other POTW's	561	26	532	13	536	-3	532	-6
Alternative 8 -- 18,000 acre-ft/yr Export San Bernardino Effluent and Intermediate Recycling by Other POTW's	555	20	528	9	539	0	536	-2

Table 21
Summary of TDS Metrics
At *Below Prado Dam*

Alternatives	Reach 3 Metric -- August Only[1]				Reach 2 Metric -- Five-Year Average[2]			
	2010	Difference	2040	Difference	2010	Difference	2040	Difference
Baseline	628		598		516		524	
Alternative 1 Maximum Export of San Bernardino Effluent and No Recycling at other POTW's	642	13	610	12	517	0	526	1
Alternative 2 Intermediate Export of San Bernardino Effluent and No Recycling at other POTW's	635	6	610	12	517	0	525	1
Alternative 3 -- Maximum Export of San Bernardino Effluent and Maximum Recycling by Other POTW's	682	54	640	42	499	-18	508	-17
Alternative 4 -- Intermediate Export of San Bernardino Effluent and Maximum Recycling by Other POTW's	667	39	626	28	499	-17	508	-17
Alternative 5 -- No Export of San Bernardino Effluent and Maximum Recycling by Other POTW's	655	26	614	16	499	-17	508	-17
Alternative 6 -- No Export of San Bernardino Effluent and Intermediate Recycling by Other POTW's	638	10	604	6	509	-8	517	-7
Alternative 7 -- 18,000 acre-ft/yr Export San Bernardino Effluent and Maximum Recycling by Other POTW's	675	47	623	25	499	-18	508	-17
Alternative 8-- 18,000 acre-ft/yr Export San Bernardino Effluent and Intermediate Recycling by Other POTW's	652	24	610	12	509	-8	518	-7

Note [1] -- Reach 3 objective is 700 mg/L; [2] -- Reach 2 objective is 650 mg/L

Table 22
Summary of TIN Impacts
Average for the Ten-Year Time History

Alternatives	At the MWD Crossing				At below Prado Dam			
	2010	Difference	2040	Difference	2010	Difference	2040	Difference
Baseline	7.5		8.0		7.3		8.1	
Alternative 1 Maximum Export of San Bernardino Effluent and No Recycling at other POTW's	6.8	-0.7	7.2	-0.9	7.3	-0.1	8.0	-0.1
Alternative 2 Intermediate Export of San Bernardino Effluent and No Recycling at other POTW's	7.2	-0.3	7.7	-0.3	7.3	-0.1	8.0	-0.1
Alternative 3 -- Maximum Export of San Bernardino Effluent and Maximum Recycling by Other POTW's	6.6	-0.9	6.8	-1.2	6.8	-0.5	7.2	-0.9
Alternative 4 -- Intermediate Export of San Bernardino Effluent and Maximum Recycling by Other POTW's	7.0	-0.5	7.5	-0.6	6.7	-0.6	7.1	-0.9
Alternative 5 -- No Export of San Bernardino Effluent and Maximum Recycling by Other POTW's	7.3	-0.2	7.9	-0.1	6.6	-0.7	7.3	-0.8
Alternative 6 -- No Export of San Bernardino Effluent and Intermediate Recycling by Other POTW's	7.4	-0.1	8.0	-0.1	7.0	-0.3	7.7	-0.3
Alternative 7 -- 18,000 acre-ft/yr Export of San Bernardino Effluent and Maximum Recycling by Other POTW's	6.8	-0.7	7.6	-0.5	6.7	-0.6	7.2	-0.9
Alternative 8 -- 18,000 acre-ft/yr Export of San Bernardino Effluent and Intermediate Recycling by Other POTW's	6.9	-0.6	7.7	-0.4	7.1	-0.2	7.7	-0.4

Table 23
Summary of TIN Metric
At *Below Prado Dam*

Alternatives	------- Reach 3 Metric -- August Only[1] -------			
	2010	Difference	2040	Difference
Baseline	8.1		8.8	
Alternative 1 Maximum Export of San Bernardino Effluent and No Recycling at other POTW's	8.2	0.1	8.7	-0.2
Alternative 2 Intermediate Export of San Bernardino Effluent and No Recycling at other POTW's	8.1	0.0	8.8	-0.1
Alternative 3 -- Maximum Export of San Bernardino Effluent and Maximum Recycling by Other POTW's	8.1	0.0	8.3	-0.6
Alternative 4 -- Intermediate Export of San Bernardino Effluent and Maximum Recycling by Other POTW's	7.8	-0.3	8.0	-0.8
Alternative 5 -- No Export of San Bernardino Effluent and Maximum Recycling by Other POTW's	7.7	-0.4	8.1	-0.8
Alternative 6 -- No Export of San Bernardino Effluent and Intermediate Recycling by Other POTW's	8.0	-0.2	8.6	-0.3
Alternative 7 -- 18,000 acre-ft/yr Export of San Bernardino Effluent and Maximum Recycling by Other POTW's	8.0	-0.1	8.0	-0.8
Alternative 8 -- 18,000 acre-ft/yr Export of San Bernardino Effluent and Intermediate Recycling by Other POTW's	8.2	0.1	8.5	-0.4

Note [1] -- Reach 3 objective is 10 mg/L

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Figure 2 Monthly Average TDS and TIN Concentrations at RIX

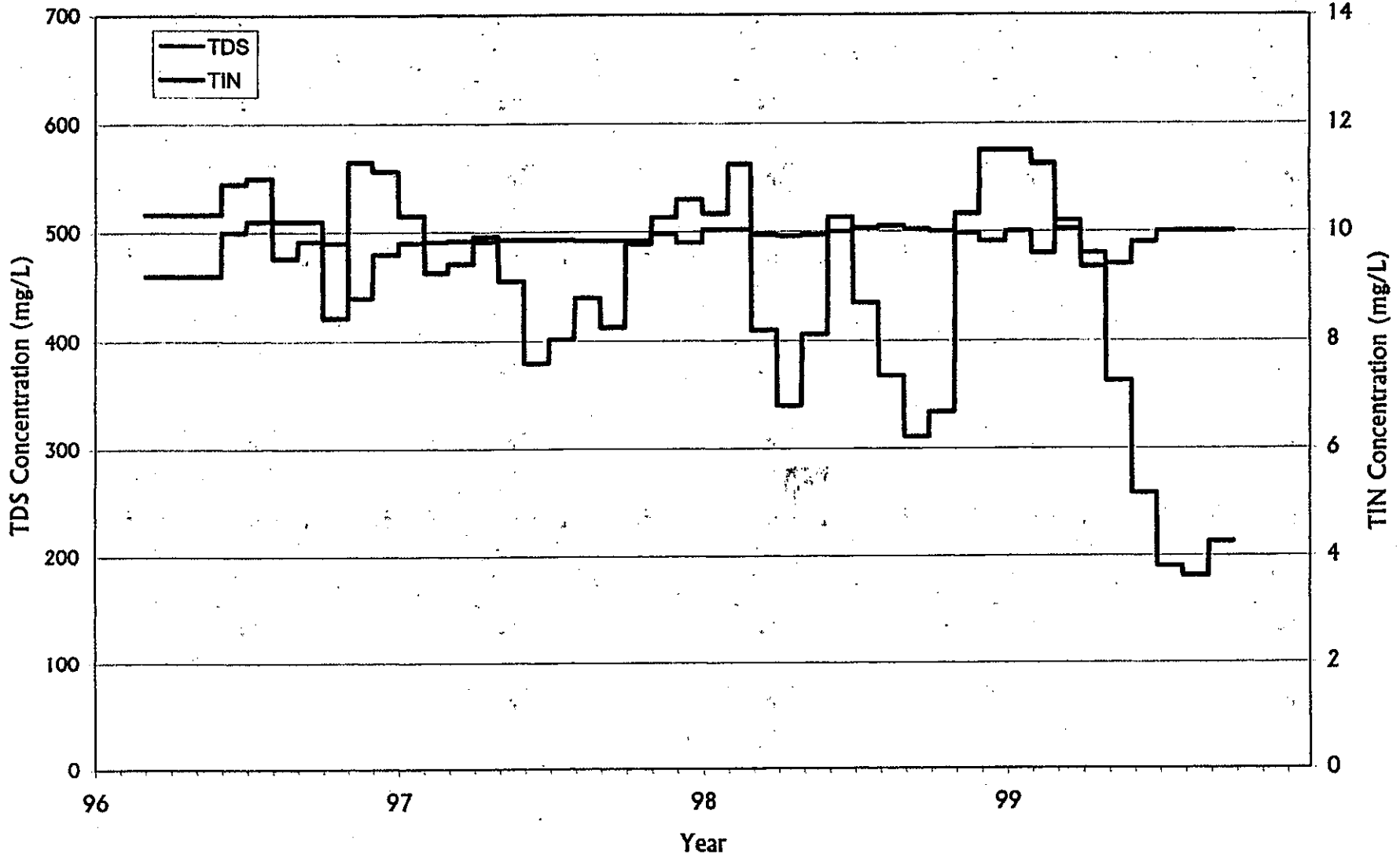

Figure 2 -- Chart1
03/18/2001

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Figure 3 Storm Water Discharge Time History for the Santa Ana River Below Prado Dam

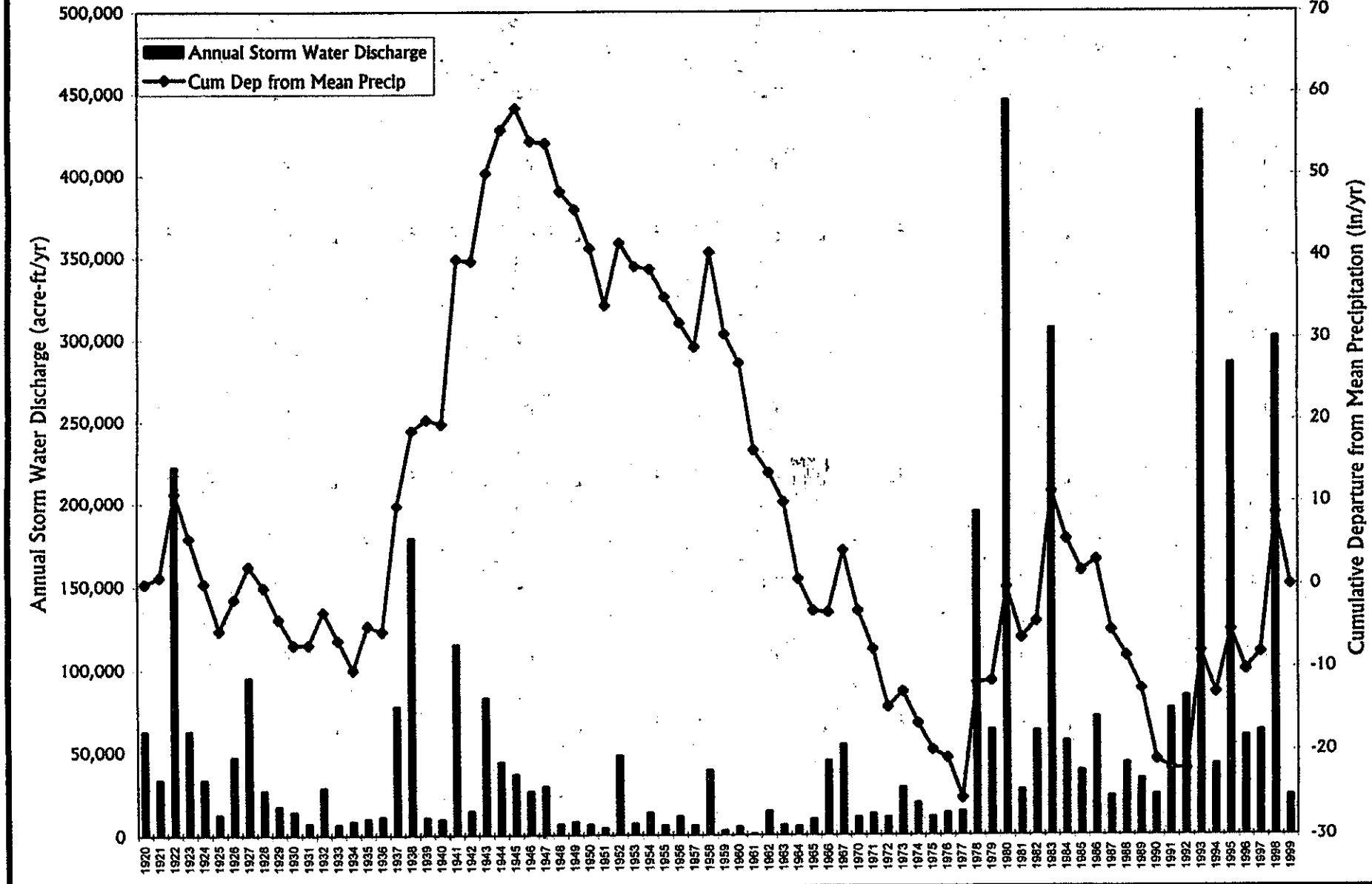


Figure 3 ADFM for Prado -- Chart1
03/18/2001

Wildermuth Environmental

Figure 4 Double Mass Curve of Rainfall at San Bernardino vs Storm Water Measured below Prado Dam

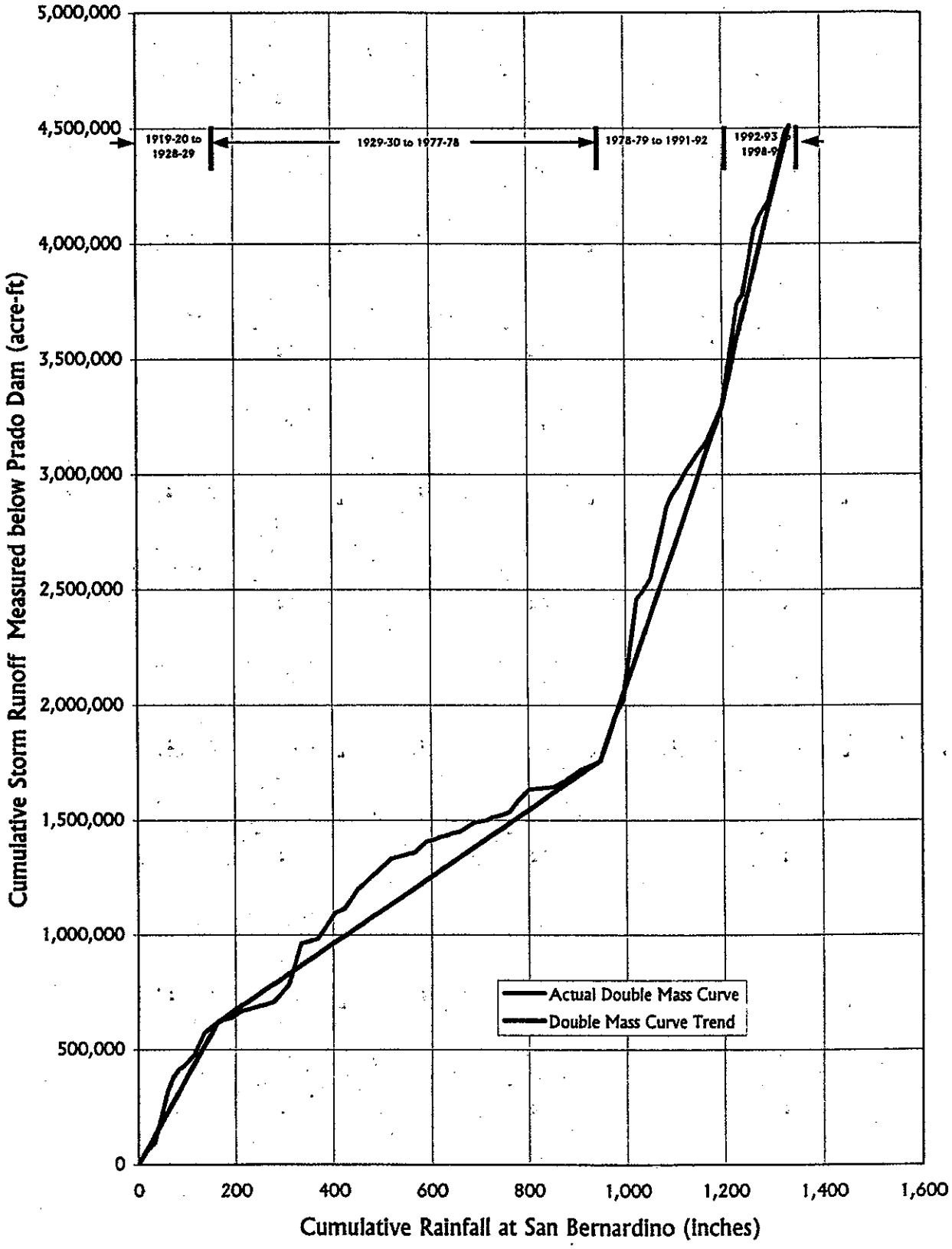
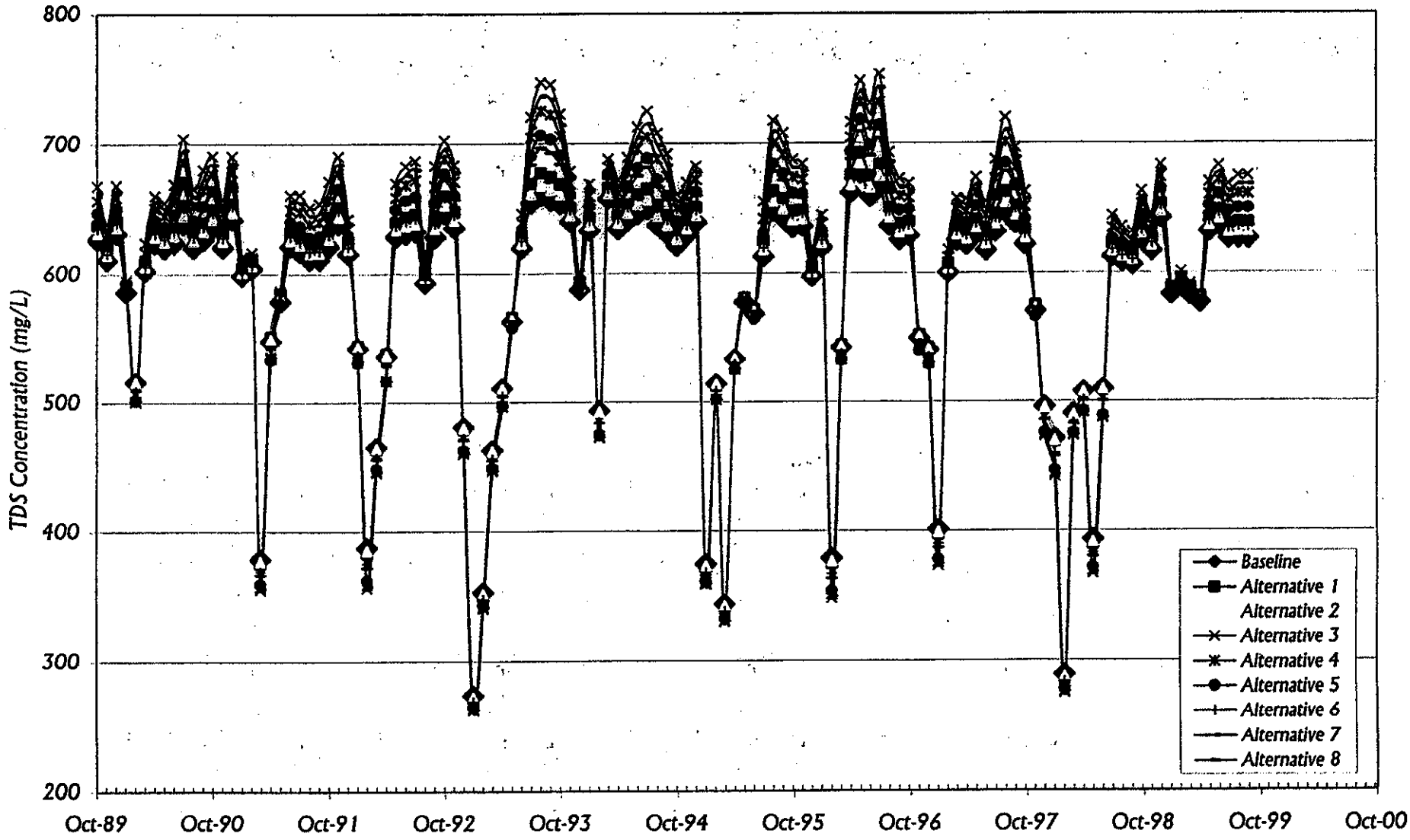


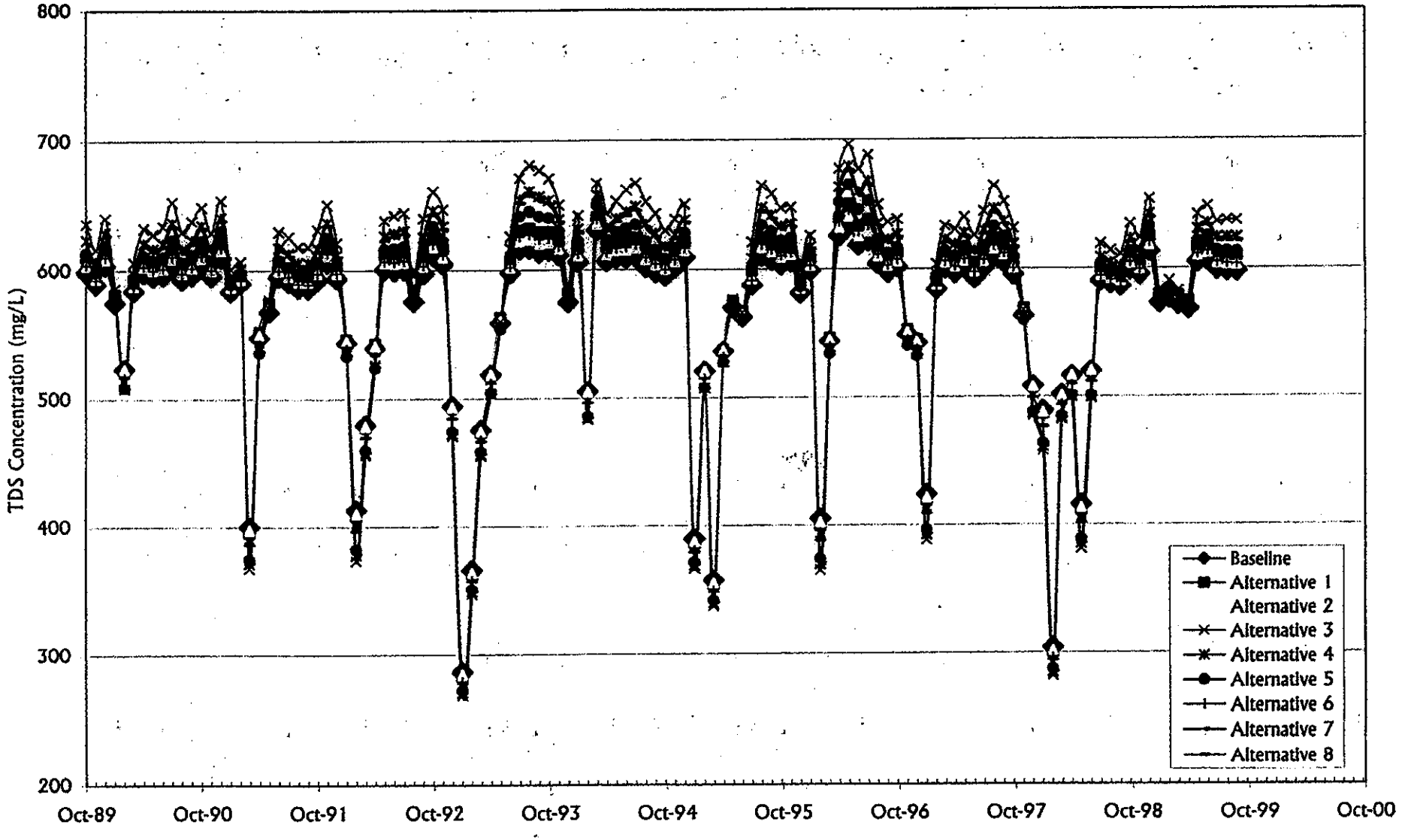
Figure 5 Comparison of TDS Concentration Time Series at 2010 at Below Prado Dam



Alt-Prado01302001 -- Chart 2010 TDS
03/18/2001

Wildermuth Environmental

Figure 6 Comparison of TDS Concentration Time Series at 2040 at *Below Prado Dam*



Alt-Prado01302001 -- Chart 2040 TDS

Wildermuth Environmental

Figure 7 Comparison of Reach 2 TDS Metrics at 2010

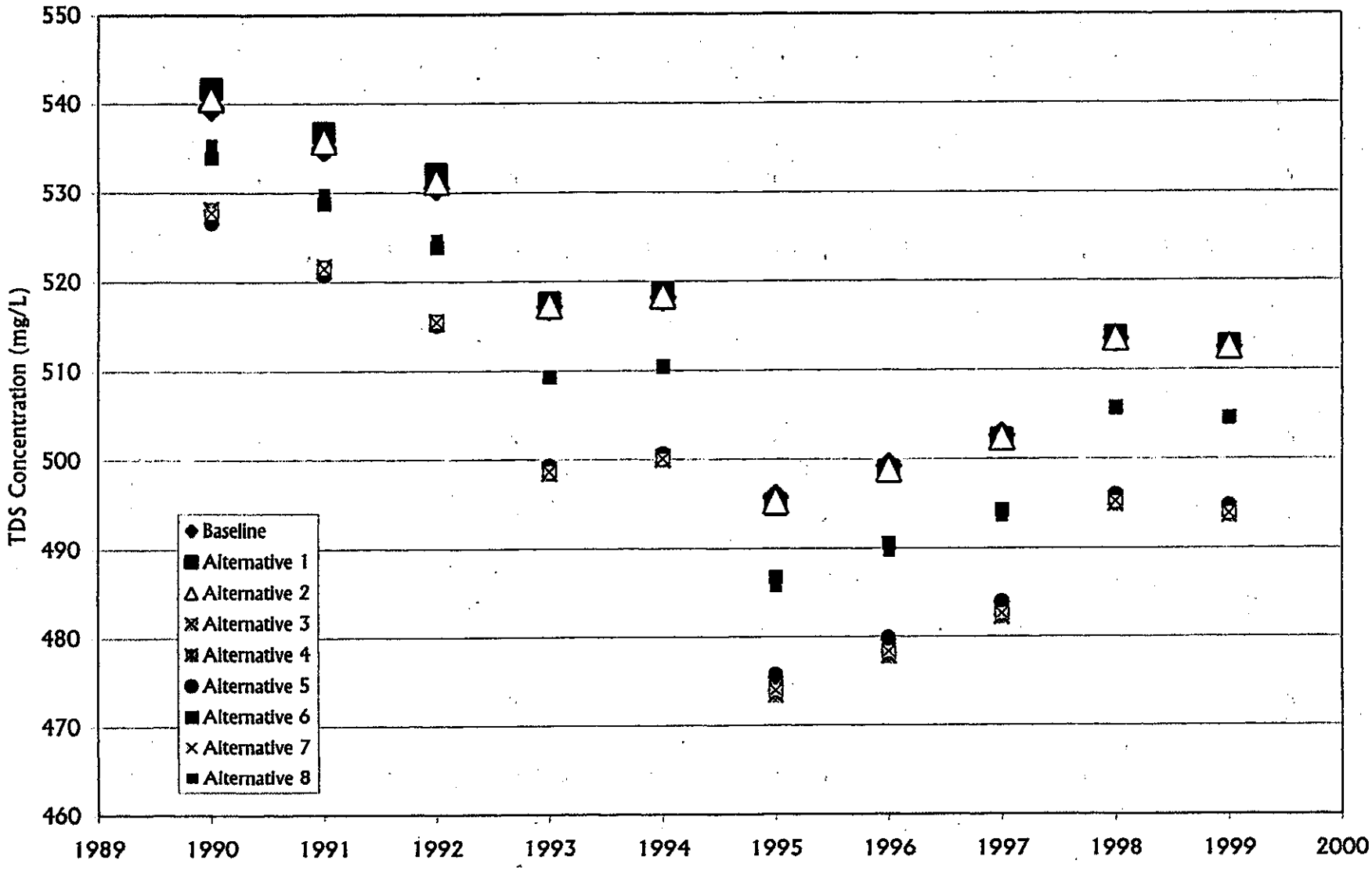


Figure 8 Comparison of Reach 2 TDS Metrics at 2040

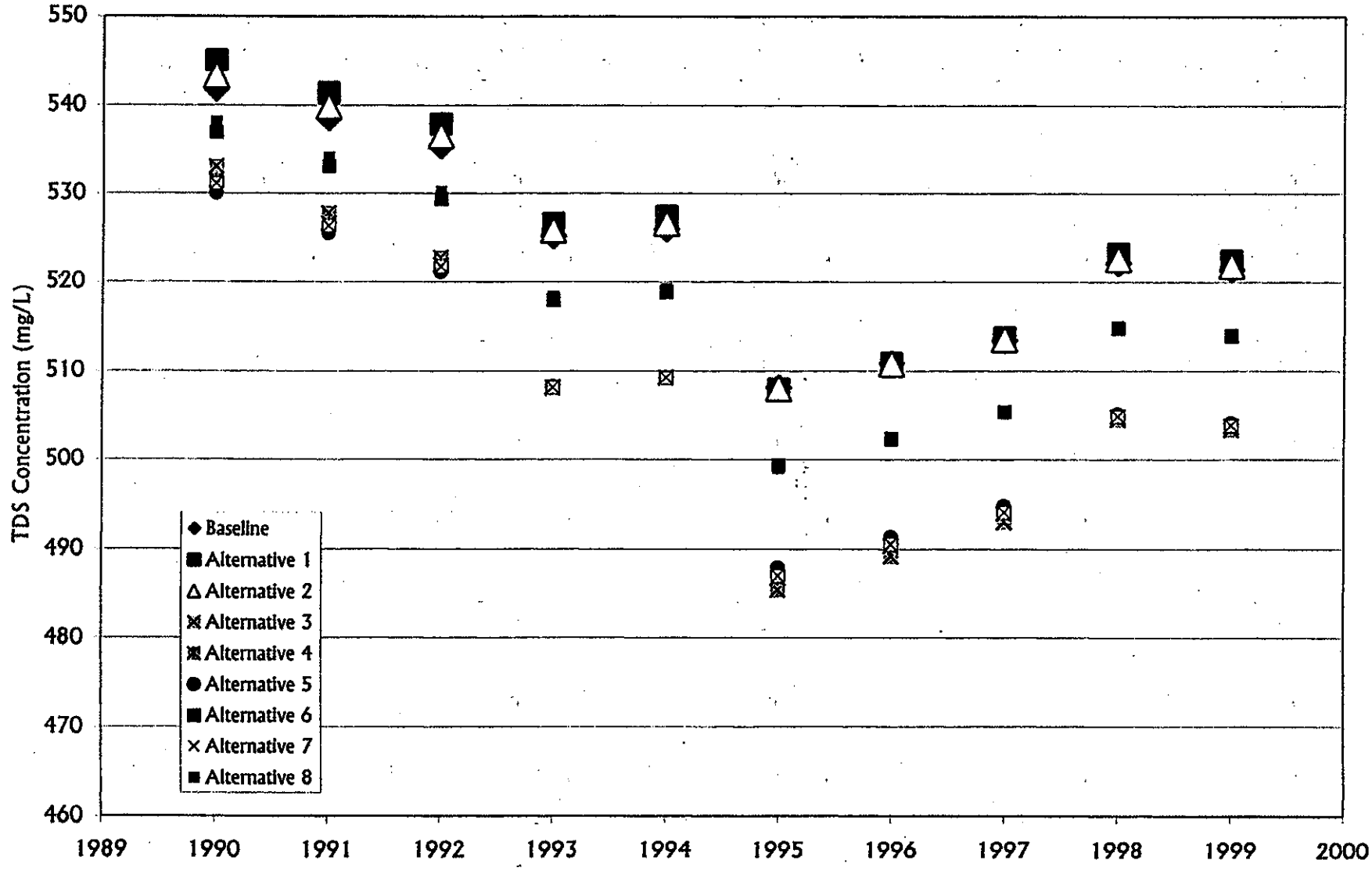
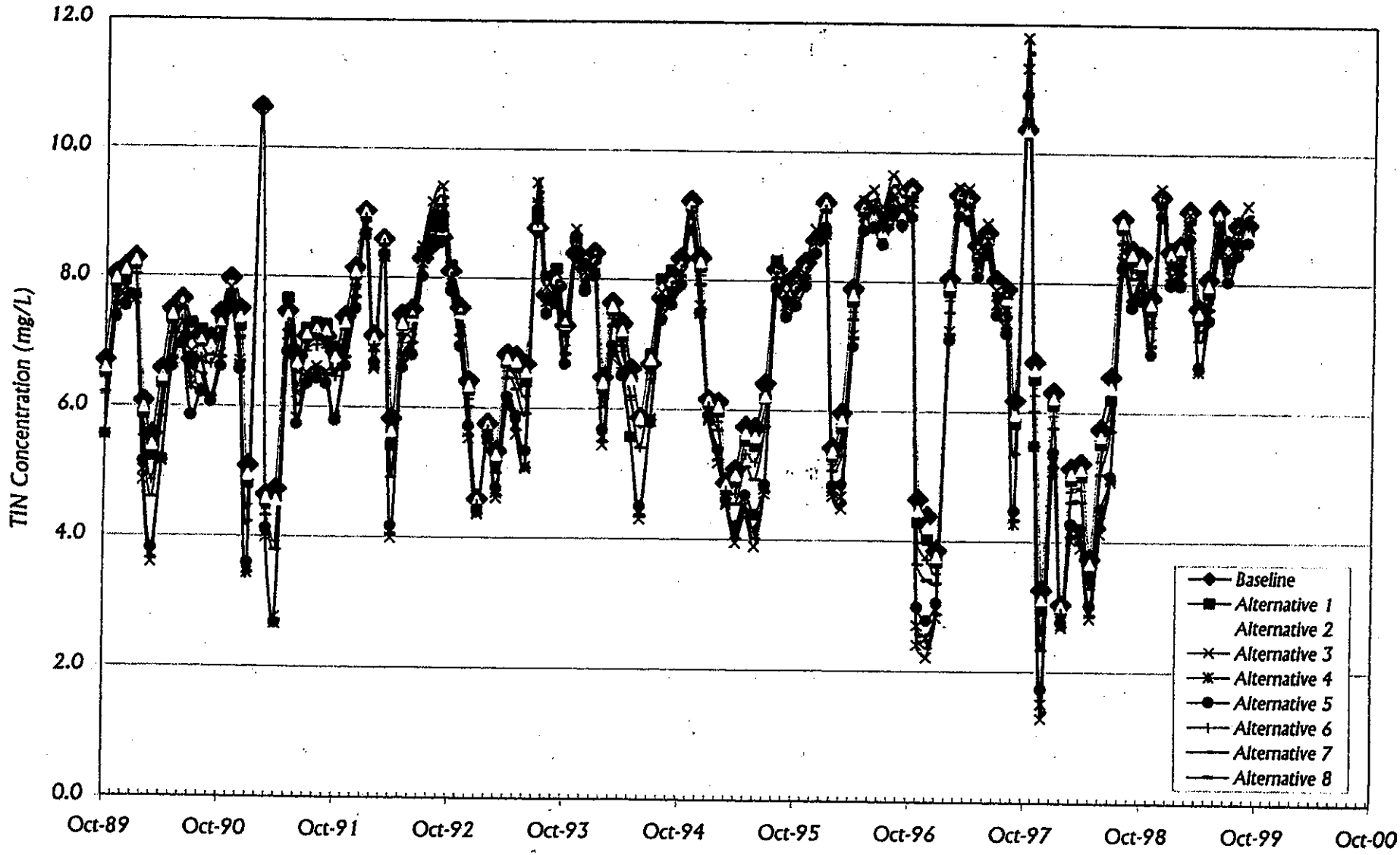


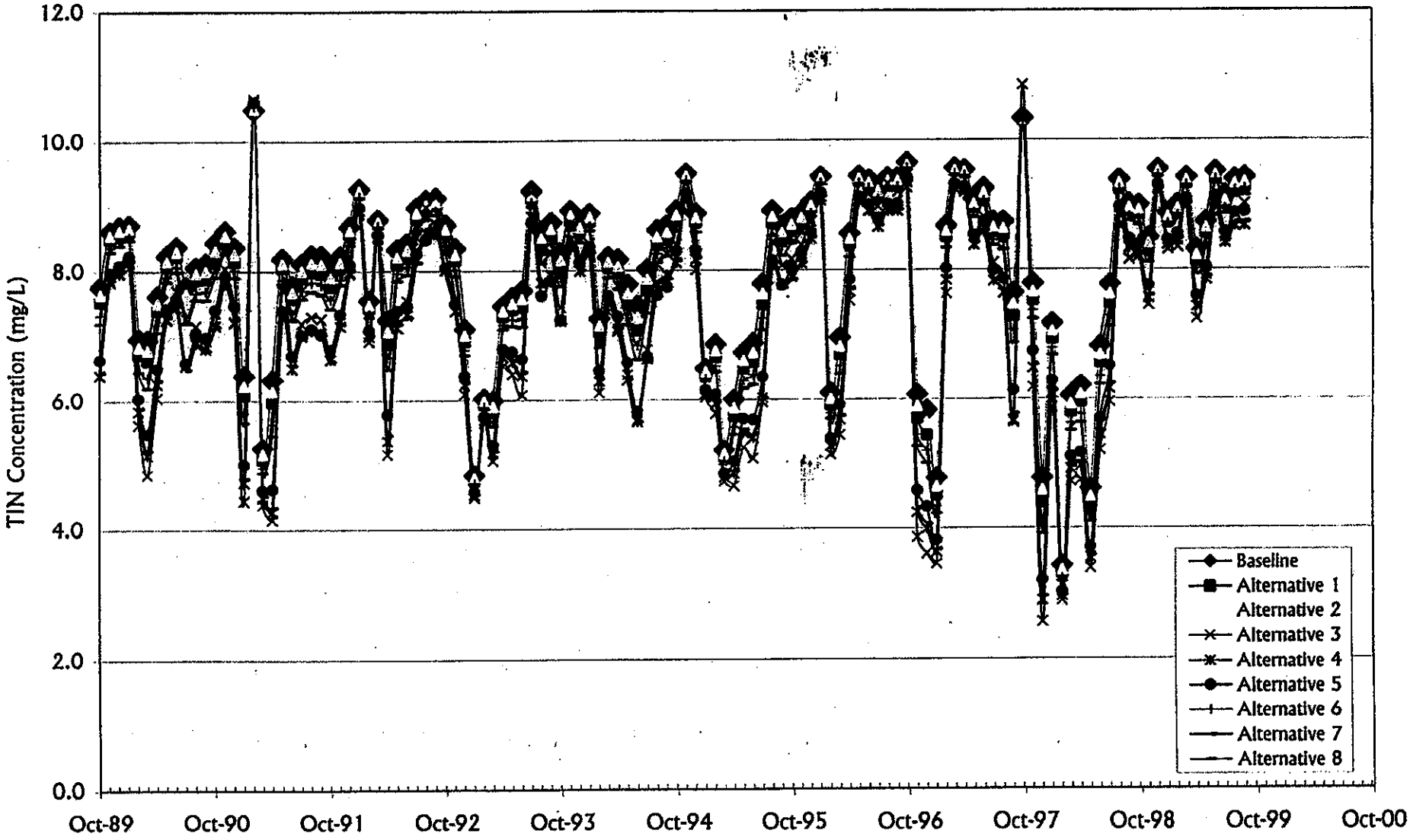
Figure 9 Comparison of TIN Concentration Time Series at 2010 at Below Prado Dam



Alt-Prado01302001 -- Fig 9 Chart 2010 TIN
03/19/2001

Wildermuth Environmental

Figure 10 Comparison of TIN Concentration Time Series at 2040 at *Below Prado Dam*



Alt-Prado01302001 -- Fig 10 Chart 2040 TIN
03/19/2001

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APPENDIX B

SANTA ANA RIVER RIPARIAN VEGETATION ASSESSMENT

SANTA ANA RIVER RIPARIAN VEGETATION ASSESSMENT DOWNSTREAM OF THE RIX TREATMENT FACILITY

August 2000
Reconnaissance Survey

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SANTA ANA RIVER RIPARIAN VEGETATION ASSESSMENT DOWNSTREAM OF THE RIX TREATMENT FACILITY

1.0 INTRODUCTION

The Santa Ana Watershed Project Authority (SAWPA) constructed a regional tertiary wastewater treatment facility to process secondary treated effluent from the San Bernardino and Colton Water Reclamation Plants. The RIX (Rapid Infiltration and Extraction) facility offers tertiary treatment of secondary effluent through the implementation of a rapid infiltration and extraction process that uses natural soils in infiltration basins. The facility is located about 0.5 mile east of Riverside Avenue on Agua Mansa Road, on the north side of the Santa Ana River, in San Bernardino County, California. The RIX facility is about six miles downriver of the San Bernardino Water Reclamation Plant (located near the northeast corner of the Interstate 10 – Interstate 215 interchange) and about two miles downriver of the Colton Water Reclamation Plant (located just west of La Cadena Road). The facility went operational on 21 March 1996, and was designed to treat and discharge up to 40 million gallons per day (MGD).

The City of San Bernardino is considering providing reclaimed water from the RIX facility to a private water wholesaler. The City's agreement with the wholesaler would result in the delivery of 18,000 acre-feet of reclaimed water per year. This would reduce the discharge of the RIX facility by 50 percent, which may have a negative impact to the riparian environment downstream of the facility. That amount of discharge reduction may potentially change the river from a perennial to an intermittent flowing stream south of the RIX facility, thereby affecting the riparian vegetation and associated organisms in the river channel.

2.0 MATERIALS AND METHODS

On 28 July 2000, biologists from MBC Applied Environmental Sciences (MBC), assisted by Mr. Alan Romspert, conducted a reconnaissance riparian vegetation survey in the river, in a three-mile stretch between the RIX facility discharge and the 60 Freeway overpass. Four study transects were established in the three-mile stretch (approximately one mile between each transect). The transects were set up perpendicular to the flow of water, extending from one bank to the bank on the opposite side of the river. The first transect was at the RIX facility discharge and included the area where the discharge joined the Santa Ana River. The second transect was at the Riverside Avenue Bridge overpass, the third was half-way between the Riverside Avenue and Market Street Bridge overpasses, and the fourth transect was at the 60 Freeway Bridge overpass. Vegetation along each transect was identified and the substrate in which the vegetation occurred was recorded. While traveling from one transect to the next, any additional plant species were noted. Voucher specimens of atypical, new, or unfamiliar plants were taken. Incidental wildlife, including birds, mammals, amphibians, and insects, as well as potential habitat for least Bell's vireo (*Vireo bellii pusillus*), a federal- and state-listed endangered species, was noted. Mr. Romspert, a recognized expert in riparian vegetation, made identifications of plant species. Common and scientific names of plants and wildlife were determined to the lowest possible taxonomic level.

3.0 RESULTS

Skies were clear on 28 July 2000. At the beginning of the survey (0800 hrs PST), air temperature was in the mid 70's (°F), increasing to the mid 90's by the end of the survey (1400 hrs PST).

During the survey, 90 species of plants were identified (Appendix A). Thirty-five of these were observed at all four transects, and the most conspicuous of these were mule fat, Freemont cottonwood, willows, and giant reed. Very little of the willow woodland consisted of pure stands of native species. Giant reed and tree tobacco occurred with willows and young Fremont cottonwood in the riverbed, while higher on the banks, castor bean and Eucalyptus occurred with willows,

subsequent slow release during summer result in continual flow in some stretches of the river which, under natural conditions, would be dry in summer (Bowler 1989). In addition, there is year round input from various dischargers, such as wastewater treatment facilities. In some areas, ground water naturally occurs near the surface, providing a year round source of water. Northwest of the I 10/I 215 Freeway interchange, the river crosses over the northwest southeast trending San Jacinto Fault, which forms a barrier to ground water, forcing water to the surface (Sharp 1976).

In addition to variation in precipitation from winter to summer, precipitation is also extremely variable from year to year, subjecting riparian vegetation to drought, flooding, scouring and deposition. Flooding, although infrequent, can be severe because of the large size and high elevation of the Santa Ana River watershed. Storms in 1938, 1962, and 1969 tore out vast stands of woodland vegetation (Minnich 1976). For the past 12 years, yearly rainfall for the San Bernardino area averaged 16.68 inches and ranged from a low of 5.73 inches in 1998-1999 to a high of 33.32 inches in 1997-1998, considered to be an El Niño-Southern Oscillation (ENSO) period (MBC 2000). Rainfall was also low in 1989-1990 (9.05 inches) and high in 1992-1993 (31.15 inches). Mean flow rate and yearly flow volume in the river (at the E Street overpass in San Bernardino) averaged 89 cubic feet per second (cfs) and 64,115 acre feet, respectively, during the previous 12 years, and ranged from 26 cfs and 15,889 acre feet, respectively, in 1998-1999 to 294 cfs and 211,684 acre feet, respectively, in 1992-1993 (MBC 2000). Flow was also substantial in 1994-1995 (an average of 212 cfs and a total of 153,918 acre feet).

Since March 1996, when the RIX facility went operational, water flow was greatly reduced between the San Bernardino Reclamation Plant and the RIX facility. Annual surveys conducted by MBC since that time have shown a small decline in willow woodland vegetation due to cessation of the effluent discharge by the Colton and San Bernardino treatment plants (MBC 1997, 1998, 1999, 2000).

From the information gathered in this survey, the area downriver of the RIX facility appears to closely resemble the state of the river between the San Bernardino treatment plant and the RIX facility as seen in December 1995 (MBC 1996). At that time, the water from the Colton and San Bernardino treatment plants was still being discharged from those facilities into the Santa Ana River, upriver of the RIX facility. It is likely that the effects observed in the stretch of river affected by diversion of discharge to the RIX facility after March 1996 will also occur downriver of the facility if water flow is reduced there. Therefore, the surveys conducted by MBC since 1996 can serve as a basis for any potential decrease in vegetation if reclaimed water from the RIX facility is diverted.

MBC (2000) reported that willow woodland vegetation declined about 14%, while low wetland vegetation declined 8% upriver of the RIX facility. These declines appear to be related to the absence of surface water. Although declines occurred throughout the study area, (the period from 1996 to 2000 experienced lower than average rainfall) comparison of sections with and without surface water found that the average amount of decline of both vegetation types was greater in sections without surface water (declines of 58% and 97% in willow woodland and low wetland, respectively, since December 1995 in sections without water, compared with declines of 5% and 55%, respectively, in sections with surface water). However, the difference in the amount of decline between sections with and without water was significant only for willow woodland. It is reasonable that a similar effect would be seen downstream of the RIX facility if cessation of discharge waters occurs from this point. The apparent effect of absence of water is probably similar for low wetland vegetation, but other factors, such as human disturbance of the riverbed, could obscure any observed result.

The presence/absence of surface water showed greater influence on vegetation than did the presence / absence of treatment plant discharge (MBC 2000). Furthermore, this influence appears to be greater on willow woodland than on low wetland vegetation, which is probably affected more by flooding and human disturbances in the riverbed.

Scouring due to flooding during the 1998-1999 winter season was not apparent during the March 1999 survey (MBC 2000). This observation coincides with the low precipitation and river flow for that year. The vegetation appears to have recovered from the flooding events of 1997. Willow woodland vegetation increased by 17% over the previous year, and low wetland vegetation increased more than 120%.

Riparian plant species are adapted to a regime of variable precipitation and disturbance through several means. For example, rapid growth rates, production of abundant seeds, dispersal of seeds to coincide with seasonal receding water levels, germination of seeds on exposed, recently deposited alluvium (where little competition occurs), production of root shoots for rapid regeneration, and adventitious roots (formed along the lower trunk) to tolerate water saturated soils (Faber *et al.* 1989).

The riparian community is transitional, forming an ecotone, a zone of overlap between two different communities (in this case, land and water) which shares the characteristics of both (Schoenherr 1992). Riparian zones are elongate with a high edge-to-area ratio, and typically exhibit the "edge effect", with greater density and diversity of species than in the adjacent uplands (Odum 1978, Bowler 1989). Along the study area, the Santa Ana River riparian community intergrades with coastal chaparral and coastal sage scrub (Faber *et al.* 1989). Wildlife in these uplands habitats use the riparian zone as a corridor and as access to water. An undisturbed riparian community is diverse and productive, and may be very dense. The trees and large shrubs are deciduous (drop their leaves in winter), typical of species which have abundant water but undergo yearly extremes in temperature.

The riparian community can be divided into three zones – (1) An active zone closest to the stream that is most subject to disturbance from winter flood damage, which is characterized by willow and cottonwood. (2) A border zone that is less subject to disruption but has a reliable water supply, which is characterized by larger trees of willow and cottonwood and a well developed understory with considerable plant diversity. And (3) an outer zone on higher terraces that are only occasionally subjected to flooding but where trees such as sycamore take advantage of the higher water tables found adjacent to streams and grow to very large size (Faber *et al.* 1989). The vegetation of the Santa Ana River clearly shows all three zones, though not in all regions. Where the river is constrained by high levees and metropolitan encroachment, the outer zone is void of native riparian vegetation. The three zones are most representative in the half mile stretch just downriver of the Colton Landfill, bracketing the RIX facility discharge.

In the Santa Ana River, a small number of species accounts for most of the plant cover. All of the woodland dominants spread by root shoots or by seed. Most of the dominant species have seeds with wings (ash) or plumes (willows, cottonwoods, mule fat) to enhance wind dispersal (Schoenherr 1992). Willows and cottonwoods are classic pioneers whose seeds establish almost exclusively on recently deposited alluvium (Strahan 1981). Willows are fast growing and require permanent water. Sycamores and blue elderberries, found on the Santa Ana River levees, tolerate drier conditions and spread by seed.

5.0 SUMMARY AND CONCLUSION

The three-mile stretch of riverbed downriver of the RIX facility closely resembles the study area upriver of RIX discussed in past surveys of the Santa Ana River in San Bernardino County by MBC (1996, 1997, 1998, 1999, 2000). For that reason, those past surveys can serve to roughly predict the environmental effects that may occur if discharge waters are diverted from RIX. In the 2000 report (MBC 2000), coverage by willow woodland and low wetland vegetation declined 14% and 8%, respectively, since December 1995, just prior to cessation of discharge from the San Bernardino and Colton treatment plants in early 1996. This follows declines of 7% and 56%, respectively, between December 1995 and March 1997, and 22% and 69%, respectively, between December

1995 and March 1998. It is likely that similar reductions in vegetation coverage would occur with the diversion of RIX discharge waters.

Reduction in coverage by willow woodland vegetation and low wetland vegetation between San Bernardino and the RIX facility appeared to be related to the cessation of discharges from the San Bernardino and Colton treatment plants (MBC 2000). However, this reduction is more consistent with the absence of surface water in the riverbed. Prior to cessation of the discharges, surface water occurred along the entire stretch of the river in the study area. Following cessation of the discharges, surface water was absent in some, but not all, sections of the stretch between San Bernardino and RIX. Surface water in this stretch derives from other inputs, such as the flood control channel immediately upriver and Warm Creek a short distance downriver of the San Bernardino plant. Downriver of La Cadena, water in the river may be a combination of ground water at the surface and ground seepage from the hills to the south.

In summary, the diversions of effluent waters from the RIX facility will likely result in a small decline in willow woodland vegetation as was described in the 2000 report by MBC. However, this decline will probably be minor compared to the decline throughout the river due to flooding and scouring during high river flow following major precipitation events, as occurred in winter 1997-1998. The resulting regime of low flow, except in winter, would more closely approximate conditions in the river before water was diverted and stored upstream to be returned at a more constant rate via municipal and agricultural discharges.

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California. April 1998. Prepared for Colton/San Bernardino Regional Tertiary Treatment and Water Reclamation Authority, 300 North "D" Street, San Bernardino, California.

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APPENDIX A

Transect Locations:

RIX inflow and the Santa Ana Riverbed	(I)
Riverside Ave. Bridge and the Santa Ana Riverbed	(II)
Half way between Riverside Ave. & Market St. Bridges	(III)
60 Freeway Bridge & Santa Ana Riverbed	(IV)

Three (3) substrate conditions occur in the riverbed:

Stream and stream edges	(A)
Moist/High subsurface water table	(M)
Dry sandy flats	(X)

Voucher specimens were collected of unusual, new, or unfamiliar plants (v)

* Indicates non-native plants

PLANT SPECIES FOUND ON PREVIOUS MBC (1999, 2000) SURVEYS UP RIVERBED NOT FOUND IN THIS SURVEY

Alnus rhombifolia	White Alder
Plantanus racemonsa	California Sycamore
Solidago californica	California Goldenrod
Scirpus californicus	California Bulrush
Salvia apiana	White Sage
Oleo europaea	European Olive
Schinus molle	Peruvian Pepper Tree

PLANTS FOUND IN SURVEY AND ASSOCIATED DATA

DICOTYLEDONES (DICOTS)

AMARANTHACEAE					
*	*Amaranthus albus*	I, II	M	v	Tumbleweed
	Amaranthus palmeri	I, II	M	v	Palmer's Amaranthus
APIACEAE					
*	*Foeniculum vulgare*	IV	X		Fennel
ASTERACEAE					
	Ambrosia acanthicarpa	I, II, III, IV	X	v	Annual Burweed
	Artemisia californica		X	v	California Sagebrush
	Artemesia douglasiana	II	X	v	Douglas' Mugwort
	Baccharis salicifolia	I, II, III, IV	M		Mule Fat
*	*Bidens pilosa* var. *pilosa*	I, II, IV	A	v	Beggars-tichs
*	*Carduus pycnocephalus*	II, IV	M	v	Italian Thistle
*	*Centaurea melitensis*	II	X		Napa Thustle/Tocalote
	Conyza canadensis	I, II, IV	M	v	Horseweed
	Encelia farinosa	I, II, III, IV	X		Brittlebush/Incienso
*	*Gnathalium luteo-album*	II, IV	M, X	v	Weedy Cudweed
	Helianthus annuus	I, II, III, IV	A, M		Common Sunflower
	Heterotheca grandiflora	I, II, III, IV	M, X		Telegraph Weed
*	*Lactuca serriola*	II, III	M	v	Prickly Lettuce
	Lepidospartum squamatum	II	X	v	California Broom-shrub
*	*Sonchus oleraceus*	I, II, III, IV	M		Common Sow-thistle
	Xanthium strumarium	I, II, III, IV	M	v	Cocklebur
BORAGINACEAE					

Appendix A. cont.

	Amsinckia menziesii var. *intermedia*	III	X	v	Common Fiddle-neck
	Heliotropium curassavicum	I, II	M		Seaside Heliotrope
BRASSICACEAE					
*	*Brassica nigra*	I, II, III, IV	X	v	Black Mustard
*	*Lobularia maritima*	I, II, IV	X	v	Sweet Alyssum
*	*Raphanus sativus*	III	X		Wild Radish
	Rorippia nasturtium-aquaticum	I, II, III, IV	A		Water Cress
CACTACEAE					
	Opuntia littoralis	I, IV	X		Coastal Prickly Pear
CAPRIFOLIACEAE					
	Sambucus mexicana	III,IV	M	v	SW/Desert Elderberry
CARYOPHYLLACEAE					
*	*Polycarpon tetraphyllum*	IV	M	v	Four-leaved allseed
CHENOPODIACEAE					
*	*Chenopodium* cf. *album*	IV	M	v	Lamb's Quarter
*	*Chenopodium ambrosioides*	I, II, III, IV	M	v	Mexican Tea
*	*Chenopodium botrys*	II, IV	M	v	Jerusalem Oak
*	*Cycloloma atriplicifolium*	II	M, X	v	Winged Pigweed
*	*Salsola tragus*	I, II, III, IV	M, X		Russian Thistle
CONVOLVULACEAE					
*	*Convolvulus arvensis*	IV	X	v	Bindweed
CUCURBITACEAE					
*	*Cucumis melo*	I	X		melon
	Cucurbita foetidissima	III	X		Calabazilla
CUSCUTACEAE					
	Cuscuta pentagona	II, IV	X	v	Field Dodder
EUPHORBIACEAE					
	Chamaesyce serpyllifolia	I, IV	M, X	v	Thyme-leafed Spurge
	Croton californicus var. *tenuis*	I, II, III, IV	X		California Croton
*	*Ricinus communis*	I, II, III, IV	M, X		Castor Bean
FABACEAE					
	Lotus purshianus var. *purshianus*	II	X	v	Lotus
	Lotus scoparius var. *brevialatus*	IV	X		Alfalfa
*	*Melilotus alba*	I, II, III, IV	M		White Sweet Clover
	Vicia ludoviciana var. *ludoviciana*	IV	X	v	Slender Vetch
GERANIACEAE					
*	*Erodium cicutarium*	III	X		Red-stemmed Filaree
HYDROPHYLLACEAE					
	Eriodictyon trichocalyx var. *trichocalyx*	III, IV	X	v	Hairy Yerba Santa

Appendix A. cont.

MALVACEAE					
*	*Malva parviflora*	IV	M	v	Cheese-weed
MYRTACEAE					
*	*Eucalyptus* sp.	II, III	M	v	eucalyptus
OLEACEAE					
*	*Fraxinus uhdei*	IV	M	v	Shamel Ash
ONAGRACEAE					
	Epilobium ciliatum sp. *ciliatum*	I, II, III, IV	A	v	Northern Willow-herb
	Oenothera elata sp. *hookeri*	IV	M	v	Hooker's Evening Primrose
PAPAVERACEAE					
	Argemone munita	I, II	X	v	Chicolte/Prickly Poppy
	Dicentra chrysanthus	IV	X	v	Golden Eardrops
POLYGONACEAE					
	Eriogonum fasciculatum var. *fasciculatum*	I, II, III, IV	X		California Buckwheat
	Eriogonum thurberi	III	X	v	Thurber's Eriogonum
	Polygonum lapathifolium	I, II, III, IV	A, M	v	Willow Weed
*	*Rumex crispus*	I, III	M	v	Curly Dock
	Rumex salicifolius	II	M	v	Willow Dock
PORTULACACEAE					
*	*Portulaca oleracea*	IV	M	v	Common Pursiane
PRIMULACEAE					
*	*Anagallis arvensis*	I	M	v	Scarlet Pimpernel
SALICACEAE					
	Populus fremontii	I, II, III, IV	A, M		Freemont Cottonwood
	Salix sp.	I, II, III, IV	A, M		Willow
	Salix gooddingii	I, II, III	A		Gooding's Willow
	Salix exigua	I, II, III, IV	M		Slender Willow
SCROPHULARIACEAE					
	Mimulus cardinalis	I, II, III, IV	A, M	v	Scarlet Monketflower
	Mimulus guttatus	I, II, III, IV	A		Common Large Monkeyflower
*	*Veronica anagallis-aquatica*	I, II, III, IV	A		Water Speedwell
SIMAROUBACEAE					
*	*Ailanthus altissima*	III, IV	M		Tree of Heaven
SOLANACEAE					
	Datura wrightii	I, II, III, IV	X		Jimpson Weed
*	*Nicotiana glauca*	I, II, III, IV	X		Tree Tobacco
	Solanum douglasii	I, II, III, IV	M	v	Douglas' Nightshade
TAMARICACEAE					
*	*Tamarix ramosissima*	I, II, III, IV	A, M	v	Tamarisk/Salt Cedar

Appendix A. cont.

URTICACEAE					
	Urtica dioica sp. *holosericea*	I, II, III, IV	A, M		Hoary Nettle
ZYGOPHYLLACEAE					
*	*Tribulus terrestris*	II	X	v	Puncture Weed
	MONOCOTYLEDONES (MONOCOTS)				
ARECACEAE					
	Washingtonia filifera	II, III, IV	X		California Fan Palm
CYPERACEAE					
*	*Cyperus involucratus*	I, II, III, IV	A		Umbrella Sedge
	Scirpus acutus var. *occidentalis*	IV	A	v	Viscid Bulrush/Tule
LEMNACEAE					
	Spirodela polyrrhiza	I, II, III, IV	A		Greater Duckweed
POACEAE					
*	*Arundo donax*	I, II, III, IV	A, M		Giant Reed
*	*Bromus madritensis* sp. *rubens*	III	X		Red Brome Grass
*	*Chloris* cf. *gayana*	I, II, III, IV	A	v	Rhodes Grass
*	*Cynodon dactylon*	I, II, III, IV	A, M		Bermuda Grass
*	*Echinochloa crus-galli*	IV	A	v	Mexican Barnyard Grass
	Eragrostis mexicana sp. *virescens*	IV	A	v	Mexican Eragrostis
	Eragrostis pectinacea	I	A	v	Love Grass
	Leptochloa uninervia	I	A	v	Dense-flowered Sprangle-top
	Paspalum distichum	I, II, III, IV	A	v	Knot Grass
*	*Polypogon monspeliensis*	I, II, III, IV	A	v	Annual Beard-grass
*	*Schismus barbatus*	I	M	v	Mediterranean Grass
TYPHACEAE					
	Typha latifolia	I, II, IV	A		Broad-leaved Cat-tail

APPENDIX B

Vertebrate animals observed throughout the survey:

AMPHIBIANS	
Rana catesbeiana	bullfrog
REPTILES	
Sceloporus occidentalis	western fence lizard
Uta stansburiana	side-blotched lizard
BIRDS	
Agelaius phoeniceus	red-winged blackbird
Ardea herodias	great blue heron
Buteo jamaicensis	red-tailed hawk
Casmerodius albus	great egret
Charadrius vociferus	Killdeer
Columba livia	rock dove
Corvus brachyrhynchos	American crow
Sayornis nigricans	black phoebe
Tachycineta thalassina	violet-green swallow
Zenaida macroura	mourning dove
MAMMALS	
Citellus beecheyi	California ground squirrel
Sylvilagus auduboni	dessert cottontail
Lepus sp.	jackrabbit

APPENDIX C

Insects observed throughout the survey:

ORDER HEMIPTERA (TRUE BUGS)	
creeping water bug (unidentified)	Naucoridae
harlequin bug	*Murgantia histrionica*
assassin bug (unidentified)	Reduviidae
Backswimmer	*Notonecta* sp.
water boatmen (unidentified)	Corixidae
common toad bug	*Gelastocoris oculatus*
ORDER ODANATA (DRAGON FLIES)	
common ruby spot damselfly	*Hetaerina americana*
violet dancer damselfly	*Argia vivida*
darner dragonfly (unidentified)	Aeshnidae
skimmer dragonfly (unidentified)	Libellulidae
ORDER ORTHOPTERA (GRASSHOPPERS)	
grasshopper (unidentified)	Acrididae
ORDER NEUROPTERA (LACEWINGS)	
antlion (unidentified)	Myrmeleontidae
ORDER LEPIDOPTERA (BUTTERFLIES)	
Western tiger swallowtail butterfly	*Papilio rutulus*
painted lady butterfly	*Vanessa cardui*
red admiral butterfly	*Vanessa atalanta*
mourning cloak butterfly	*Nymphalis antiopa*
cabbage butterfly	*Pieris* sp.
Skipper butterfly (unidentified)	Hesperiidae
ORDER DIPTERA (TRUE FLIES)	
flower fly (unidentified)	Syrphidae
robber fly (unidentified)	Asilidae
ORDER COLEOPTERA (BEETLES)	
ground beetle (unidentified)	Carabidae
tiger beetle (unidentified)	Cicindelidae
ladybird beetle (unidentified)	Coccinellidae
stink beetle	*Eleodes* sp.
long-horned beetle (unidentified)	Cerambycidae
Western spotted cucumber beetle	*Diabrotica undicimpunctata undicimpunctata*
ORDER HYMENOPTERA (ANTS, WASPS, BEES)	
Southern fire ant	*Solenopsis xyloni*
yellow jacket	*Vespula pensylvanica*
golden polistes	*Polistes fuscatus aurifer*
velvet-ant	Mutillidae
tarantula hawk	*Pepsis chrysothymus*
bumble bee	*Bombus* sp.
honey bee	*Apis mellifera*

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APPENDIX C

SANTA ANA SUCKER POPULATION STUDIES PRESENTATION

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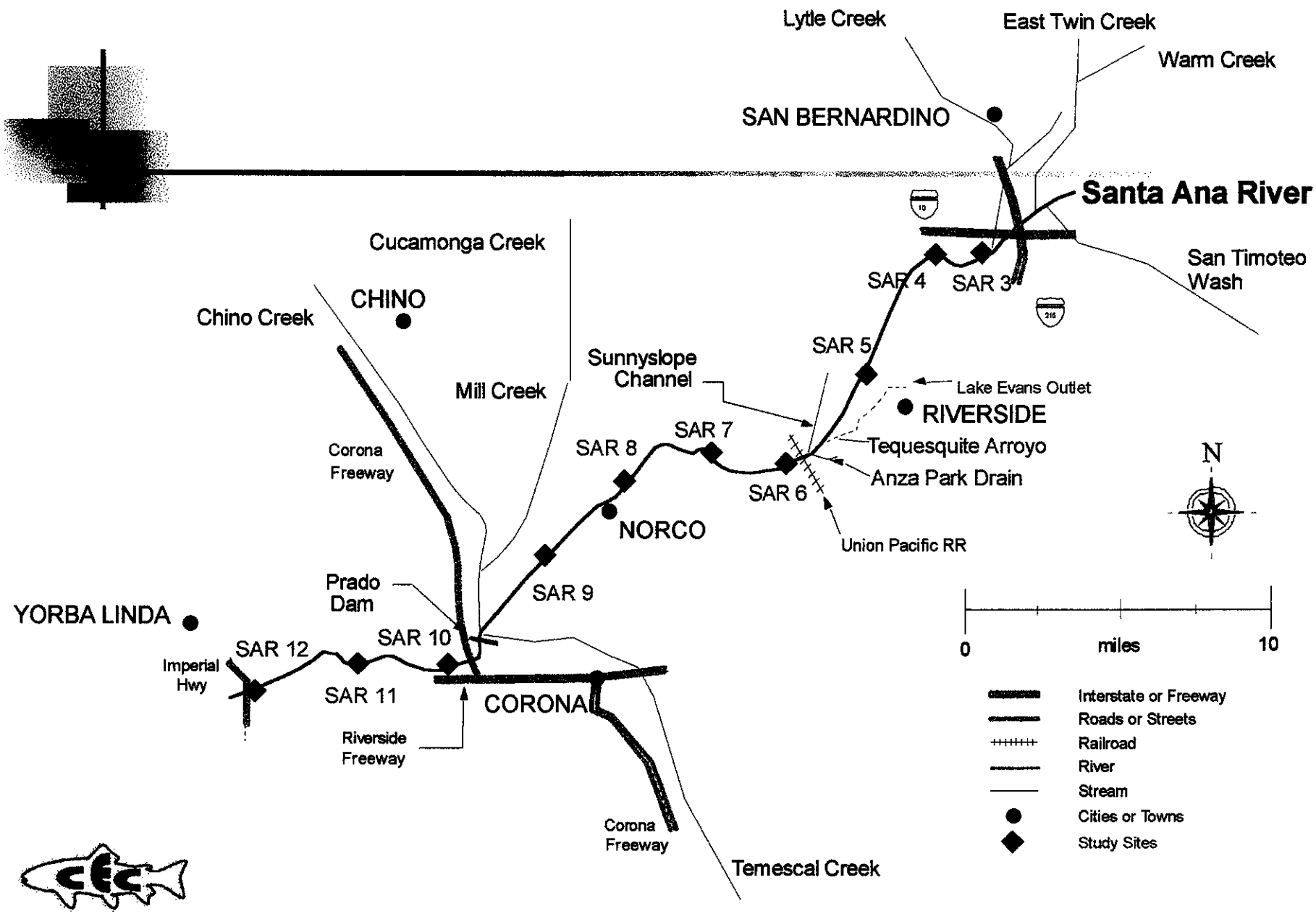
Collection of the Santa Ana Sucker in the Santa Ana River

Chadwick Ecological Consultants, Inc.
1991 – 2001

History of CEC Sampling Efforts on the Santa Ana River

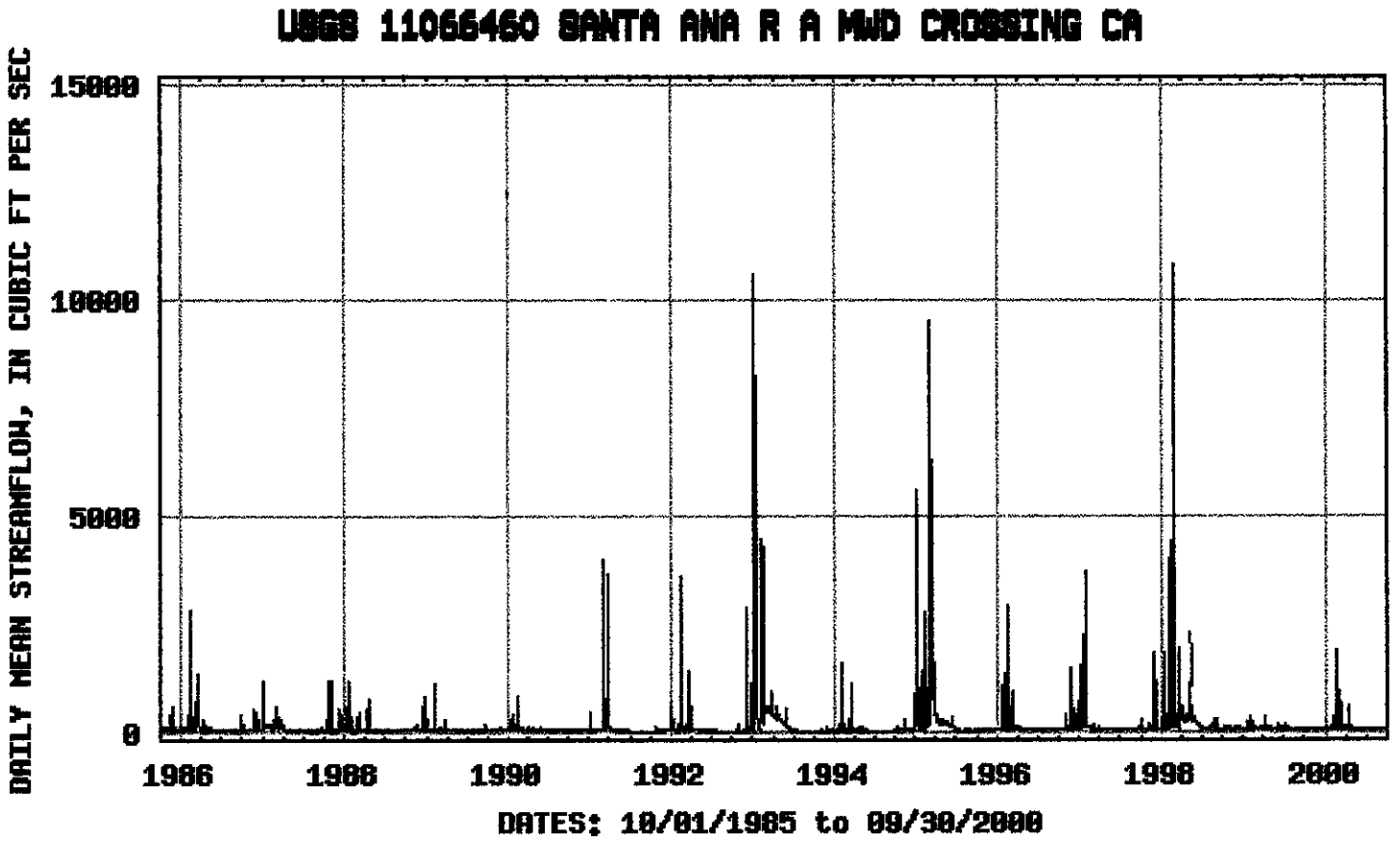
- Use Attainability Analysis (UAA)
  - 1990 electrofishing data
  - 1991 electrofishing data
- Mercury Monitoring
  - 1995 – 1999 electrofishing data
  - 2000 – 2001 seining data
- This presentation focusing on SAR upstream of Prado Dam


Lytle Creek
East Twin Creek
Warm Creek
SAN BERNARDINO
Santa Ana River
San Timoteo Wash
Cucamonga Creek
CHINO
Chino Creek
SAR 4
SAR 3
SAR 5
Sunnyslope Channel
Lake Evans Outlet
Mill Creek
RIVERSIDE
Corona Freeway
SAR 8
SAR 7
Tequesquite Arroyo
Anza Park Drain
SAR 6
NORCO
Union Pacific RR
N
Prado Dam
SAR 9
YORBA LINDA
SAR 12
SAR 10
Imperial Hwy
SAR 11
CORONA
Riverside Freeway
0
miles
10
Interstate or Freeway
Roads or Streets
Railroad
River
Stream
Cities or Towns
Study Sites
Corona Freeway
Temescal Creek

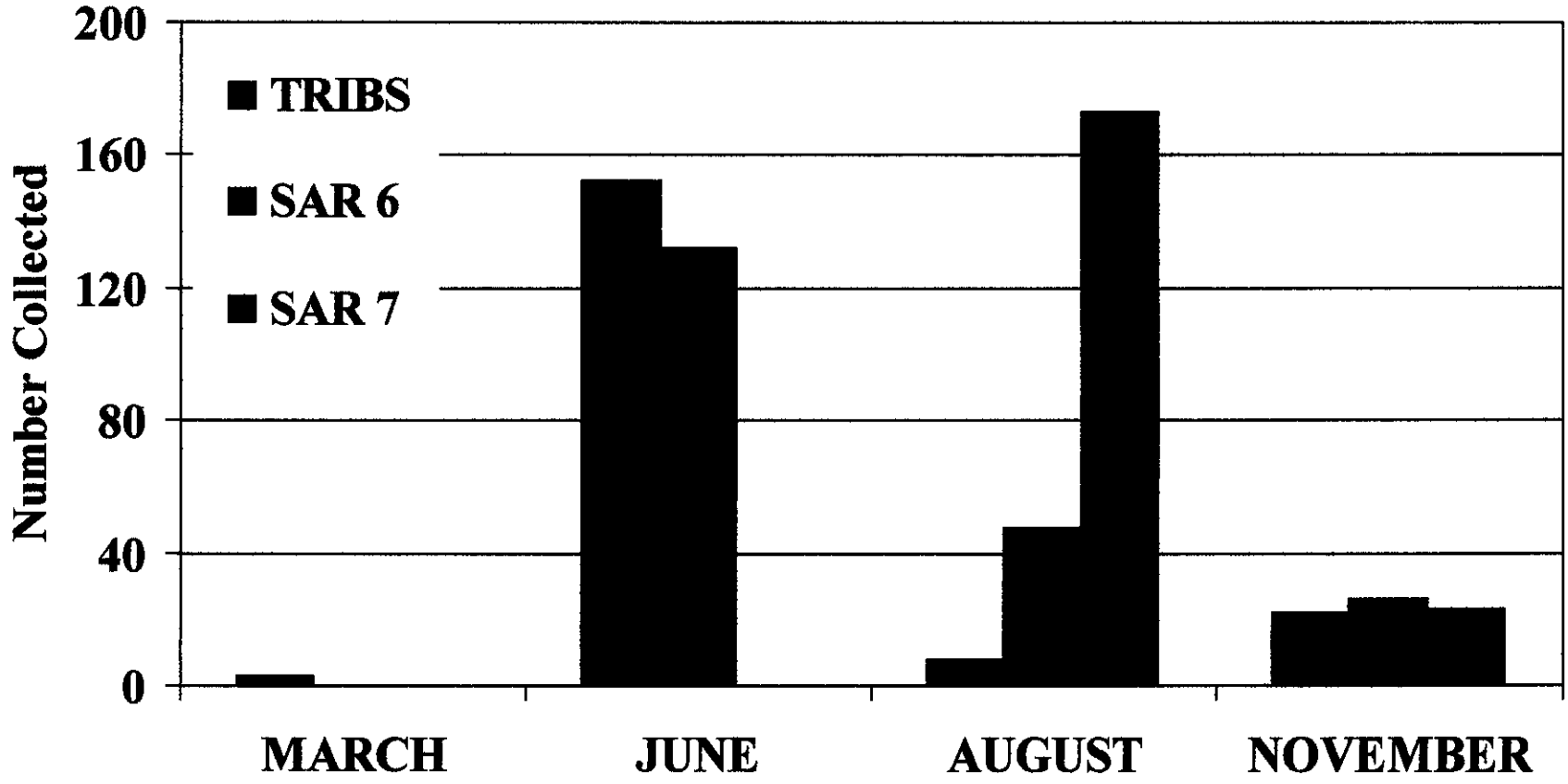
Species List for 1991-2001

- Santa Ana Sucker (7)
- Arroyo chub* (6)
- Fathead minnow* (8)
- Western mosquitofish* (8)
- Common carp* (7)
- Yellow bullhead (7)
- Largemouth Bass (6)
- Black bullhead* (5)
- Bluegill (4)
- Channel catfish (4)
- Tilapia (3)
- Green sunfish* (3)
- Prickly sculpin (2)
- Sailfin molly (2)
- Goldfish (1)
- Black crappie (1)
- Inland silversides (1)
- *(x) = the number of years species was collected (8 max)*
- ** = present in Santa Margarita River sites in 1991*

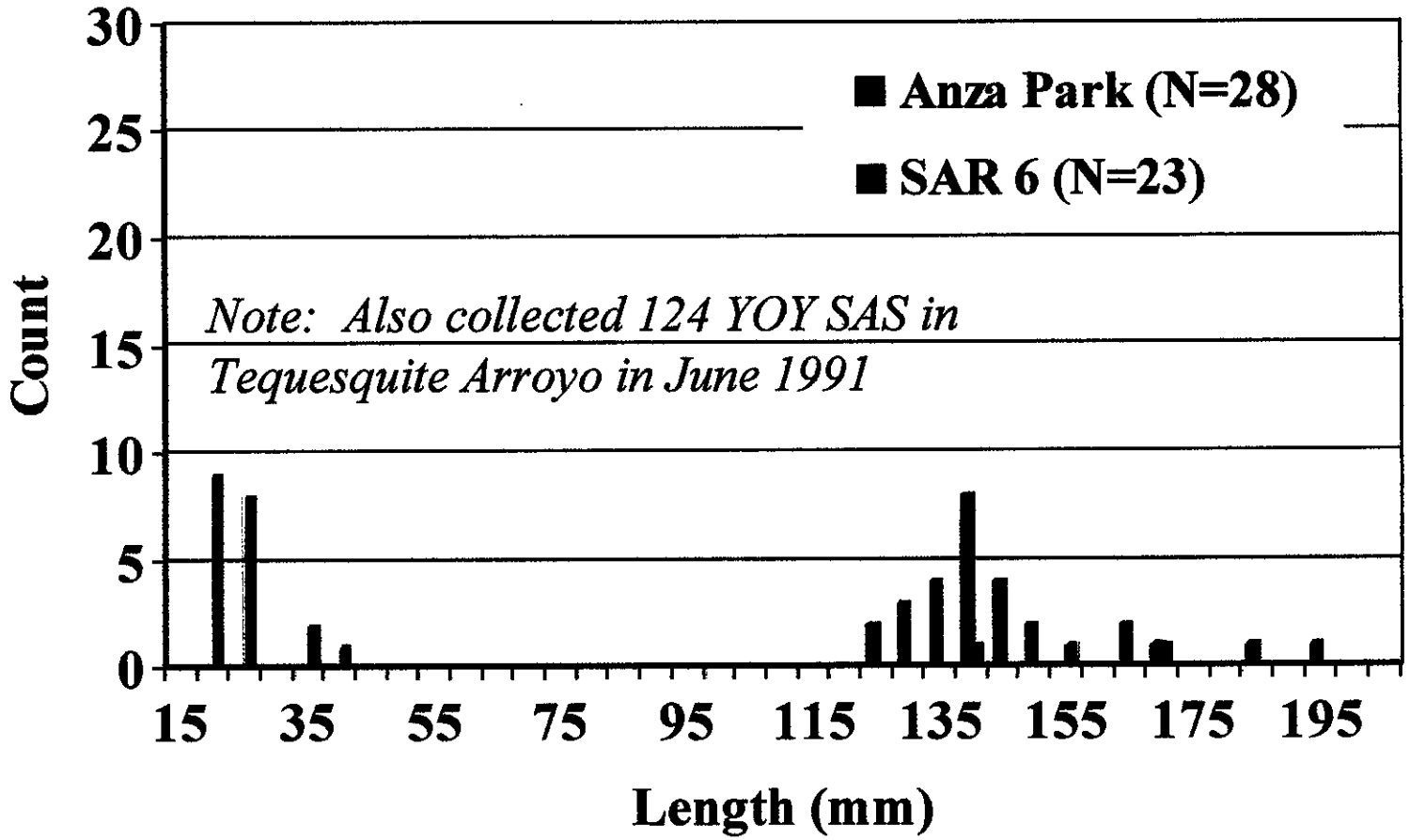
USGS


USGS 11066460 SANTA ANA R A MWD CROSSING CA
DAILY MEAN STREAMFLOW, IN CUBIC FT PER SEC
15000
10000
5000
0
1986
1988
1990
1992
1994
1996
1998
2000
DATES: 10/01/1985 to 09/30/2000
EXPLANATION
DAILY MEAN STREAMFLOW
ESTIMATED STREAMFLOW

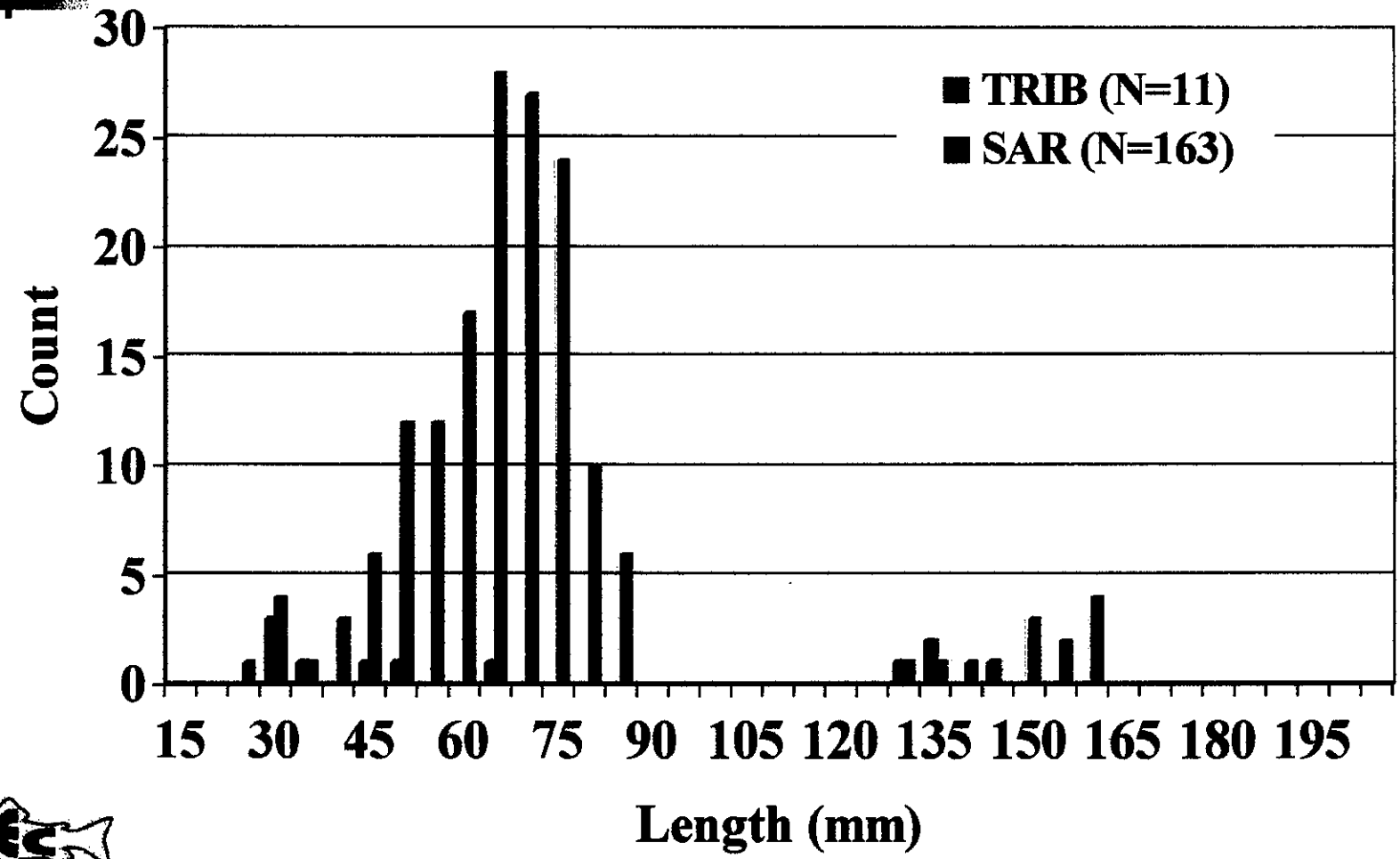
Number of Santa Ana Sucker Collected in the Santa Ana River and Tributaries, 1991



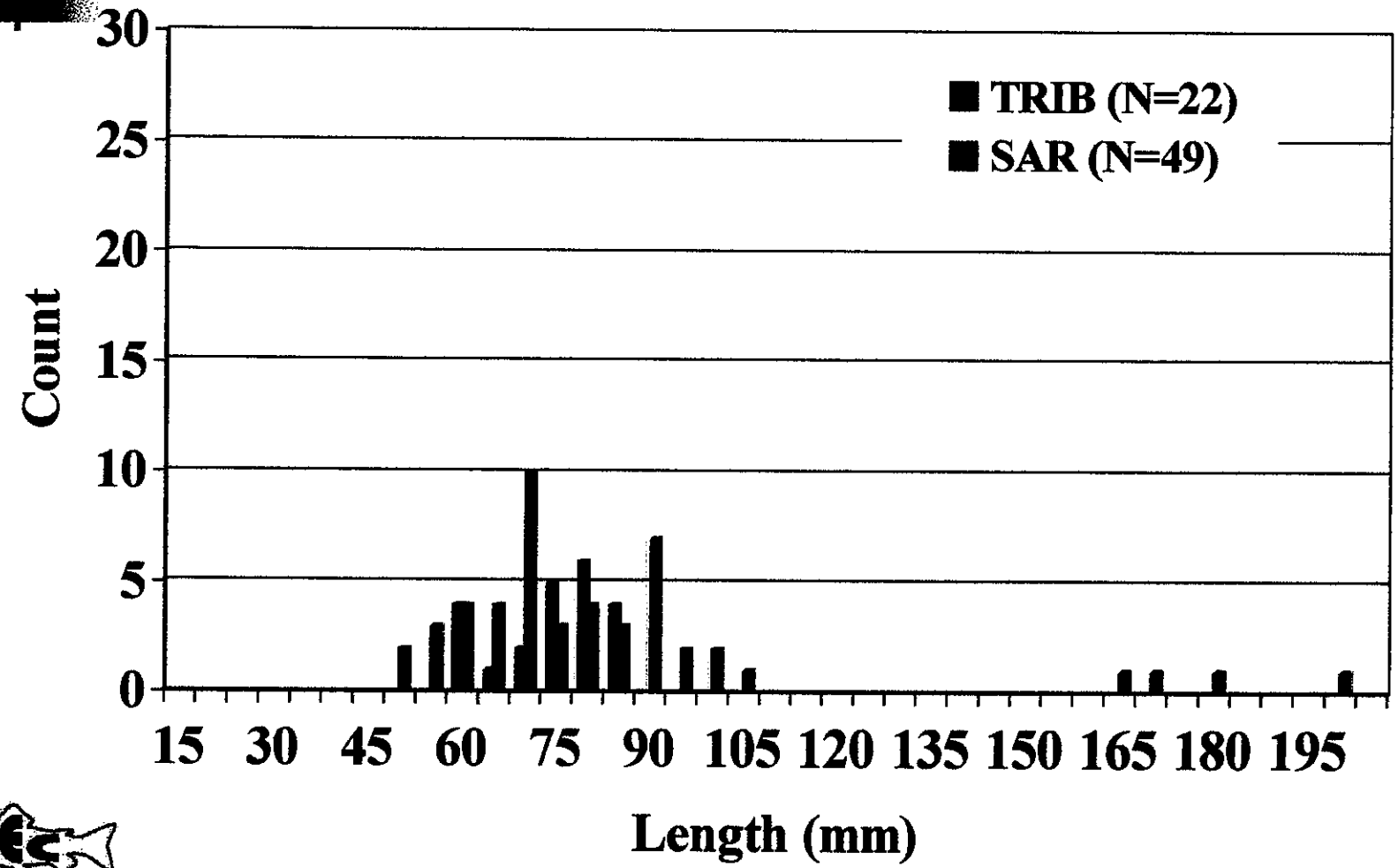
Length-Frequency Distribution of Santa Ana Suckers in June, 1991



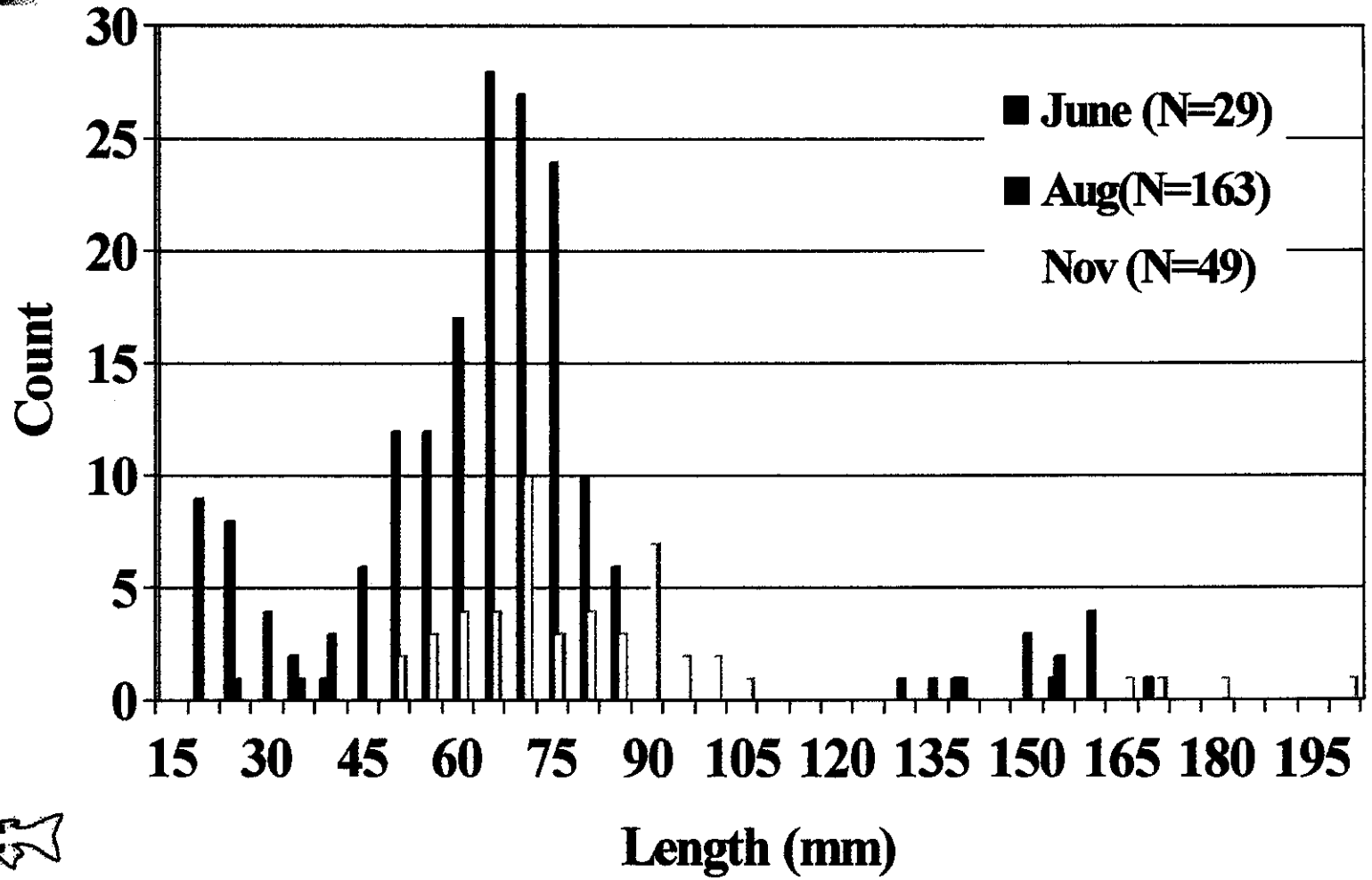
Length-Frequency Distribution of Santa Ana Suckers in August, 1991



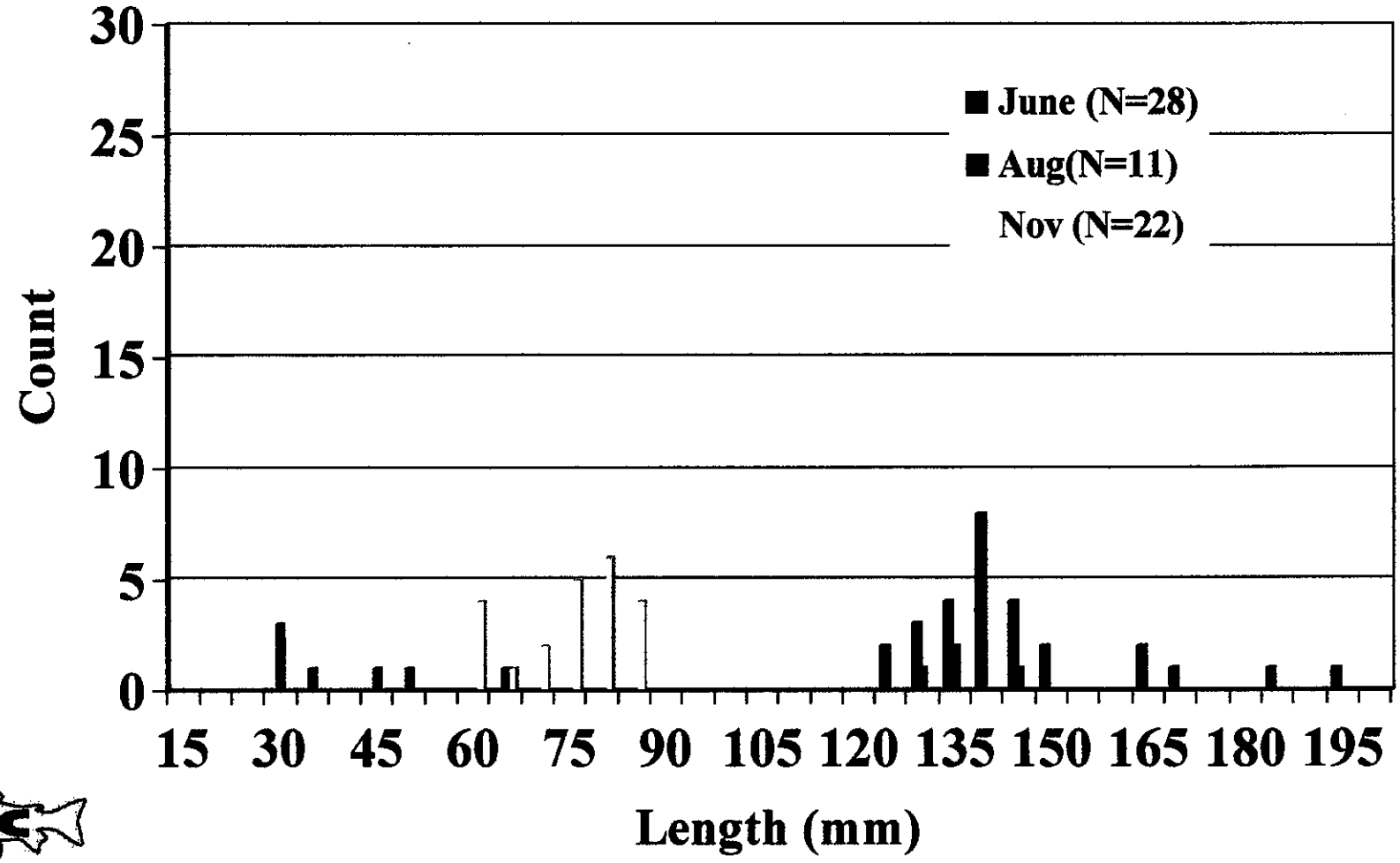
Length-Frequency Distribution of Santa Ana Suckers in November, 1991



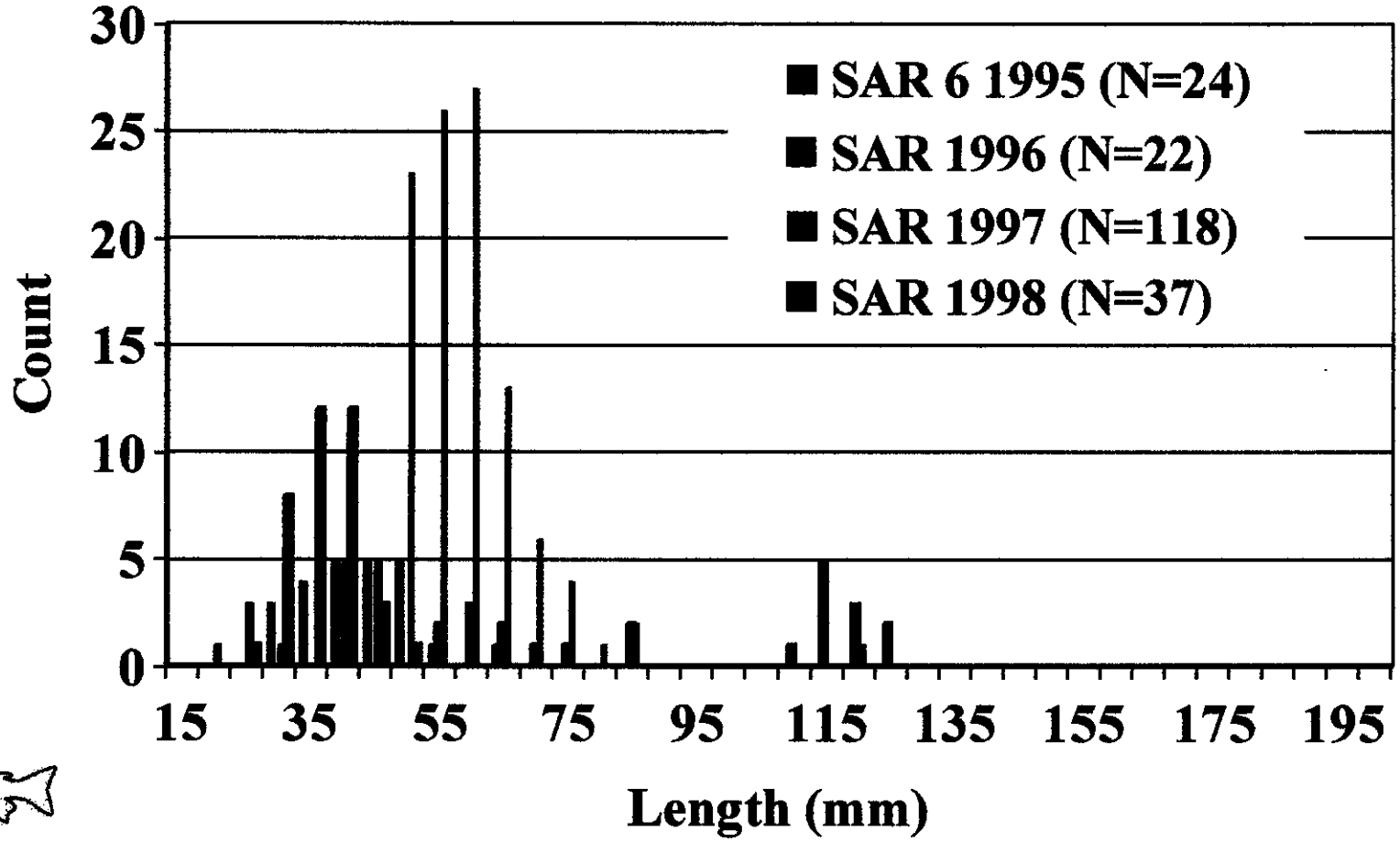
Length-Frequency Distribution of Santa Ana Suckers in the Santa Ana River, 1991



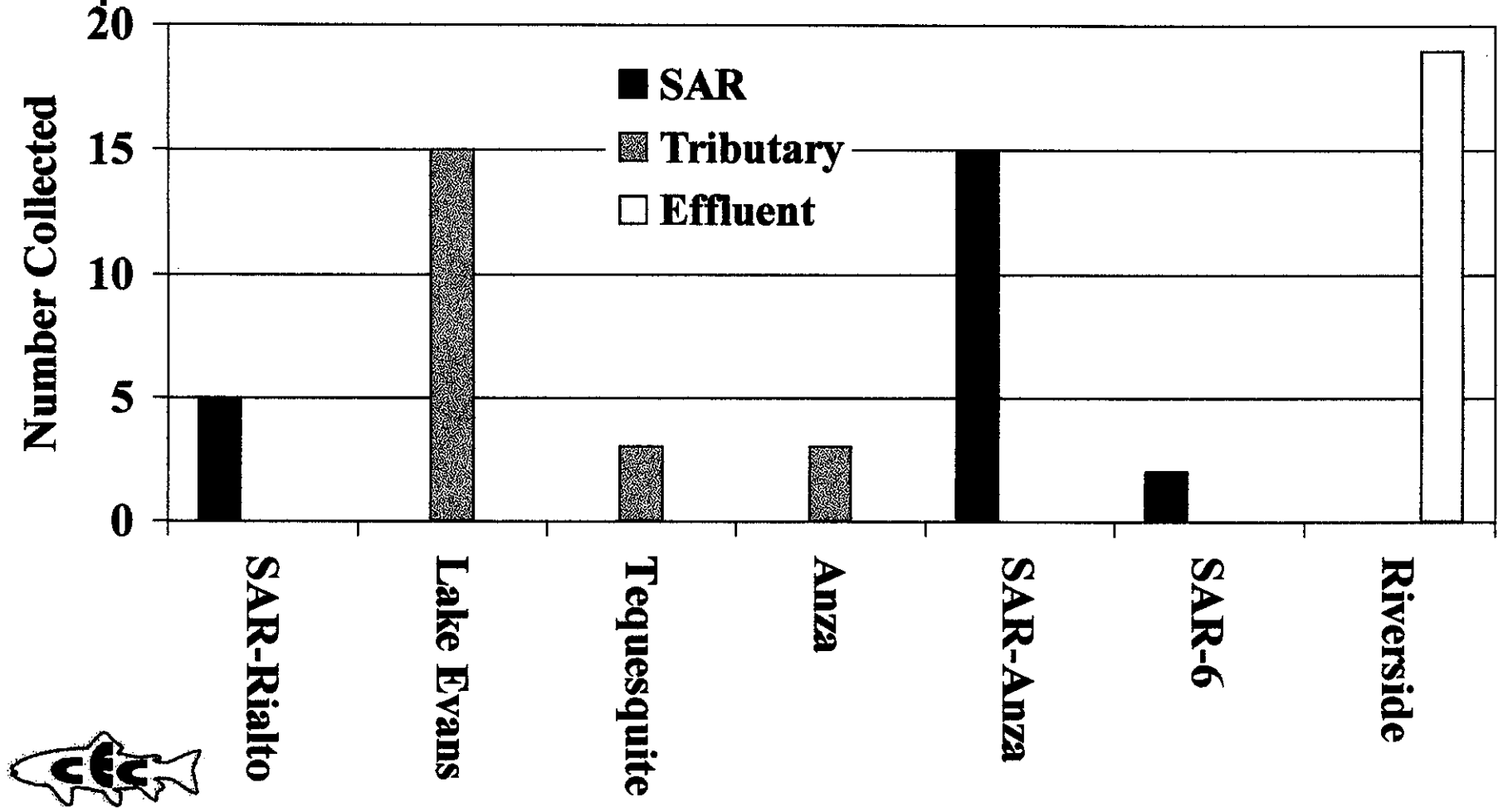
Length-Frequency Distribution of Santa Ana Suckers in the Tributaries, 1991



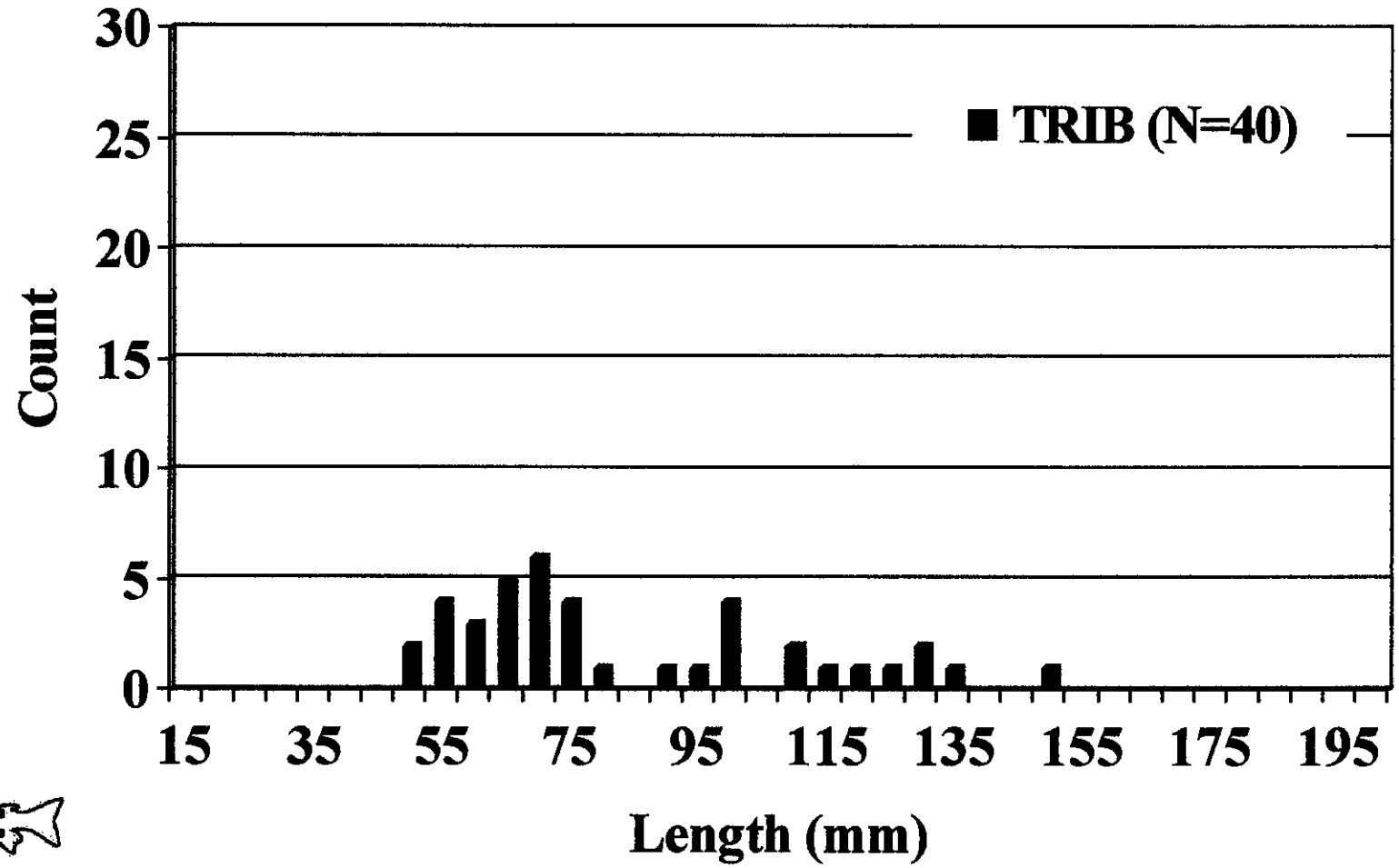
Length-Frequency Distribution of Santa Ana Suckers in August, 1995 - 1998



Longitudinal Distribution of Santa Ana Suckers in 1996 at Sites where the Sucker Occurred



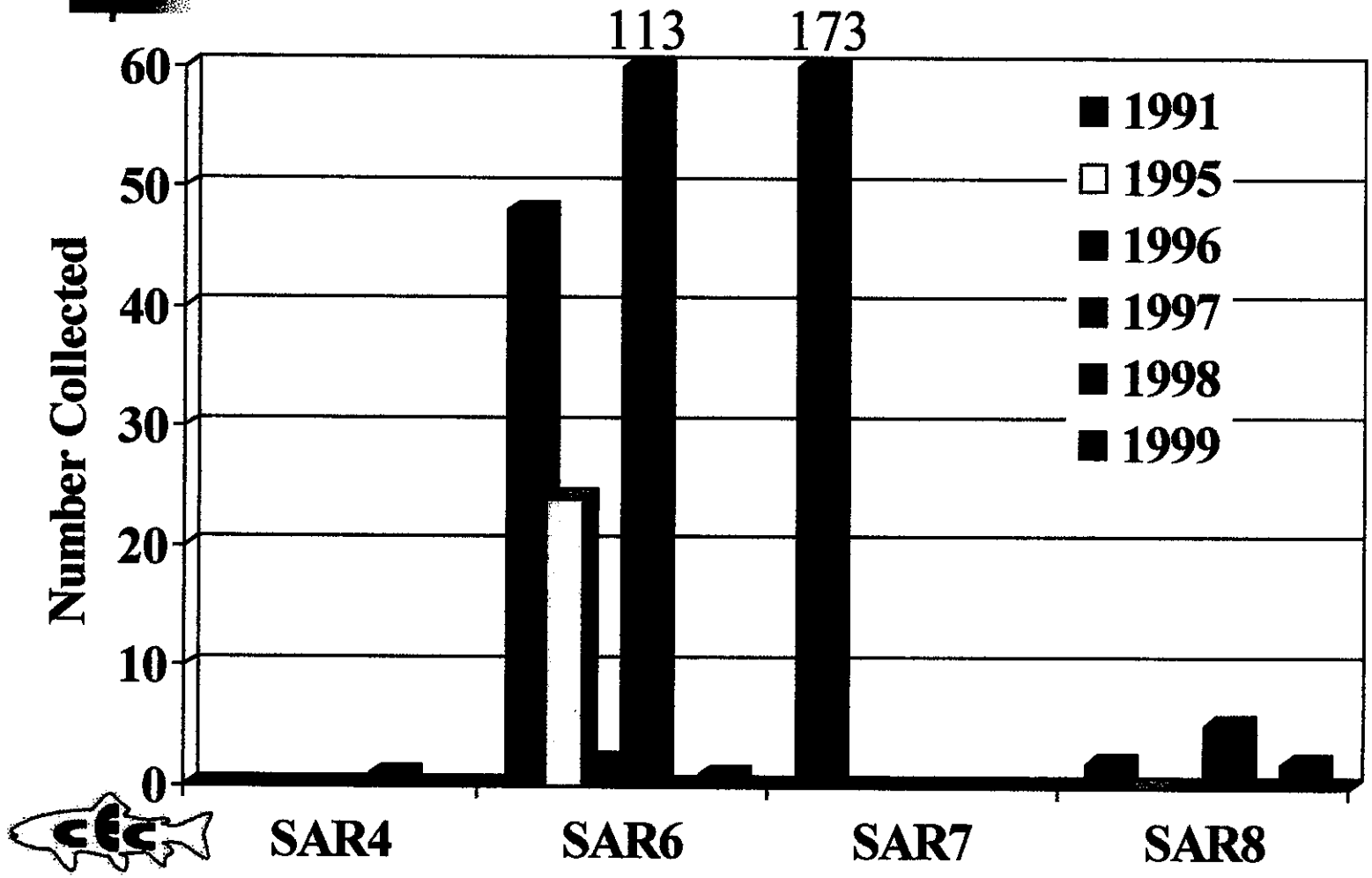
Length-Frequency Distribution of Santa Ana Suckers in Riverside Narrows Tributaries, August, 1996



1999 – 2001 Sampling Results

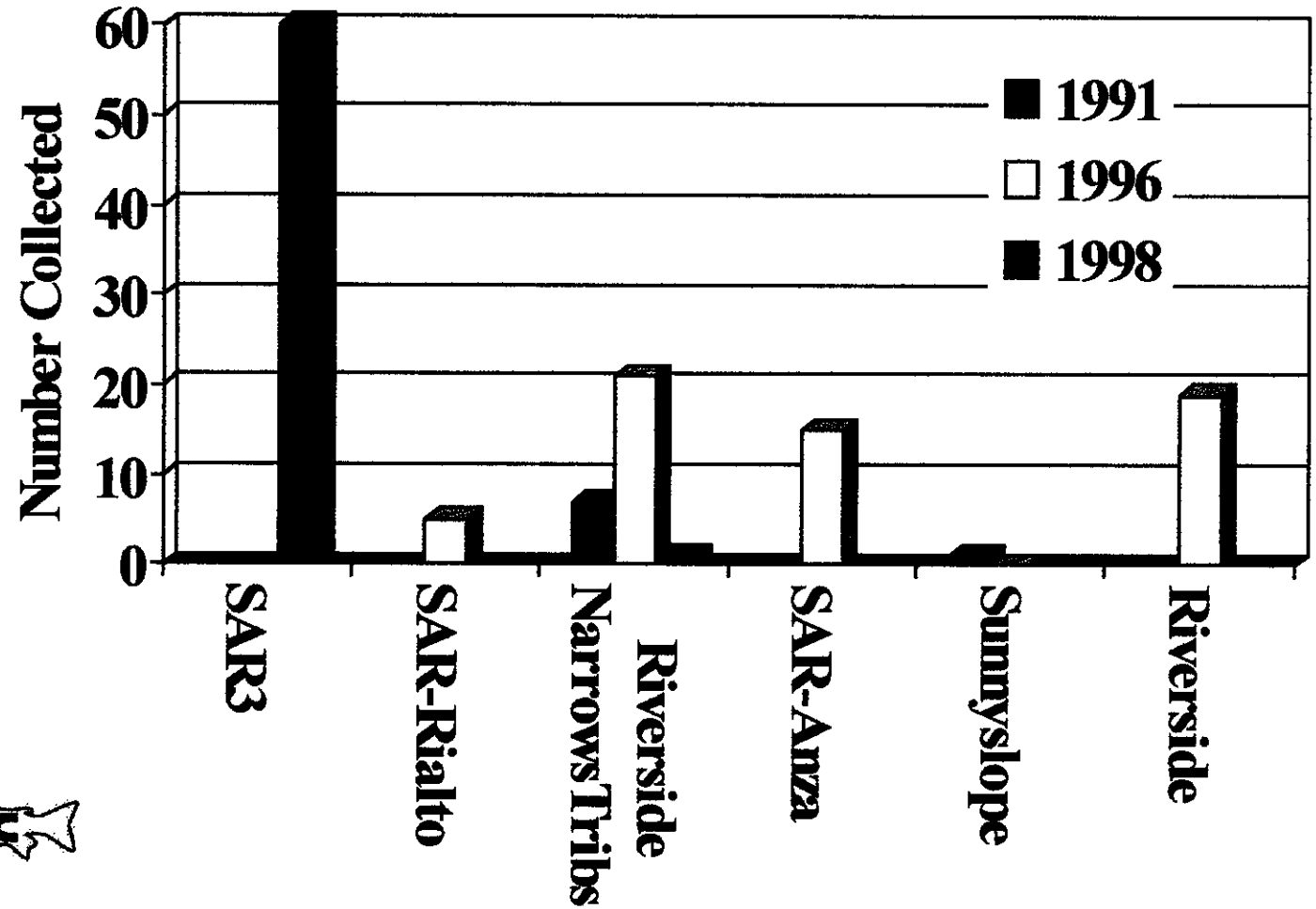
- 1999 - Two Santa Ana suckers (175 and 77 mm) were captured at Site SAR 8 (19/km) and one (49 mm) was captured seining at Site SAR 6.
- 2000 - One juvenile Santa Ana sucker was captured at SAR 12.
  - No Santa Ana suckers were caught seining at Sites SAR 6 or SAR 8 in 2000.
- 2001 - No Santa Ana suckers were caught seining at Sites SAR 6 or 8.

Santa Ana Sucker Collections Over Time - Mainstem Santa Ana River sites (with at least 3 years of electrofishing data)



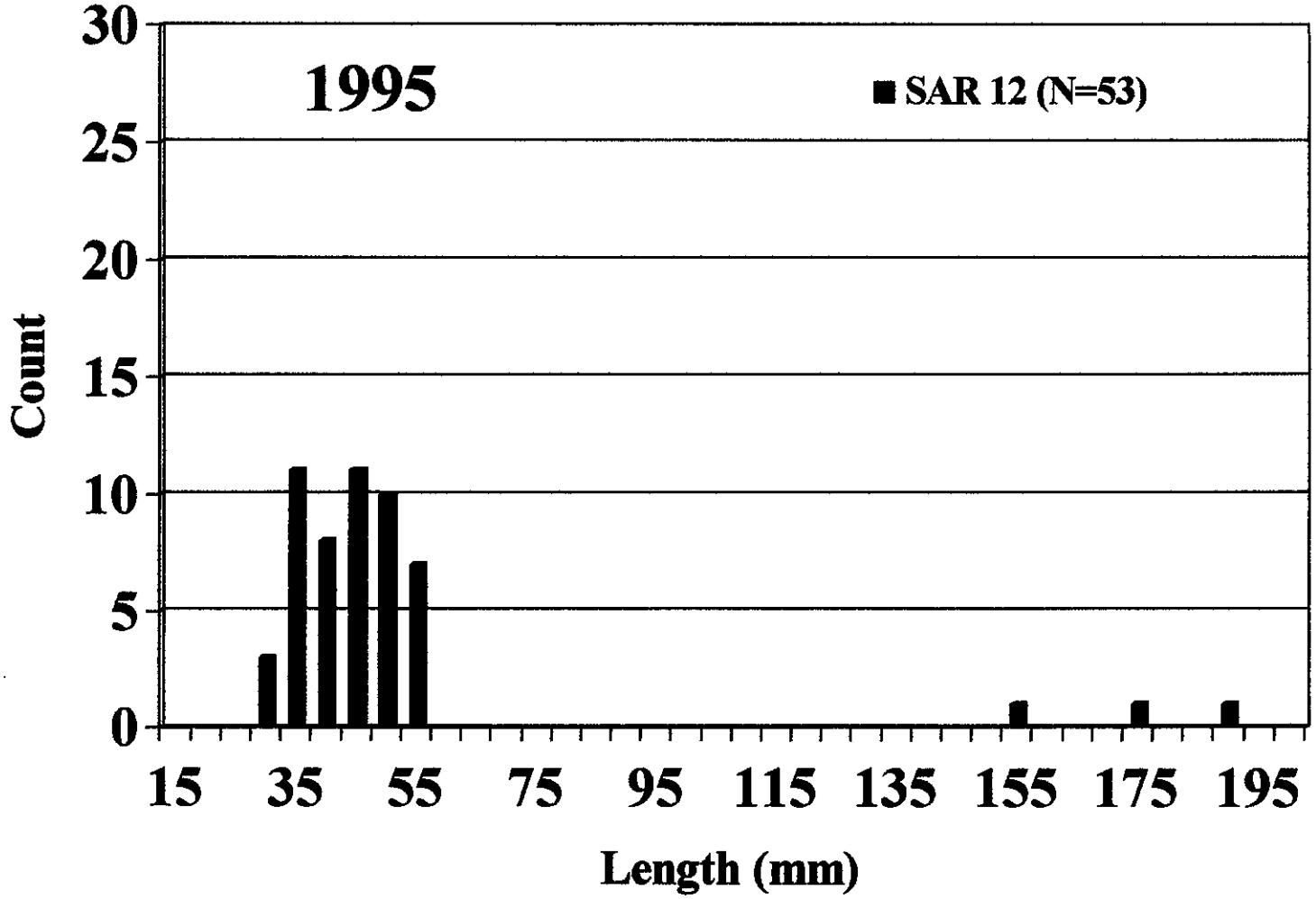
Santa Ana Suckers Collections at Miscellaneous Santa Ana River Sites and Tributaries over time

95



Santa Ana Sucker collections downstream of Prado Dam

1991 =2
1995=53
1996=1
1997=0
1998=0
1999=0
2000=1
2001=0



Summary of Santa Ana Sucker Collections by CEC

- Santa Ana Suckers present during all sampling periods (when electrofishing used)
- Distribution in river can vary seasonally
- Primarily centered on Riverside Narrows
- Collections indicate 0+ year class is usually predominant at time of sampling
  - Evidence of 1+ and 2+ year classes as well
- Seining much less effective sampling method for collecting Santa Ana Suckers

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APPENDIX D

MULTI-SPECIES HABITAT PLAN
SPECIES ACCOUNTS

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SPECIES: **Common Name and Scientific Name:** Santa Ana Sucker (*Catostomus santaanae*) (Snyder, 1908b).

STATUS: **State:** Species of Special Concern
Federal: Threatened (Federal Register 65: 19686-19698, April 12, 2000; Federal Register 64:3915, January 26, 1999)

DATA CHARACTERIZATION

The location database for the Santa Ana sucker includes six records for the species all within the Santa Ana River. The records are dated from 1993 to 1997. Although there are few records, the Santa Ana River is the main location for the species recorded by UCR. Other locations documented by personal communications from experts include the tributaries of the Santa Ana River.

The literature available is moderate in scope and quantity and describes both general biology of the species, some locational information, as well as management recommendations.

HABITAT AND HABITAT ASSOCIATIONS

The Santa Ana sucker generally lives in small, shallow streams, less than 7 meters in width, with currents ranging from swift in the canyons to sluggish in the bottom lands. They are found in permanent streams in water ranging in depth from a few centimeters to a meter or more (Smith 1966). Preferred substrates are generally coarse and consist of gravel, rubble, and boulders with growths of filamentous algae (Smith 1966; Moyle 1976), but occasionally they are found on sand/mud substrates (Moyle *et al.* 1995). It appears to be most abundant where the water is cool, clean, and clear, although the species can tolerate seasonally turbid water.

Streams in which the species is found are subject to periodic, severe flooding that results in drastic decreases in sucker population densities. California streams have strong seasonal patterns of flow (*i.e.*, low flows during rainless summers and high flows during winter and spring from rainfall and snow melt). Annual precipitation varies considerably, and extended droughts with very low stream flow are common. The species is adapted for living in unpredictable environments by having life history strategies that include a short generation time, high fecundity, and relatively prolonged spawning period. These characteristics enable Santa Ana suckers to rapidly recolonize rivers following a flood by producing more young over a longer time span. The species also has a greater dependence on detritus, algae, and diatoms by juveniles (Greenfield *et al.* 1970) which may be another adaptation for survival in highly variable environments.

BIOGEOGRAPHY

The native range of *C. santaanae* is southern California including the San Gabriel (east, north and west forks), Los Angeles, and Santa Ana River drainages (Smith 1966; Page and Burr 1991). Historically, it occurred from near the Pacific Ocean to its current locations. In the last 50 years, it has dramatically declined, and is now restricted to the headwaters of the San Gabriel River System, Big Tujunga Creek in the Los Angeles River basin, and portions of the Santa Ana River.

Introduced populations include the Santa Clara River (Miller 1968; Bell 1978; Swift *et al.* 1993), St. Maria-St. Inez drainage (Moyle 1976a), and accidentally into River Springs in Mono County, although the River Springs population has since become extirpated (Miller 1968). Two populations occur partially on federal land within the Angeles National Forest (USFWS 1997). This taxa is the only native catostomid found in the coastal drainages of southern California (Greenfield *et al.* 1970).

KNOWN POPULATIONS WITHIN WESTERN RIVERSIDE COUNTY

The Santa Ana sucker occurs within the planning area in the Santa Ana River from approximately Mt. Rubidoux downstream to a few miles below Imperial Highway (Swift *et al.* 1993). The species is now apparently absent from the upper reach of the Santa Ana River in the San Bernardino Mountains. The portions of the Santa Ana River occupied by the Santa Ana sucker constitute approximately 60 percent of the total remaining native range of the species. A length-frequency analysis indicates that the species is naturally reproducing in the Santa Ana River system, however, other investigators contend the large number of suckers reported in the tributaries are juveniles and may be the progeny of very few adults (USFWS 1999).

KEY POPULATIONS IN PLANNING AREA

The Santa Ana sucker occurs within the planning area in the Santa Ana River from approximately Mt. Rubidoux downstream to a few miles below Imperial Highway (Swift *et al.* 1993). The species is now apparently absent from the upper reach of the Santa Ana River in the San Bernardino Mountains. The portions of the Santa Ana River occupied by the Santa Ana sucker constitute approximately 60 percent of the total remaining native range of the species.

The Santa Ana sucker breeds in the tributary streams of the Santa Ana River. These include Temescal Wash and San Timoteo Creek (Robert Fisher, pers. comm.). The species does not appear to breed in the Santa Ana River itself because it is too swift and too contaminated (Robert Fisher, pers. comm.). Santa Ana suckers are intolerant of polluted or highly modified streams, consequently, the water quality must be maintained to provide breeding locations for this species.

BIOLOGY

Genetics : Snyder (1908b), who collected the fish from the Santa Ana River, originally described *Catostomus santaanae* as *Pantosteus santa-anae*. Smith (1966) omitted the hyphen and reduced the genus to a subgenus of *Catostomus*. Variability in certain anatomical features is exhibited by the Santa Ana Sucker, whereas they are homogeneous among other members of the subgenus *Pantosteus* (Smith 1966). The increase in fragmentation of the remaining population causes a loss of genetic variability and results in higher vulnerability to random events, environmental factors, and inbreeding which may allow increased expression of deleterious genes. Small populations cannot respond successfully to environmental stressors when genetic variability is reduced.

Diet and Foraging: Greenfield *et al.* (1970) conducted an extensive study of the species' life history. They found that detritus, algae and diatoms constituted 98% of the animal's diet; and the remaining 2% included aquatic insect larvae, fish scales and fish eggs. In addition, larger fish had a higher percentage of insect material in their diets. Young (age-group 0+) feed primarily on algae, diatoms, and detritus. As they reach the 1+ age-group, aquatic insects become a significant part of their diet (Greenfield *et al.* 1970). The Santa Ana sucker, typical of the sucker family, has large, thick lips and a small mouth used to "vacuum" algae and invertebrates from stream beds.

Daily Activity : Greenfield *et al.* (1970) concluded that at six months of age, suckers averaged 44 mm SL; they matured during their second summer and usually died at the end of their third summer at 75 to 110 mm SL; a few were found to reach their fourth summer, reaching 14 to 16 cm SL. Additionally, he found that females and males grew at the same rate.

Reproduction : By the first year, suckers become reproductively mature and begin spawning during the first and second years. They are explosive breeders, producing between 4,400 and 16,000 eggs at a time; more fecund than most other catostomids. There is a linear relationship between body size and number of eggs produced. Within 360 hours of fertilization, eggs hatch (at 13 degrees Celsius) and are demersal and adhesive (Greenfield *et al.* 1970). Spawning peaks between late May through early June, but can occur from March until early July (Moyle 1976), except in the Santa Clara River where it primarily occurs between March and April (Greenfield *et al.* 1970). Greenfield *et al.* (1970) used three techniques to determine the time of spawning: increase in mean egg diameter throughout the season, the maturity index, and the first major appearance of young. Moyle (1976) suggested that the combination of early maturity, protracted spawning period, and high fecundity allows Santa Ana suckers to quickly repopulate streams following periodic severe floods which can decimate populations.

Survival : Most Santa Ana Suckers do not survive beyond the second year, although a few live three to four years. They are adapted to living in unpredictable environments and their propensity for explosive breeding enables them to repopulate rivers and streams following population reducing flood events. Other aspects that contribute to this ability are short generation time and prolonged spawning period. Other survival mechanisms may include small size which allows them to utilize a greater range of instream refuges that would be unavailable to larger fish during high flows. Death usually occurs in the age-group 2+, with some fish carrying on into the 3+ age-group (Greenfield *et al.* 1970). The data show that spawning occurs during the first spring following hatching. Growth of river populations is slower than pond populations (Greenfield *et al.* 1970). Because the young feed primarily on algae, diatoms, and detritus, smaller individuals of the 0+ age-group can rapidly repopulate a flooded area (Greenfield *et al.* 1970).

Dispersal : Natural dispersal is usually up- or downstream as conditions and suitable habitat permit, and is typically facilitated by flooding events.

Socio-Spatial Behavior: Literature regarding socio-spatial behavior of the Santa Ana Sucker is limited. Villa (1985) found that a related species, the Sacramento sucker (*Catostomus occidentalis*), begins migration in December and peaks during the first week of March. Within the migration, males outnumbered females 2:1, and 98% were repeat spawners (judging by spawning checks on scales). Four to five weeks after peak spawning, peak out-migration of juveniles occurred, lasting for three weeks (Villa 1985).

Community Relationships: No information.

THREATS TO SPECIES

Urbanization, water diversions, groundwater over-drafting, dams, pollution, heavy recreational use, gold mining wastes, gravel extraction, and introduced competitors and/or predators may have contributed to the decline of this species (see USFWS 1996). Predators include centrachids (sunfishes) and bullheads, among others. Intensive urban development of the area has resulted in water diversions, extreme alteration of stream channels, changes in the watershed that result in erosion and debris torrents, pollution, and the establishment of introduced non-native fishes. The impact associated with urbanization is likely the significant cause of the extirpation of this species from lowland reaches of the Los Angeles River and San Gabriel River. As the Los Angeles urban area has expanded, the Los Angeles, Santa Ana, and San Gabriel rivers have been highly modified, channelized, or moved in an effort to either capture water runoff or protect property. Urban development also threatens the sucker in the Santa Ana river basin. In addition to physically altering the river, this urban development has resulted in changes in water quality and quantity, as well as the hydrologic regime of the systems. All

three rivers within the historic range of the Santa Ana sucker have dams that isolate and fragment fish populations. Dams likely have resulted in some populations being excluded from suitable spawning and rearing tributaries (USFWS 1999).

Cattle can have a devastating effect on fish populations. Increased ammonia and nitrate levels caused by urine and feces dropped into the water by cattle result in an increase in oxygen consumption by nitrifying bacteria (Taylor *et al.* 1989). This decreases the oxygen available for fish and introduces toxins which can be deleterious in chronic amounts (Lewis and Morris 1986; Thurston *et al.* 1986; and Sheenan *et al.* 1986). Cattle access to spring systems increases ubiquitous bacteria such as *Pseudomonas aeruginosa, Aeromonas hydrophila,* and coliforms (Taylor *et al.* 1989). An increase in fish mortality and morbidity was found to be associated with these cattle-related conditions. In addition, cattle tend to congregate in riparian areas, resulting in the degradation of these important areas which provide cover, food, shade, and water for native fish and wildlife. Improved livestock management could help to curb these impacts.

The high degree of fragmentation of the remaining populations make the Santa Ana sucker especially vulnerable to random events, environmental factors, and loss of genetic variability. Random events such as floods, variations of annual weather patterns, predation and associated demographic uncertainty, may lead to the demise of the remnant populations in the Los Angeles or Santa Ana basins. In addition, streams in which the taxa is found are subject to periodic, sever flooding that results in drastic decreases in sucker population densities.

SPECIAL BIOLOGICAL CONSIDERATIONS

During the 1970's the Santa Ana Sucker was described as common (Moyle 1976). Since then, the species has experienced an approximately 75% reduction of its native range (Swift et al 1993; USWFS 1999). The four small river systems that comprise the range of the Santa Ana sucker all flow through the expanding urban sprawl of Los Angeles, becoming subject to dams, draining, pollution, channelization, poor watershed management and excessive flooding episodes. The preservation of refuges for this and other endemic species is a necessary step toward curbing present trends which will inevitably lead to extinction.

Dams and reservoirs greatly reduce the natural variability in environmental conditions, resulting in the domination of nonnative fish faunas (Moyle 1976; Herbold and Moyle 1986; Moyle and Light 1996). High disturbance systems support groups of species that would probably not coexist under natural conditions. For example, 3-4 species of predatory bass commonly live within reservoirs on California rivers, while rarely are more than two species are found together in natural systems (Moyle and Light 1996). Cornell and Lawton (1992) argue that ecological communities are rarely saturated with species,

thus, even complex systems may be invaded relatively easily. Successful invasions are most likely to occur when native assemblages have been temporarily disrupted or depleted (Moyle and Light 1996). The match between an invader and the hydrologic regime seems to be the most important factor in determining the success of an invasion, rather than the biotic resistance (Moyle and Light 1996; Case 1991). However, most invasions do not result in direct extirpation, except in the case of Piscivores, or when invaders can hybridize with native species (Moyle and Light 1996). In relatively unmodified streams, such as Deer Creek (Tehama County), the natural hydrologic regime prevents repeated invasions of nonnative fish (Molye and Light 1996).

Management considerations should include preservation and management of key stream sections, as well as the elimination of introduced predatory fishes such as the green sunfish and largemouth bass (Moyle 1976). The preservation of refuges for this and other endemic species is a necessary step toward curbing present trends which will inevitably lead to extinction. Native fish hatcheries may be a potential source for re-establishing fish populations.

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SPECIES: **Common Name and Scientific Name:** Arroyo chub (*Gila orcutti*) (Eigenmann and Eigenmann 1890)

STATUS: **State:** Species of Special Concern
Federal: None

DATA CHARACTERIZATION

There are six records for the arroyo chub in the UCR location database ranging in date from 1974 to 1999. All of the records are for the Santa Ana River. However, other investigators report locations within the Santa Margarita River and other locations.

The quantity and scope of the available literature is moderate and describes both general biology of the species, some location information, as well as management recommendations.

HABITAT AND HABITAT ASSOCIATIONS

The arroyo chub is adapted to surviving in the warm fluctuating streams of the Los Angeles Plain. They prefer slow moving or backwater sections of warm to cool streams with substrates of sand or mud (Moyle 1976). The depth of the stream is typically greater than 40 centimeters (Moyle 1976).

BIOGEOGRAPHY

Their native range includes the Los Angeles, San Gabriel, San Luis Rey, Santa Ana, and Santa Margarita rivers and also Malibu and San Juan creeks (Wells and Diana 1975). This species is common at three localities within its native range, namely the upper Santa Margarita River and its tributary, De Luz Creek; Trabuco Creek below O'Neill Park and San Juan Creek drainage; and Malibu Creek. It is present, but scarce in Big Tujunga Canyon (Pacoima Creek above Pacoima Reservoir), and in the Sepulveda Flood Control Basin, Los Angeles River drainage; upper San Gabriel River drainage; and middle Santa Ana River tributaries between Riverside and the Orange County line (Swift *et al.* 1993).

Introduced populations occur at Santa Maria-St. Inez, Mojave, Santa Clara, and Cuyama river drainages, and a portion of San Felipe Creek (Miller 1968; Moyle 1976a; Bell 1978; Sigler and Sigler 1987; Page and Burr 1991). Within the literature, there is some disagreement regarding the extent of this species' native distribution. Miller (1968) and Bell (1978) conclude that the Santa Clara population is probably introduced while Moyle (1976a), and Page and Burr (1991) indicated that this population is native. Fish

fossils at Rancho La Brea, including arroyo chub (Swift 1989) indicate local, permanent stream conditions, and not stream transport from distant mountainous areas.

KNOWN POPULATIONS WITHIN WESTERN RIVERSIDE COUNTY

The arroyo chub is known to occur in the Santa Ana River from Jurupa, downstream to Prado Basin, Santa Margarita River near Temecula, and headwaters of Santa Margarita River with a known population in Temecula Creek within Riverside County (NDDB, Swift *et al.* 1993; Black pers. comm.). The arroyo chub is also present in Temescal Wash (Robert Fisher, pers. comm.).

KEY POPULATIONS IN PLANNING AREAS

There are few key population areas; these include the only known locations or potentially suitable locations within the planning area. This includes the Santa Ana River, Santa Margarita River, Temecula Creek, and Temescal Wash.

BIOLOGY

Genetics : The increase in fragmentation of the remaining population causes a loss of genetic variability and results in higher vulnerability to random events, environmental factors, and inbreeding which may allow increased expression of deleterious genes. Small populations cannot respond successfully to environmental stressors when genetic variability is reduced (Moyle 1976).

Diet and Foraging : The arroyo chub is omnivorous, feeding primarily on algae (Greenfield and Deckert 1973), but also ingesting other plants, aquatic insects and their larvae, small crustaceans, and feeding extensively on roots of a floating water fern (*Azolla*) infested with nematodes (Moyle 1976).

Daily Activity: No information.

Reproduction : Arroyo chubs are fractional spawners that breed more or less continuously from February through August, although most spawning takes place in June and July (Tres 1992). Most spawning occurs in pools or in quiet edge water, at temperatures of 14 to 22 degrees Celsius during March and April (Moyle *et al.* 1995). Larger fins distinguish males from females, and when breeding, males develop a prominent patch of tubercles on the upper surface of the pectoral fins (Tres 1992). Egg release is initiated by the male rubbing his snout against the area below the female's pelvic fins. Once released, eggs may be fertilized by more than one male. After four days (at 24 degrees Celsius) embryos hatch. After hatching, the fry spend the first

three to four months in quiet water, in the water column and usually among vegetation or other flooded cover. They begin to reproduce at the age of one year. Age and growth in arroyo chubs remains to be thoroughly investigated, but Moyle (1976) reports that they seldom exceed 75 mm SL.

Survival : Castleberry and Cech (1986) demonstrated in laboratory studies that this species is physiologically adapted to survive hypoxic conditions and the wide fluctuations in temperature common in south coastal streams. They are adapted for surviving the warm fluctuating streams of the Los Angeles Plain which historically shifted naturally between muddy torrents in the winter and clear intermittent brooks in the summer (Moyle 1976).

Dispersal : Natural dispersal is typically up- or downstream as conditions and suitable habitat permit, and is typically facilitated by flooding events (Moyle 1976).

Socio-Spatial Behavior: No information.

Community Relationships: Mass hybridization between the arroyo chub and the Mojave tui chub have depleted most, if not all, pure stock of tui chub in the Mojave River drainage (Hubbs and Miller 1943; Moyle 1976a, 1976b; Miller *et al.* 1991; Swift *et al.* 1993). Castleberry and Cech (1986) studied the response of arroyo chubs and Mojave tui chubs to abiotic factors. They found that arroyo chubs are more tolerant and respond more appropriately to laboratory conditions simulating stressors of desert rivers than the tui chubs. This presumably is because they are better suited to habitats such as these, evolving in environments similar to the Mojave river (Eigenmann and Eigenmann 1890; Miller 1942). In contrast, tui chubs, until the late Cenozoic, have evolved in lake environments and are less suited for inhabiting rivers. Arroyo chubs were found to be more tolerant of higher temperatures which would occur under low water conditions. They exhibited a large metabolic rate increase following temperature increases which could aid in remaining active and escaping stressful conditions. Moreover, arroyo chubs experienced difficulty acclimating to cooler temperatures, while tui chubs showed a greater tolerance for colder temperatures, which is typical of lake dwelling fishes. In the Mojave river environment, in which low water temperatures are transient, this would give the tui chubs a selective disadvantage in relation to arroyo chubs. Castleberry and Cech (1986) suggest that tui chubs persisted in the Mojave river in the absence of a similar fish.

Within the Cuyama River, California roach-arroyo chub hybrids are abundant (Moyle 1976). High stream flows segregate the two species, the chubs preferring large pools and reservoirs while the roach utilizes riffles and smaller pools. Low flow events force the species together, resulting in hybridization.

THREATS TO SPECIES

The species is threatened by impacts to rivers and streams, channelization, water diversion, groundwater over drafting, sand and gravel mining, changes in the watershed that result in erosion and debris torrents, pollution, the establishment of introduced or non-native fishes, and flood control activities. The arroyo chub is scarce within their native range because the low-gradient streams in which they do best have largely disappeared. Their native range is largely coincident with the Los Angeles metropolitan area where most streams are degraded and populations reduced and fragmented (Moyle *et al.* 1995). Recently, the red shiner has been introduced into arroyo chub streams and may be competitively excluding chubs from many areas. Chubs generally decline when the shiners become abundant (Moyle *et al.* 1995). The potential effects of introduced species, combined with the continued degradation of the urbanized streams that constitute much of its habitat, mean that this species is not secure despite its relatively wide range.

As the Los Angeles urban area has expanded, the Los Angeles, Santa Ana, and San Gabriel rivers have been highly modified, channelized, or moved in an effort to either capture water runoff or protect property. Urban development also threatens the chub in the Santa Ana river basin. In addition to physically altering the river, this urban development has resulted in changes in water quality and quantity, as well as the hydrologic regime of the systems. The rivers within the Los Angeles area of the arroyo chub range have dams that isolate and fragment fish populations. Dams likely have resulted in some populations being excluded from suitable spawning and rearing tributaries (USFWS 1999). Dams inhibit the ability for populations to intermix, and their operation creates erratic water flows. In addition, human recreational use can disturb spawning and feeding behavior.

Cattle can have a devastating effect on fish populations. Increased ammonia and nitrate levels caused by urine and feces dropped into the water by cattle result in an increase in oxygen consumption by nitrifying bacteria (Taylor *et al.* 1989). This decreases the oxygen available for fish and introduces toxins which can be deleterious in chronic amounts (Lewis and Morris 1986; Thurston *et al.* 1986; and Sheenan *et al.* 1986). Cattle access to spring systems increases ubiquitous bacteria such as *Pseudomonas aeruginosa, Aeromonas hydrophila,* and coliforms (Taylor *et al.* 1989). An increase in fish mortality and morbidity was found to be associated with these cattle-related conditions. In addition, cattle tend to congregate in riparian areas, resulting in the degradation of these important areas which provide cover, food, shade, and water for native fish and wildlife. Improved livestock management could help to curb these impacts.

The high degree of fragmentation of the remaining populations make the arroyo chub especially vulnerable to random events, environmental factors, and loss of genetic variability. Random events such as floods, variations of annual weather patterns, predation and associated demographic uncertainty, may

lead to the demise of the remnant populations in the Los Angeles or Santa Ana basins. In addition, streams in which the taxa is found are subject to periodic, severe flooding that results in drastic decreases in sucker population densities (Moyle 1976).

SPECIAL BIOLOGICAL CONSIDERATIONS

Arroyo chub are now considered scarce within their native range, because they prefer lower gradient streams that have largely disappeared. The majority of the arroyo chub population occurs within areas of large human populations associated with the Los Angeles metropolitan area, and consequently should be monitored closely (Moyle 1976).

Dams and reservoirs greatly reduce the natural variability in environmental conditions, resulting in the domination of non-native fish faunas (Moyle 1976; Herbold and Moyle 1986; Moyle and Light, 1996). High disturbance systems support groups of species that would probably not coexist under natural conditions. For example, 3-4 species of predatory bass commonly live within reservoirs on California rivers, while rarely are more than two species found together in natural systems (Moyle and Light 1996). Cornell and Lawton (1992) argue that ecological communities are rarely saturated with species, thus, even complex systems may be invaded relatively easily. Successful invasions are most likely to occur when native assemblages have been temporarily disrupted or depleted (Moyle and Light 1996). The match between an invader and the hydrologic regime seems to be the most important factor in determining the success of an invasion, rather than the biotic resistance (Moyle and Light 1996; Case 1991). However, most invasions do not result in direct extirpation, except in the case of Piscivores, or when invaders can hybridize with native species (Moyle and Light 1996). In relatively unmodified streams, such as Deer Creek (Tehama County), the natural hydrologic regime prevents repeated invasions of nonnative fish (Moyle and Light 1996).

Management considerations should include preservation and management of key stream sections, as well as the elimination of introduced predatory fishes such as the green sunfish and largemouth bass (Moyle 1976). The preservation of refuges for this and other endemic species is a necessary step toward curbing present trends which may lead to extinction. Native fish hatcheries may be a potential source for re-establishing fish populations.

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SPECIES: **Common Name and Scientific Name:** Delhi Sands flower-loving fly (*Rhaphiomidas terminatus abdominalis*)

STATUS: **State:** None
Federal: Endangered

DATA CHARACTERIZATION

The life cycle of the Delhi Sands flower-loving fly make it difficult to study the life history and requirements of this species. Although recent studies have been conducted on the Delhi Sands flower-loving fly and related species, further studies and information are needed regarding food requirements, microhabitat needs, survivorship, dispersal requirements, socio-spatial requirements, and effectiveness of habitat restoration efforts. All four records within the U.C. Riverside data base hold *x* and *y* coordinate points, and therefore are considered precise enough for conservation planning purposes. All records were collected between 1995 and 1996.

HABITAT AND HABITAT ASSOCIATIONS

R. t. abdominalis is tied to fine, sandy soils, often with wholly or partly consolidated dunes referred to as the "Delhi" series (USFWS 1993). The fly if typically found in relatively intact, open, sparse, native habitats with less than 50% vegetative cover (USFWS 1997). The vegetation type, desert sand-verbena series includes *Eriogonum fasciculatum, Croton californicus, Lotus scoparius,* and *Oenothera californica* (Sawyer and Keeler-Wolf 1993). In most cases, *Eriogonum fasciculatum, Heterotheca grandiflora,* and *Croton californicus* are associated with the presence of Delhi sands flower-loving fly (Ballmer1989, USFWS 1997). In addition, *Ambrosia acanthocarpa, Amsinkia intermedia, Eriastrum sapphirinum, Eriogonum thurberi, Lessingia glandulifera* (USFWS 1993), and *Eriastrum filifolium* (Cazier 1985) have also been found in association with *R. t. abdominalis.*

BIOGEOGRAPHY

The Delhi Sands flower-loving fly is restricted (endemic) to the Colton Dunes (Delhi soil series) that once covered over approximately 40 square miles in northwestern Riverside and southwestern San Bernardino counties in southern California (USFWS 1997; USDA 1980, 1990) in irregular patches. The historic range of the Delhi Sands flower-loving fly likely extended over much of this area. All known extant populations of the Delhi Sands flower-loving fly occur within an 8 to 11-mile radius of each other within the counties of Riverside and San Bernardino (USFWS 1993; 1997) straddling Interstate 10 in the vicinity of Colton and Rialto, Riverside and San Bernardino Counties ranging from Colton to Mira



Loma. Nearly all of the remaining habitat is privately owned and distributed largely within the vicinity of Colton, Rialto, Fontana, Ontario, and the Prado-Mira Loma area, with the most contiguous and highest quality habitat in Colton.

KNOWN POPULATIONS WITHIN WESTERN RIVERSIDE COUNTY

The distribution of the Delhi Sands flower-loving fly within Riverside is limited to the northern portion of the County in the vicinity of Mira Loma, Jurupa, and the Agua Mansa area. The Delhi series soils extend east-west along Interstate 60 within the County of Riverside.

KEY POPULATIONS IN PLANNING AREA

Although few areas of Riverside County have been surveyed for *R. t. abdominalis*, there are known localities in the Jurupa Hills area and within the Aqua Mansa Industrial Center. The historic range also extends west into the Mira Loma area. Known populations occur adjacent to the Prado/Mira Loma area of Riverside County. For purposes of species recovery, all known populations and recoverable vacant soils are considered key areas within the western Riverside planning area.

BIOLOGY

Genetics/Systematics: Taxonomic studies by Sinclair, *et al.* (1993), Woodley (1989), and Yeates (1994) have recently included the genus *Rhaphiomidas* into the family Mydidae. This genus includes 19 species and 5 sub-species in southwestern United States and Mexico (Rogers and Mattoni 1993; Cazier 1985). Much study conducted on museum specimens (Coquillett 1891; Townsend 1895; Cazier 1941) placed the species into *R. episcopus, R. mellifex, R. terminatus,* and finally into *R. abdominalis*. In 1985, Cazier revised the genus and determined that *R. abdominalis* was a sub-species of *R. terminatus*.

No genetic analysis studies have been conducted.

Diet and Foraging: The only observed foraging events have involved a few brief nectaring events on California buckwheat flowers (USFWS 1997). Rogers and Mattoni (1993) were unable to determine what the larval stages ate. It is unclear whether the early stages are herbivores, detrivores, or carnivores (USFWS 1997).

R. t. abdominalis has a long proboscis which is used for extracting nectar from flowers (USFWS 1993).

Daily/Seasonal Activity: The adult stage can only be found on the surface for a few days during the late summer, however the larval stages are present year-round in the soil. The larval stage may last for two or more years (USFWS 1997).

Rogers and Mattoni (1993) found that the females became active at 10:00 hours, regardless of cloud cover and became inactive at 18:00 hours unless ovipositing.

Reproduction and Development: The single reproductive period for *R. t. abdominalis* occurs in August and September, when the adults emerge from pupae and take flight. The males are more active than the females, probably searching for mating opportunities (USFWS 1993). The males out number the females 2:1. Eggs are deposited in sand and may lay at least 50 eggs (Ballmer 1989). Oviposition locations may be tied to certain vegetation characteristics; similarly to the genus *Apiocera* (Cazier 1985).

Larvae develop and may spend one to two years under the surface of the sand. They develop into pupae when fully developed and emerge (USFWS 1993).

Survival: There is no information regarding survival.

Dispersal: There is no information regarding dispersal.

Socio-Spatial Behavior: There is no information regarding socio-spatial behavior.

Community Relationships: There is no information regarding community relationships, however Argentine ants may predate on *R. t. abdominalis* (USFWS 1997), and asilid flies in the genera *Proctocanthus* and *Promachus* are known to prey on *Rhaphiomidas* flies (Rogers and Mattoni 1993; Cazier 1985). Additionally, subterranean predatory insect, reptiles, and mammals may opportunistically take *R. t. abdominalis* larvae and pupae.

THREATS TO SPECIES

Formerly widespread over the Colton Dunes, the Delhi Sands flower-loving fly now is restricted to 12 known populations, of which 11 are small and highly vulnerable to extinction. Virtually all populations occur in small, isolated habitat patches surrounded by incompatible land uses. Extensive surveys for *R. t. abdominalis* by Ballmer (1989) and others (USFWS 1993, 1997) indicate that it now only occupies 2.5% of the total Delhi sands available.

The greatest threat to the Delhi Sands flower-loving fly is loss and degradation of its habitat. Urban development, agricultural uses, sand mining, and invasion by exotic species. Dumping of cow manure and trash have also caused significant loss and modification of the species' habitat. Other threats include off-road vehicles and collecting.

SPECIAL BIOLOGICAL CONSIDERATIONS

The Delhi Sands flower-loving fly is endemic to the Colton Dunes (Delhi series soils) in areas that contain suitable conditions for the subterranean early stages, adult nectar sources, and adult feeding, breeding, and perching areas. Soil and climatic conditions, and other ecological and physical factors contribute to the maintenance of open sand areas within the species range.

Since the Delhi Sands flower-loving fly is endemic to the Colton Dunes and is strongly associated with the Delhi soils series, protection of this habitat is imperative for conservation of this species. Conservation needs will require protection and management of occupied and restorable habitat, removal of exotic vegetation, and reduction of other threats to the species and/or its habitat.

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APPENDIX E

POTENTIAL IMPACT OF ALTERATION OF OUTFLOWS ON POPULATIONS OF THE SANTA ANA SUCKER

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POTENTIAL IMPACTS OF ALTERATION OF OUTFLOWS OF THE RIX PLANT ON POPULATIONS OF THE SANTA ANA SUCKER

Draft Report

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Introduction

The Rapid Infiltration/Extraction Waste Water Treatment Facility (RIX) of the City of San Bernardino provides most of the surface water flows for part of the Santa Ana River during most of the dry season. This outflow enters the river channel northeast of Riverside, about 2.2 kilometers (1.4 miles) upstream of the Riverside Avenue Bridge, and provides 60 to 70 cubic feet per second (cfs) of flow. This flow is not significantly increased until the vicinity of Mt. Rubidoux and the Mission Road crossing downstream where tributaries and groundwater upwelling add to the flow. In this upper area the RIX flow supports a population of the federally threatened Santa Ana sucker, *Catostomus santaanae* (U. S. Fish and Wildlife Service 1999, 2000). Additional small numbers of sucker occur farther down the river to the Imperial Highway crossing in Orange County. Since recent studies have shown that most of the suckers and much of their reproduction occurs in this upper reach of the river (Swift 2001), any changes to the amount, quality, and flow characteristics of the water could have serious impacts to this fish. This report summarizes the biology of the sucker, discusses the possible ways that changes in the flow parameters might affect the fish and suggests possible ways to mitigate for potential changes in the RIX flows.

Most of the information available on the biology of the sucker in the Santa Ana River was summarized very recently by Swift (2001). His report discusses many of the studies of the sucker up to the present time in the Santa Ana River with recommendations for future work. In addition, a conservation plan for the sucker in the Santa Ana River was prepared by Haglund and Baskin (2000) and continues to be updated with changing conditions and as additional knowledge is acquired about the sucker. Continued field work in June and July 2001 have provide additional observations, along with work in the other two localities holding the sucker, the upper San Gabriel River and lower Big Tujunga Wash in Los Angeles County. Various aspects of projected changes in RIX operations and flows were available in a Webb Associates report (1999), and these and other issues were discussed with Kathy Dales in Riverside on May 9, 2001. On May 23, 2001 Dales, Swift, and Scott Hildebrandt, met at the RIX site, surveyed the river for about half a mile below the RIX outlet in the river, and took representative transects. When we arrived at the river at about 09:00 hours 30 to 70 centimeters of the shore was exposed and the river rose to cover the "normal" flow levels in an hour or so. On the morning of June 16, 2001 while conducting other studies on the sucker, a dramatic lowering of the water level occurred. During this event the flow volume was observed to drop by 70% to 80% for a period of an hour or so. Kathy Dales of Albert Webb Associates forwarded additional photographs, typical channel geometries, and maps based on the RIX outlet channel and the river channel within 500 meters of the RIX outlet in the river. Also utilized were parts of a report by WE Inc. (2000, revised 2001) on the projected changes in total dissolved solids (TDS) and total inorganic nitrogen (TIN) for the RIX operation. All of these were incorporated into the following analysis.

Biology of the Santa Ana sucker

The Santa Ana sucker was native to a small area of coastal southern California with about 5 endemic freshwater fishes and two or three others that were more wide ranging (Swift et al. 1993). It attains about 20 centimeters (8 inches) in length and lives for three or four years at a maximum. It belongs to the subgenus *Pantosteus* (of *Catostomus*), or mountain suckers, known for being smaller in size and more strictly adapted to cooler, faster streams than other suckers. This subgenus is found in the southwestern United States and nearby Mexico (Swift 1980; Smith 1966). They are known to graze on algae and other organisms that grow on gravel, cobble, rocks, logs, and other firm or hard substrates. Santa Ana suckers were shown to eat such foods in the upper Santa Clara River, Los Angeles County (Greenfield et al. 1970), where the species is introduced. They can seldom be found in standing water of ponds, backwaters, lakes or reservoirs and are usually rare in area with predominately sandy or muddy substrates.

In the Santa Ana River the suckers are most abundant in the 9 or so kilometers from the RIX Plant downstream to the so Anza Narrows area identified by the the lower end of Mt. Rubidoux, the Union Pacific Railroad Crossing, or the MWD Pipeline crossing. This upper segment of the river has the most gravel, cobble and rocky substrate as well as several tributaries that contribute to some parts of the sucker life cycle. In the Narrows region and farther downstream sand and mud predominate and suckers are rare. Downstream of Prado Dam the substrate become more desirable again but suckers remain rare for unknown reasons, although increases in turbidity, exotic (non-native) fish and amphibian predators, and increased salinity may all be factors. Partial or complete barriers to upstream movement by suckers exist just below River Road, just below Prado Dam, and below Weir Canyon Road crossing. Thus fish that go downstream cannot return to join the majority of the population upstream.

Even upstream the adult suckers were found widely scattered in the few deeper pools (more than 30 or 40 cm deep). About one of these pools occurred per 100 meters of stream. This is in contrast to sucker populations in the upper San Gabriel River and Big Tujunga drainages where adults are much more common in shallow water over rock, cobble and gravel.

It is virtually certain that all reproduction by suckers in the Santa Ana River takes place from the Mt. Rubidoux area upstream to the RIX Plant and a short distance beyond in the Rialto Drain. Fish do not apparently invade the river above Rialto Drain even during high winter flows. The fish spawned from about mid-March to mid-May in 2000 and 2001, and some variation around this time period is to be expected depending on the timing of high storm flow events in the spring. The fish spawn on gravelly riffles in the Rialto Drain, Sunnyslope Creek and undoubtedly in various suitable areas in the main river between these two points. Spawning apparently does not take place in the RIX outlet itself, nor in several other tributaries downstream. Presuming the Santa Ana sucker is like other similar species, the eggs take 5 to 10 days to hatch and the early larvae spend another few days in the gravel before becoming free-living in the water. Water temperatures varied from about 15 to 25 degrees during the period that spawning was taking place.

Larvae eight to 12 millimeters long appeared in aggregations of about 5 to 30 individuals in the shallowest flowing water at the edges of the stream usually 15

centimeters or less in depth and tapering gradually to shore. Sections of stream that were more entrenched with the water abruptly deepening from shore usually had few larvae. Broad flat sand bars and areas where tributary branches entered the larger river often held even larger numbers of larvae. Larvae transformed into juveniles (essentially miniature adults) at 12 to 15 millimeters in length and moved to progressively deeper water along the same gradually sloping bottom. This was usually in areas with sandy or muddy substrate and with undulating bottom of sandy ridges and ripple marks two to twelve centimeters in height in water 30 centimeters or less in depth. In a few weeks as the young-of-the-year (YOY) suckers attained 30 to 50 millimeters in length in June and July they began to inhabit deeper parts of the river and become more associated with gravelly and rocky areas of the stream. Beginning in May some YOY fish can be found farther downstream beyond the Anza Narrows area all the way to Imperial Highway, although the numbers are far fewer than occur in the upstream area. Some of these fish take up residence and mature since adult suckers are present but rare in the river downstream of the Anza Narrows area.

It is apparent that the vast majority of the adult population of suckers in the Santa Ana River, as well as the only definitely known spawning areas are in the 8 to 10 kilometers of stream below the Rialto Drain and RIX outlets downstream to the Anza Narrows. Most of the low flow water in the upper half or more of this upstream area comes from the RIX Plant with minor contributions by the Rialto Drain and several tributaries near Mt. Rubidoux.

Only a few adult suckers have been observed in the channel leading from the outlet of the RIX Plant to the main river channel. Up to five adult suckers have been observed in the large plunge pool at the outlet, and none could be found in along the rest of the outlet. Larvae and young of the year were common to abundant in the vicinity of the channel where it meets the river in April and May. Usually these YOY were in the warmer river water on the south side of the river channel and seemed to avoid the cooler RIX water that tended to remain on the north side of the river channel for the first 200 to 400 meters downstream of the confluence. Later in May and June the larger young suckers prefer the (now cooler) water on the north side. The RIX outlet is usually between 20 and 25 degrees C. all year, and thus is warmer than the river early in the year when spawning begins but by late May is cooler than the river. The preferred temperature during actual spawning is not known but may be lower than that in the RIX outlet since no larvae and few adults were found there early in the year whereas the Rialto Drain supported much spawning. The Rialto Drain (and the main river) reach somewhat lower temperatures early in the year due to low air temperatures. The RIX water is artificially warmed by ultraviolet light treatment and thus shows little or no decline in temperature in the winter.

Other water quality parameters have been measured by various workers (Saiki 2000) and are within normal limits. Saiki found low levels of many of the common contaminants in sucker from the MWD crossing area and Imperial Highway. Actual tolerance limits for common requirements like oxygen concentration, pH, and salinity or dissolved solids like nitrogen, phosphorus, and others, is not known. Saiki's observations are based on daytime collections and 24 cycles in such parameters are poorly known, although the USGS has been monitoring aspects of the rivers water resources for a few years now (Carmen Burton, personal communication).

Other Fishes

Only one other native species occurs in the Santa Ana River with the sucker presently, the arroyo chub, *Gila orcutti*, a California Species of Special Concern. The distribution of chub in the Santa Ana River is similar to the sucker; it is most common in the upper river from RIX downstream to the Anza Narrows area and very rare or absent farther downstream (Swift 2001).

About fifteen additional exotic (non-native) fish species are established in the river as game or bait fish or for mosquito control (Swift 2001). Most of these exotics are adapted to slower moving streams with backwaters or lakes and ponds and thus are rare in the upper part of the Santa Ana River where suckers are the most abundant. The two exotics that are common upstream with suckers are the tilapia, *Oreochromis sp.*, and mosquitofish, *Gambusia affinis*. The tilapia are tropical fish originally from Africa, are sensitive to winter cold, and probably survive in the RIX outlet and a few other effluent outflows because they are relatively warm in winter. Most if not all of these exotic species have been implicated in adverse effects on native minnows and suckers in other areas and could impact suckers in the Santa Ana River. The fact that the suckers are most abundant upstream where exotics are rare, and rare downstream where exotics are common indirectly suggests the exotics are having some effect. However, most of the exotics are better adapted to conditions downstream whereas the suckers are better adapted to conditions upstream. These differences undoubtedly also contribute to the difference in distribution. The high winter flows often decimate the exotics so they are rare in the spring when the suckers spawn. The exotics build up in numbers somewhat later than the suckers so usually the suckers appear to be seasonally "ahead" of the exotics in reproduction. This combination of habitat preference and early spawning by the suckers is probably at least partially protecting them from competition from, and predation by, the exotic species.

Santa Ana River

The Santa Ana River flood plain from the RIX Plant downstream is constrained between rip-rapped levees 150 to 250 meters wide. The floodplain is relatively flat with a mixture of sand, gravel, rocks, and occasional boulders. Intermittently 10 to 30 meter long rows of boulders (gabions) extend inward from the levees to help deflect water flow away from the edges of the levees. The actual wetted channel of the river meanders back and forth between the levees and often is margined with dense vegetation. During high winter storm flows, much of the vegetation is removed, but it regrows in spring and summer to provide a border on the stream of herbaceous vegetation at the water's edge. Taller willow trees, cottonwoods, and Arundo remain in some areas. The latter larger patches of vegetation provide obstructions that resist water flow causing the water to excavate deeper pools where the suckers tend to be found, as noted above. These resistant patches have been documented to be native cottonwoods and willows, as well as Arundo, the introduced bamboo-like plant already the object of a large eradication effort in the drainage and elsewhere.

The wetted channel usually is 5 to 20 meters wide with depths from 0 to 30 centimeters with occasional deeper pools to about 1.5 meters. Most of the channel is relatively broad and shallow and with moderate cover or canopy. Cover means places in the stream where fish could hide, namely large rocks, logs, undercut banks or overhanging vegetation. After high spring flows the shores are scoured clean and little cover is available and mostly consists of larger boulders and rocks, occasional large trees or Arundo patches that are not washed away, and water deeper than about 50 centimeters that constitutes cover by virtue of depth. As the season progresses, low herbaceous vegetation grows along the shores and a short distance (10 to 60 centimeters) out over the water from the shore. Thus late in the summer and fall an almost continuous narrow band of cover exists along both shores. Canopy is the higher vegetation that overhangs and shades the surface of the stream. Only 10 or 20% of the river has significant canopy above the Prado Basin.

The water from the RIX and Rialto is very clear and thus the river has high clarity downstream to the Anza Narrows area where the turbidity slowly increases downstream due to the suspension of finer sediments. As noted above the temperature fluctuates over a narrow range coming from the RIX Plant, usually 20 to 25 degrees C. This differential extends for a few hundred meters downstream in the river. In winter the river is often colder than the RIX outflow and in summer it gets warmer, at least in mid-day when the river will get up into the low 30s degrees C. Farther downstream the river gets this warm many summer days and only a few tributaries like Evans Lake Drain, Mt. Rubidoux Creek, Arroyo Tequesquite, and Anza Park Drain stay as cool as the RIX effluent. These cooler temperatures are more typical in the San Gabriel River and Big Tujunga Wash where the suckers occur at higher elevation and in greater densities of fish.

The gradient or slope of the river in this upper area of the Santa Ana River is 0.43% and declines to .24% to .34% downstream of the Anza Narrows. This higher gradient helps to maintain the rocky, cobbly and gravelly substrate; steeper channels flush away finer sediments and leave the coarser component. In a few areas where rip rap borders the wetted channel it contributes to the hard substrate component. However, flood control agencies try to keep the channel away from the rip rapped levee sides to avoid eroding into them. In the stretches of the San Gabriel River and Big Tujunga Wash where suckers occur the gradient is mostly 1% to 2.5%, and consequently higher proportions of relatively larger aggregate are exposed.

The substrate is usually 60% to 100% gravel, cobble, and rock from the RIX Plant downstream to about Mission and gradually becomes less to the Anza Narrows where it becomes virtually all sand. This shifting sand substrate overwhelmingly predominates the river down to Prado Dam. It is uncertain to what extent the coarse substrate upstream is due to the gradient or slope and consequent strong flows preferentially exposing it, and the greater presence of coarser items in this area compared to downstream.

RIX Channel

The RIX Channel between the Plant outlet and the main river is narrow and deep, 3 to 6 meters wide and 30 to 100 meters deep. The flow is relatively rapid and shallow margins are virtually nonexistent. Cover is restricted to the vegetated margins and 70 to

100 percent of the channel has a canopy of willows and Arundo. Several photos provided by Albert Webb Associates agree with my observations, except that on one occasion they show the outlet channel divided into two separate ones on the way to the main river. The strong narrow flow maintains the bottom largely of larger gravel, cobble and rock. The dense trees and Arundo around most of the channel keep it well shaded. This dense canopy has developed since the RIX outlet channel usually has escaped the scouring action of high winter flows.

As noted on the Albert Webb Associates studies, the average flow at the RIX Plant currently is about 60 to 70 cfs, a relatively constant and continuous flow at all seasons. The only variation appears to be due to weekly to biweekly safety events that cause the plant to shut down for short periods, a few minutes to a couple of hours. This results in the dramatic reduction in flows that have been observed by several biologists and noted above as occurring during two of this author's recent visits. The RIX flow is augmented by 10 to 15 cfs from the Rialto Drain upstream, and during the winter storm season runoff contributes to higher river flows with one or more storm peaks in most years.

Since the first few winter storms often mostly are absorbed by the dry ground, the increase in river flows usually do not occur until January or later and extend into early May. These flows can increase the river to 1000 to 2000 cfs for a day or more and may maintain a flow of over 200 cfs (including RIX input) for much of the January to May period (USGS flow records from MWD crossing). In the past these peaks probably lasted longer and the drop in flow was more prolonged. With increased human population and development in the inland empire these peak runoff events become stronger (have higher flows)and last for shorter periods of time. Such an increase in "flashyness" of arid land streams is commonly observed with increasing human population, and this trend should be expected to continue until the region is "built out".

The hard substrate in the RIX outlet channel and for a few hundred meters downstream is coated with a dark green to black algae that diminishes below Riverside Drive and is replaced by lighter brown and green algae. The reason for this difference is not known and does not seem to have a relation to the distribution of suckers.

Project effects

The project proposes several scenarios of reduction in flow for recycling of various proportions of the RIX flow. The most extreme reduces the flow by about 50%. Superimposed on these proposed reductions are projections for increased flow predicted to come through the RIX Plant. The combination of these features results in a predicted increase in both recycled water and water to be discharged into the river at least until 2040 (WE Inc. 2001, Table 2a). By that time about 110 cfs will be produced, about double the current output. The proposed recycling scenarios in the same table show discharge rates (presumably into the river) from about 44 to 60 cfs by 2010 and from 48 to 85 cfs by 2040. Collectively these represent from about 67% to 130% percent of current average flows into the river. The initial study by the City of San Bernardino proposed as much as a 50 percent reduction in the near future but figures this low are not

presented in the WE Inc. analysis. The analysis of TDS and TIN also predict little change in those parameters.

The sucker and its habitat would be benefited by increases in the flow, and subject to possible detrimental changes with reductions in flow. The degree of change would, of course, be related to the amount of reduction. The actual amount of habitat would be reduced because a lower flow would cover less stream bottom. The reduced habitat would support fewer fish and other supporting organisms that provide food and shelter. A smaller volume of water would be subject to greater fluctuations in temperature since a smaller volume of water is more prone to solar heating than a larger one. The reduction in depth would reduce the protection of cover from predators provided by depth alone when other cover is not available. The amount of loss would vary depending on the channel configuration and as noted above the configuration changes with the season.

Relatively narrow deep channels, such as the immediate outlet of the RIX Plant would not decline in area much because they have steep sides and lowering the water by half or less still leaves 80% or 90% of the bottom with water over it. Even though the water is shallower, it is so well shaded that little temperature change would occur. However, in the main river where more width, exposure, and gradual sloping of the shores exists, particularly early in the year, 30 to 50 percent of the wetted channel could be lost. The illustrated cross sections prepared for this study appear to show relatively deep channels that would not lose much area of wetted channel, but the horizontal scales vary considerably such that considerable lateral extent of wetted channel is indeed lost with the maximum flow reductions. This is accounted for in the text by references to reduction in width but is difficult to appreciate visually in the cross sections because of the different scales of the vertical and horizontal axes. The dramatic reductions in flow apparently inadvertently caused by the "fail safe" warning system in the plant has demonstrated to several observers that 30 to 60 percent reduction in wetted surface of the stream can occur with a 50% reduction in flow. Of course even greater reductions have been observed that reduce the habitat even more. These reductions will be most pronounced in the low flow periods when the river is most dependent on the RIX flow and may be relatively slight when winter high flows are added to the main river flow.

Analysis

Obviously the RIX Plant is providing 80% to 90% of the water available for sucker to live in for the upper 6 to 7 kilometers of river upstream of Mt. Rubidoux. Since this stretch of river is the main population center of the sucker and the only region known as a spawning area, the RIX flow is, or has become, very important to the survival of the species in the Santa Ana River. The RIX Plant is supplying water to an area that probably would not have enough water to support the fish under current conditions, but probably had permanent flows in the early1800s before large scale water use began. Indeed, the type locality, the place where the Santa Ana sucker was first collected and recognized to be a new species, was the Santa Ana River at Riverside (Snyder 1908). The tremendous need for water has placed the Santa Ana River population of suckers in

the worst condition of the three known populations, and the RIX Plant water is the primary reason suckers still survive in the river.

The benefits of the RIX flow to the sucker are more than just the existence of water in the stream. The relatively high quality of the water is beneficial since other runoff is notoriously degraded for a variety of reason. For example, despite considerable effort in the last three to four years, no suckers have been taken in the Chino and Cucamonga creeks tributary to the Prado Basin area despite considerable clarity and hard substrates. Presumably some water quality issue is keeping both remaining native species, Santa Ana sucker and arroyo chub, from invading these tributaries they inhabited historically. The temperature of the RIX outlet is desirable for suckers in the summer when the river proper can reach much higher temperatures. The clarity of the water is also advantageous because it allows the light penetration that supports the growth of the surface organisms on the rocks and gravel providing the preferred food of the suckers.

The adverse effects of the RIX outflow are primarily due to two factors, the temperature (in winter only) and the unnatural fluctuations in flow. The temperature has been observed to be too warm for the youngest suckers early in the spring and possibly deters spawning in the area also because it is too warm. More study is needed to absolutely confirm this but all observations so far point in that direction. The dramatic periodic reductions in flows probably explain why groups of adults are widely scattered in the deepest pools downstream and largely absent from many shallower areas otherwise suitable for them. These deep pools are the only refuges when the water drops considerably and are the key to the sucker's survival. Some mortality of mosquitofish and young tilapia (but not of suckers) has been observed during these low flow events. These small fish were stranded in the shallows as the water receded drastically over a short period of time. Such lowering could cause considerable mortality on the youngest suckers that are restricted to the shallowest stream waters. However, when the first young appear, usually some other winter flows are contributing to the river and the effects of the reductions at the RIX source may not have as much effect. No observations of these effects during the early spring high flow periods are available to the author. In any case, if the regular outflow of the RIX Plant was reduced by 50%, these interrupted flow events have the potential to leave very little water in the river for several kilometers downstream at least during the low flow season of the year, from about late May to December. Such extreme lowering would compromise the survival of the suckers by severe absolute reduction of water to survive in as well as exposing them to predation by birds and other predators. It presumably also leads to a certain amount of mortality among other aquatic organisms utilized for food by the suckers. On the positive side these fluctuations may be helping to keep the exotic predators at low levels in this upstream area.

Assuming the quality of the water and the habitat stays the same or improves, the main factors necessary for maintaining the sucker population are probably the amount of water and a relatively natural flow regime. Some reduction in flow might be mitigated for by guarantees of a regular flow without the drastic periodic reductions now occurring at the RIX Plant. Suckers can live in streams with lower flows, such as Haines Creek in lower Big Tujunga Wash, which has a flow of 10-20 cfs during the low flow periods, and extends for about three kilometers into the Hansen Dam Flood Basin. It supports a continuing Santa Ana sucker population, the size of which is not known. It is possible

that even with reduced flows that elimination of the fluctuations would support more suckers than now occur. If accompanied by habitat improvements such as lower temperature, more cover, and removal of exotic species a larger population of suckers might be supported with less water. Although exact data are not available on the numbers of suckers supported by various sizes of streams, comparisons with denser populations in the other two localities suggest that such habitat improvements could compensate to some extent for lower levels of water flow in the dry season. In some ways the most severe effect is the current one of repeated severe drops in flow that, if eliminated, could support a larger sucker population even with less water.

As noted above, the habitat in this area of the Santa Ana River improves (in terms of gradient or slope and substrate type) in an upstream direction. Suckers do not occur upstream of the RIX-Rialto Drain source because of the lack of water. Albert Webb Associates (1999) note that some groundwater upwelling occurs near La Cadena Street upstream, and another native species of minnow, the Santa Ana speckled dace, *Rhinichthys osculus ssp.*, a California Species of Special Concern, occurs in the vicinity of the I-215 crossing of the river (Swift 2001). Perhaps some combination of high quality water released farther upstream could increase the amount of high quality habitat to compensate for loss of habitat downstream, or to replace lower quality habitat farther downstream below the Anza Narrows area. If so, other factors, such as barriers to migration (drop structures at La Cadena Avenue), come into play and would complicate recovery of the sucker. Another alternative may be to invest in habitat improvement downstream of the Anza Narrows where suckers occur but are not faring as well as in the upstream area. Additional water is available from the Mt. Rubidoux area downstream and the habitat is not as dependent on the RIX flows as upstream.

It seems clear that any reduction in flow would have some adverse effects on suckers, all other things being equal, and that a 50% reduction could not help but have severely adverse effects on the sucker population. In view of the projected potential increase in flow to the river in the future (under some scenarios), even with some recycling, it would seem possible to accommodate the sucker also. Perhaps most critical is the interim period coming soon when reduced discharge into the river is not yet matched by increased supply as projected. Interim measures should be developed that will prevent the loss of the fish through this period until the higher flows become available. While the thought of hatcheries or artificial propagation come to mind, such solutions are rarely scientifically defensible except in the most dire situations, such as with the California condor, where the population is reduced to very few individuals. Many other such efforts with other fish species usually have led to significant loss of genetic diversity. With the Santa Ana sucker, two other populations exist outside the Santa Ana system in the separate and independent San Gabriel and Big Tujunga drainages. Unless the Santa Ana River population was shown to be significantly unique genetically, the U. S. Fish and Wildlife Service probably would not agree to captive rearing as a suitable solution to loss of water in the river.

Recommendations

1. Maintain as much flow as possible in the Santa Ana River since currently, and for the foreseeable future, the RIX flows are most of what is supporting the sucker in the system.

2. Establish a minimum flow for maintenance of the sucker population in the Santa Ana River.

3. Maintain a natural or nearly natural flow regime to avoid or eliminate the drastic fluctuations now evident in the upper segment of river.

4. Improve the natural habitat in and downstream of the RIX Plant to mitigate for the loss of water flow.

5. Improve the RIX outlet itself for use by suckers by widening the flow, removing some canopy, and cooling the winter flows so suckers can use the channel for spawning.

6. Mitigate for water loss by improving habitat upstream or far downstream beyond the major influence of the RIX flows.

7. Develop interim plan for the transition from existing operation to recycling with increased flows so no net loss of water occurs in the river.

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APPENDIX F

HYDRAULIC REVIEW OF THE RIX PLANT DISCHARGE TO THE SANTA ANA RIVER

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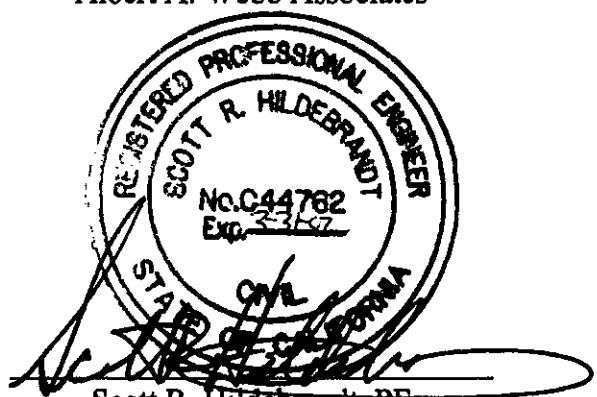
HYDRAULIC REVIEW OF THE RIX PLANT DISCHARGE TO THE SANTA ANA RIVER

San Bernardino Municipal Water District

June 2001

Approved By:
Albert A. Webb Associates



Scott R. Hildebrandt, PE
Principal Engineer

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INTRODUCTION

The purpose of this report is to address the potential environmental impacts associated with the reduction in wastewater treatment plant (WWTP) discharge from the RIX Plant into the Santa Ana River. The primary concerns of the reduction of flow are to the habitat for downstream water quality and surface water recharge riparian vegetation, the Santa Ana Sucker, and other relevant species.

In order to prepare this report, research was conducted in two methods. First, discharge information was gathered to determine the baseflow rate in the Santa Ana River above and below the RIX WWTP discharge point and for the RIX WWTP itself. Second, a field investigation was conducted to observe the flow characteristics and channel geometry. This data was used to calculate the various flow characteristics at specified points along the channel and the river to determine what impacts might occur from the reduction of flow from the RIX WWTP.

In order to determine the impacts to the Santa Ana River as a result of the reduction of flow from the RIX WWTP, a general characterization of the river must be established. For the purposes of this report, the Santa Ana River is characterized as a seasonal stream with a low flow or base flow that is comprised of discharge from the Rialto WWTP and the RIX WWTP. It is this WWTP discharge that supports the riparian habitat and provides recharge.

BASEFLOW DATA

Discharge in the Santa Ana River can be considered as two components, baseflow and storm flow. Rising groundwater was not considered as a factor in the Santa Ana River in the reach adjacent to the RIX WWTP. In fact, data from the United States Geological Survey (USGS) indicates that recharge occurs in this reach. The data for baseflow and storm flow in the Santa Ana River was obtained from the Santa Ana River Watermaster report for the 1998-1999 water year published in April 2000. For the purposes of this report, the 1998-1999 water year data was used in this analysis to represent a typical annual discharge.

Additional data provided by the USGS was based upon actual streamflow measurements taken in October of 2000.

Data from the Santa Ana River Watermaster report includes WWTP discharge and streamgauge information taken at the Riverside Narrows. Data from the USGS includes WWTP discharge and streamgauge information taken above and below the RIX WWTP and the Rialto WWTP. In order to determine baseflow within the Santa Ana River upstream and downstream of the RIX Plant, the components of the baseflow are established as follows:

Baseflow above RIX Plant: WWTP discharge from Rialto

Baseflow below RIX Plant: WWTP discharge from Rialto and RIX discharge less recharge from Rialto WWTP.

Storm flow was established as the storm flow component measured at the Riverside Narrows. The storm flow component of flow was established as 3,200 acre-feet. The storm flow component of flow is significantly lower than the level expected during major storm events (i.e., 10-year to 100-year storm events) where storm flows can reach levels of 200,000± acre-feet (1992-93 & 1982-83 & 1979-80); therefore, the impact associated with combined baseflow and storm flow are considered to be the same as baseflow only.

Using the information from the most recent Santa Ana River Watermaster report and the USGS, the following was established as the annual baseflow and storm flow upstream and downstream of the RIX Plant.

Baseflow above Rialto Plant =	0 Ac.Ft.
Baseflow above RIX Plant =	7,674 Ac.Ft.
Storm Flow + Baseflow above RIX Plant =	10,874 Ac.Ft.
Baseflow below RIX Plant =	58,207 Ac.Ft. [1]
Storm Flow + Baseflow below RIX Plant =	61,407 Ac.Ft.

Using the information from the RIX Plant Operations Department, the annual discharge to the Santa Ana River was established as follows:

Average Annual Discharge from RIX Plant =	47,587 Ac.Ft.
Observed Annual Discharge from RIX Plant =	48,074 Ac.Ft.*
Reduced Annual Discharge from RIX Plant =	29,592 Ac.Ft.**

* Observed daily flow (42.9 MGD) extrapolated to annual flow
** Reduced daily flow (26.0 MGD) extrapolated to annual flow

[1] Based upon an average baseflow measured by the USGS of 80.4 cfs.

For the purposes of this report, discharge information was converted from acre-feet per year (AF) to cubic feet per second (cfs) to be consistent with the data used in the hydraulic computer model. Additionally, discharge from the RIX Plant which has been reported in millions of gallons per day (MGD) was also converted to cubic feet per second (cfs). Acre-feet per year (AF) is converted to cubic feet per second by dividing AF by 724, and millions of gallon per day (MGD) is converted to cubic feet per second (cfs) by multiplying MGD by 1.548. All data for each location is presented in Table 1.

TABLE 1

Location	Discharge (AF)	Discharge (MGD)	Discharge (cfs)
Baseflow above RIX Plant	7,674	6.8	10.6
Storm flow + baseflow above RIX Plant	10,874	9.7	15.0
Baseflow below RIX Plant [1]	58,207	51.9	80.4

Storm water + baseflow below RIX Plant	61,407	54.8	84.4
Average Daily Discharge from RIX	47,587	42.4	65.7
Observed Daily Discharge from RIX 07-20-00	48,074	42.9	66.4
Observed Daily Discharge from RIX 05-23-01	44,874	40.0	61.9
Reduced Daily Discharge from RIX	34,535	30.8	47.7
Storm Flow Component of Flow in the Santa Ana River in this reach	3,200	2.9	4.4

(1) Baseflow component includes average daily discharge from RIX plus baseflow from Rialto WWTP, less recharge observed by the USGS. This value was adjusted to 72.2 cfs for the field observations taken on May 23, 2001 due to the change in discharge from RIX on that day. No recharge was assumed for the second set of field data.

FIELD OBSERVATION

On July 20, 2000 and May 23, 2001, this office conducted a field investigation of the RIX WWTP outlet into the Santa Ana River and the Santa Ana River channel. The purpose of these investigations were to observe the average outflow characteristics from the plant without disturbance of storm flow. Based upon the field investigation the following information was established:

1. The discharge from the RIX WWTP is a continuous discharge that fluctuates between 36 MGD and 43 MGD.
2. No base flow was observed upstream of the Rialto WWTP.
3. The outlet channel consists of braided streams that converge at the confluence with the Santa Ana River.

Cross-sectional information along the outlet channel was observed at ten locations in the immediate area. Exhibit 1 shows the approximate section location. The geometric data for each cross-section is shown in Table 2. This data is used to determine approximate flooding limits, depth, and velocity. The outlet channel from the RIX WWTP is primarily influenced by the discharge from RIX. In the event of a major storm event (i.e., a 10-year or 100-year level event), the resulting storm flow will influence the outlet channel. The main Santa Ana River channel is influenced by several factors, including WWTP discharge, surface water recharge, and storm flow.

TABLE 2
Cross-Sectional Data

Cross-Section No.	Top Width	Depth	Channel Slope[(1)]
A	7'	1'	0.005
B	10'	0.5'	0.025
C	7'	0.5'	0.025
D	25'	2'	0.0027
E	25'	2'	0.0035
F	40'	1'	0.011

G	60'	1'	0.008
H	51'	2'	0.0012
I	55'	1'	0.0012
J	29'	1.25'	0.0016

(1) Based upon field measurements of Flow and Depth of Channel.

CROSS-SECTION & HYDRAULIC INFORMATION

Cross-Section "A" - Cross-section "A" was observed at the upstream end of the first braided stream as shown on Exhibit 1. The section was categorized as a trapezoidal-shaped channel with a rounded bottom with a maximum depth of one foot as shown on Exhibit 1. Flow through this section resulted in velocities sufficient enough to expose the channel bed aggregate. Under observed RIX WWTP operating conditions, the discharge is approximately 7.5 cubic feet per second, the average velocity is 2.1 feet per second, and the average width of flooding is 6.8 feet. Under the reduced discharge by 24.8 cubic feet per second from the RIX WWTP, the discharge in this section will be approximately 1.0 cubic foot per second, the average velocity will be 1.1 feet per second, and the average width of flooding will be 4.8 feet.

Cross-Section "B" - Cross-section "B" was observed approximately 50 feet downstream of cross-section "A" within the braided stream as shown on Exhibit 1. The section was categorized as an offset trapezoidal-shaped channel with a rounded bottom with a maximum depth of 0.5 feet as shown on Exhibit 1. Flow through this section resulted in velocities sufficient enough to expose the channel bed aggregate. Under observed RIX WWTP operating conditions, the discharge is approximately 7.5 cubic feet per second, the average velocity is 2.1 feet per second, and the average width of flooding is 10 feet. Under the reduced discharge by 24.8 cubic feet per second from the RIX WWTP, the discharge in this section will be approximately 1.0 cubic feet per second, the average velocity will be 1.6 feet per second, and the average width of flooding will be 7.2 feet.

Cross-Section "C" - Cross-section "C" was observed several hundred feet downstream of cross-section "B" at a point approximately 50 feet upstream of the confluence between the braided channel and the main channel as shown on Exhibit 1. The section was categorized as an offset trapezoidal-shaped channel with a rounded bottom with a maximum depth of 0.5 feet as shown on Exhibit 1. Flow through this section resulted in velocities sufficient enough to expose the channel bed aggregate. Under observed RIX WWTP operating conditions, the discharge is approximately 4 cubic feet per second, the average velocity is 2.8 feet per second, and the average width of flooding is 6.7 feet. Under the reduced discharge by 24.8 cubic feet per second from the RIX WWTP, the discharge in this section will be approximately 1 cubic foot per second, the average velocity will be 1.6 feet per second, and the average width of flooding will be 6.5 feet.

59.8 feet. Under the reduced discharge by 35.8 cubic feet per second, including river baseflow, the average velocity will be 2.2 feet per second, and the average width of flooding will be 59.6 feet.

Cross-Section "H" – Cross-section "H" was observed in the Santa Ana River at a point 300' downstream of the confluence of the river and the RIX WWTP outlet channel as shown on Exhibit 2. The section was categorized as a parabolic-shaped channel with a rounded bottom with a maximum depth of two feet as shown on Exhibit 1. Flow through this section resulted in velocities sufficient enough to expose the channel bottom aggregate. Under the observed RIX WWTP operating conditions, the discharge in the Santa Ana River, which includes river baseflow, is approximately 72.5 cubic feet per second, the average velocity is 2.0 feet per second, and the average width of flooding is 50 feet. Under the reduced discharge to 47.7 cubic feet per second, including river baseflow, the average velocity would be 1.9 feet per second, and the average width of flooding will be 40.0 feet.

Cross-Section "I" – Cross-section "I" was observed in the Santa Ana River at a point 900' downstream of the confluence of the river and the RIX WWTP outlet channel as shown on Exhibit 2. The section was categorized as a trapezoidal-shaped channel with a rounded bottom with a maximum depth of one foot as shown on Exhibit 1. Flow through this section resulted in velocities sufficient enough to expose the channel bottom aggregate. Under the observed RIX WWTP operating conditions, the discharge in the Santa Ana River, which includes river baseflow, is approximately 72.5 cubic feet per second, the average velocity is 2.0 feet per second, and the average width of flooding is 55.0 feet. Under the reduced discharge to 47.7 cubic feet per second, including river baseflow, the average velocity will be 1.7 feet per second, and the average width of flooding will be 49.0 feet.

Cross-Section "J" – Cross-section "J" was observed in the Santa Ana River at a point 1100' downstream of the confluence of the river and the RIX WWTP outlet channel as shown on Exhibit 2. The section was categorized as a trapezoidal-shaped channel with a rounded bottom with a maximum depth of fifeteen inches as shown on Exhibit 1. Flow through this section resulted in velocities sufficient enough to expose the channel bottom aggregate. Under the observed RIX WWTP operating conditions, the discharge in the Santa Ana River, which includes river baseflow, is approximately 72.2 cubic feet per second, the average velocity is 2.7 feet per second, and the average width of flooding is 29.0 feet. Under the reduced discharge to 47.7 cubic feet per second, including river baseflow, the average velocity will be 2.5 feet per second, and the average width of flooding will be 25.5 feet.

CONCLUSIONS

Based upon the results of the attached hydraulic analysis, the range of flow depths for the current RIX Plant discharge vary from 0.40± feet to 1.7±. The range of flow velocities for the current discharge vary from 2.1 fps to 3.3 fps. Both the current range of

velocity and range of flow depth are conducive habitat for the Santa Ana Sucker larvae, young, and adult species. Native vegetation has grown to the existing stream edge and has sustained growth. In reviewing the results for the reduced discharge from the RIX Plant, the range of flow depths for the reduced discharge vary from 0.20± feet to 1.2± feet. The range of flow velocities for the reduced discharge vary from 1.1 fps to 2.3 fps. While the lower depth of flow is conducive habitat for the Santa Ana Sucker larvae and young species, it is marginal habitat for the adult Santa Ana Sucker. Based upon the reduction in flooding width (varies 3 feet to 12 feet) the native vegetation will either encroach to the new stream edge or will remain in its current location. This was evidenced at Cross-Section "C" where stream flow had previously receded and the native vegetation was starting to grow back along the new stream edge. However, it is important to note that the pool at the discharge point will remain approximately 3 feet to 4 feet deep, which is conducive to the adult Santa Ana Sucker. Furthermore, the range of velocities indicates that the reduced discharge is still swift enough to transport fine to sandy sediments without transporting the gravel substrate. This is especially important if the Santa Ana River experiences a major storm event and the braided channel below the RIX Plant covered with sediment deposits from the Santa Ana River.

HYDRAULIC REVIEW OF THE RIX PLANT DISCHARGE TO THE SANTA ANA RIVER

San Bernardino Municipal Water District

June 2001

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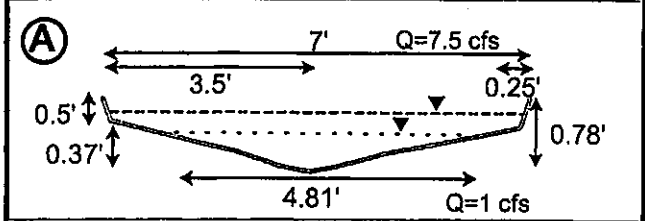
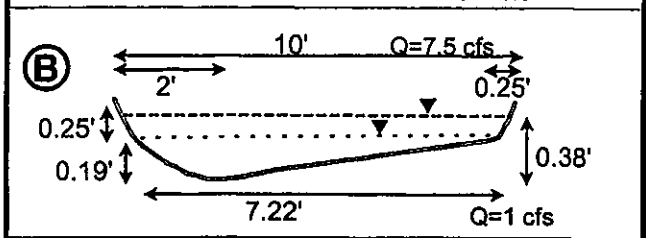
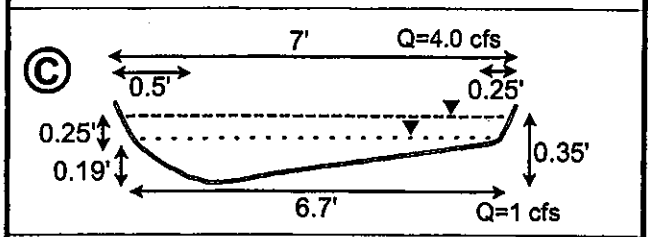
TYPICAL CHANNEL GEOMETRY

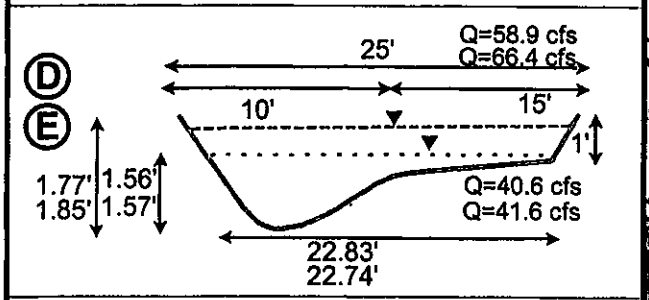
---------- Observed RIX Discharge

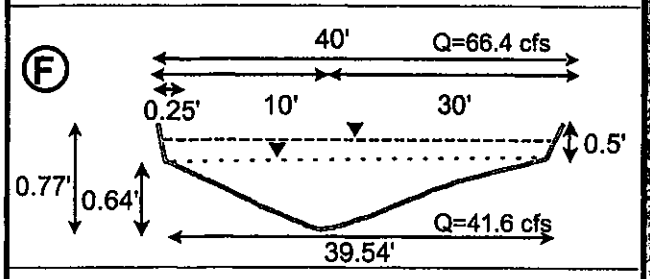
. . . . . Reduced RIX Discharge

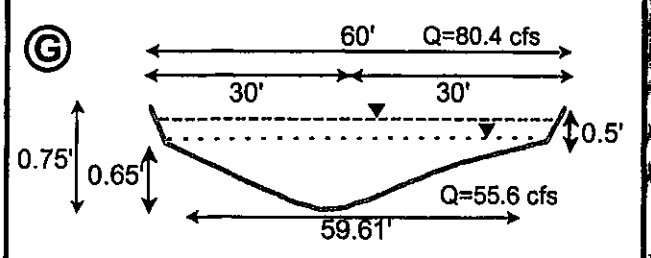


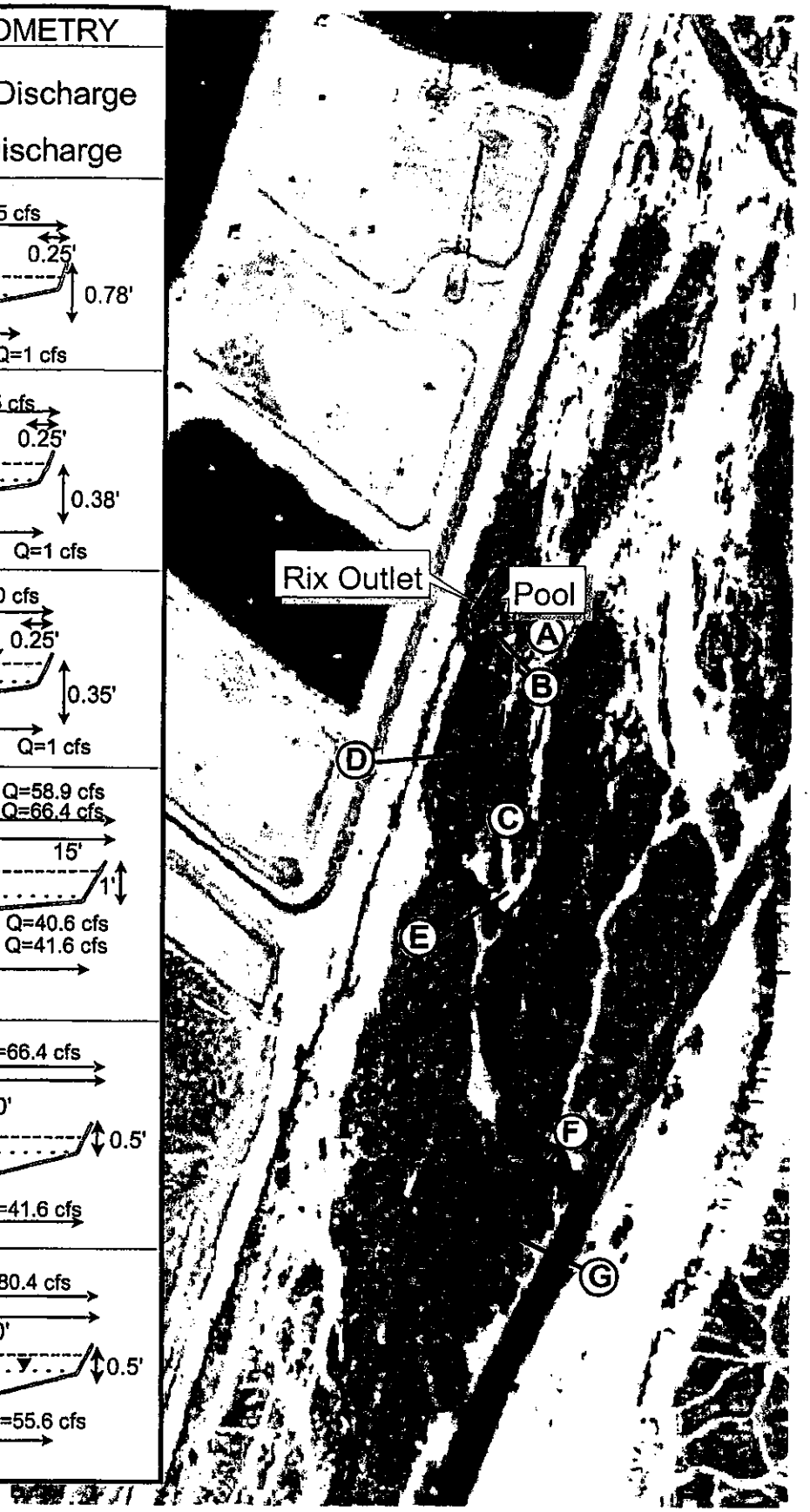












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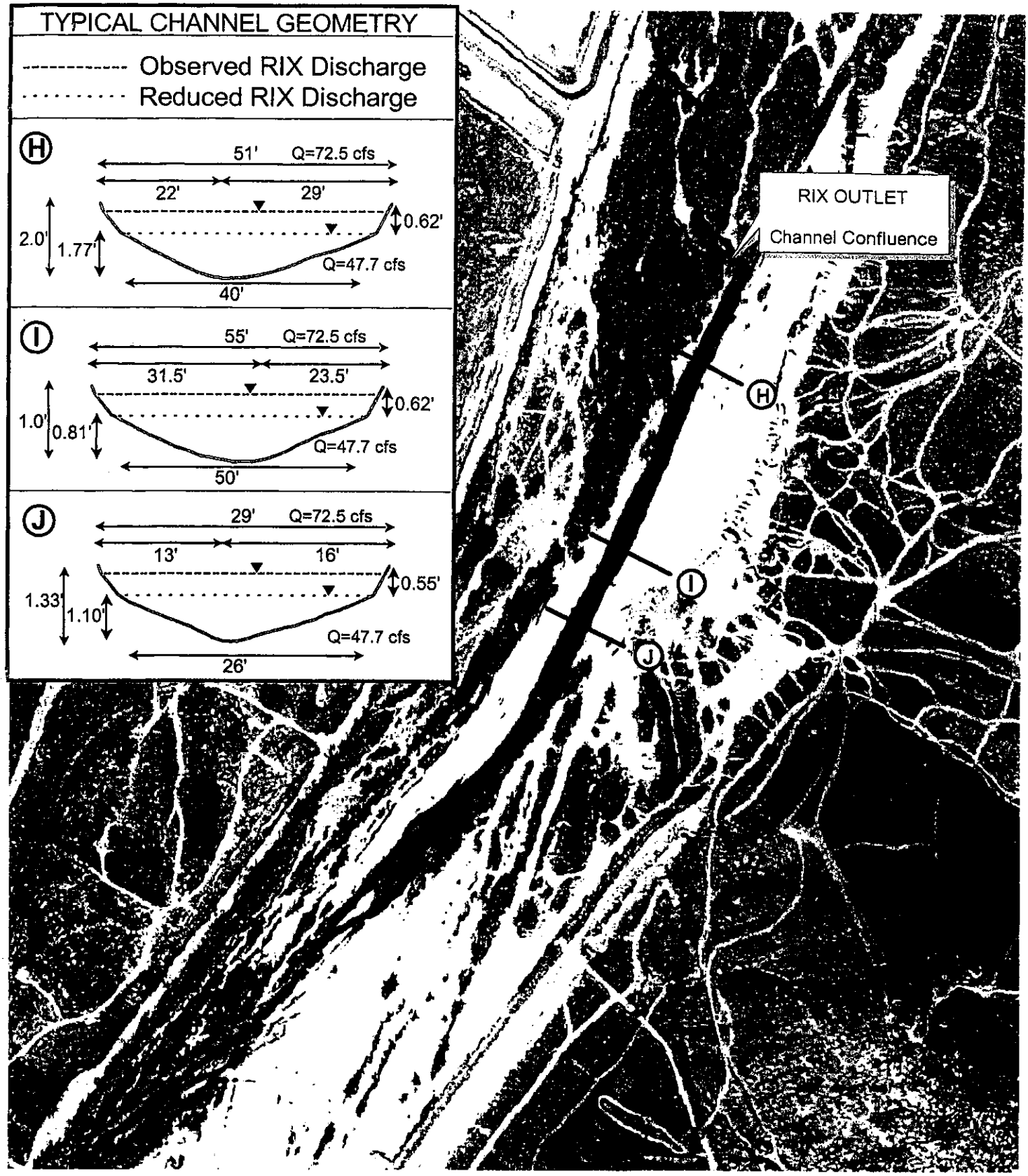
G:/99-0013/GIS/PHOTOS.APR - LAYOUT; OUTLET; 8.5x11

EXHIBIT 1
CROSS SECTION LOCATION MAP

N

1":300'



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N

EXHIBIT 2
CROSS SECTION LOCATION MAP

1":400'

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HYDRAULIC CALCULATIONS

RIX PLANT DISCHARGE TO THE SANTA ANA RIVER

JUNE 20001

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** RESULTS OF IRREGULAR CHANNEL ANALYSIS **
CALCULATIONS BASED ON MANNINGS EQUATION
WITH ALL DIMENSIONS IN FEET OR FEET AND SECONDS

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Ver. 8.0 Release Date: 01/01/2000 License ID 1238

Analysis prepared by:

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Phone (909) 686-1070 Fax (909) 788-1256

********** DESCRIPTION OF STUDY **********
* HYDRAULIC ANALYSIS OF CROSS-SECTION 'A' TO DETERMINE FLOWRATE IN THE *
* BRAIDED CHANNEL BELOW THE RIX PLANT OUT BEFORE REDUCTION OF DISCHARGE. *
* W.O. 99-0013 SRH 9913A.OUT *

TIME/DATE OF STUDY: 16:10 06/28/2001

* ENTERED INFORMATION FOR SUBCHANNEL NUMBER 1 :

NODE NUMBER	"X" COORDINATE	"Y" COORDINATE
1	0.00	1.00
2	0.25	0.50
3	3.50	0.00
4	6.75	0.50
5	7.00	1.00

SUBCHANNEL SLOPE(FEET/FEET) = 0.005000
SUBCHANNEL MANNINGS FRICTION FACTOR = 0.030000

SUBCHANNEL FLOW(CFS) = 7.5
SUBCHANNEL FLOW AREA(SQUARE FEET) = 3.48
SUBCHANNEL FLOW VELOCITY(FEET/SEC.) = 2.158
SUBCHANNEL FROUDE NUMBER = 0.531
SUBCHANNEL FLOW TOP-WIDTH(FEET) = 6.78
SUBCHANNEL HYDRAULIC DEPTH(FEET) = 0.51

TOTAL IRREGULAR CHANNEL FLOW(CFS) WANTED = 7.50
COMPUTED IRREGULAR CHANNEL FLOW(CFS) = 7.52

ESTIMATED IRREGULAR CHANNEL NORMAL DEPTH WATER SURFACE
ELEVATION..... 0.78

NOTE: WATER SURFACE IS BELOW EXTREME
LEFT AND RIGHT BANK ELEVATIONS.

** RESULTS OF IRREGULAR CHANNEL ANALYSIS **
CALCULATIONS BASED ON MANNINGS EQUATION
WITH ALL DIMENSIONS IN FEET OR FEET AND SECONDS

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Analysis prepared by:

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********** DESCRIPTION OF STUDY **********
* HYDRAULIC ANALYSIS OF CROSS-SECTION 'A' TO DETERMINE FLOWRATE IN THE *
* BRAIDED CHANNEL BELOW THE RIX PLANT OUT AFTER REDUCTION OF DISCHARGE. *
* W.O. 99-0013 SRH 9913A1.OUT *
****

TIME/DATE OF STUDY: 16:13 06/28/2001

* ENTERED INFORMATION FOR SUBCHANNEL NUMBER 1 :

NODE NUMBER	"X" COORDINATE	"Y" COORDINATE
1	0.00	1.00
2	0.25	0.50
3	3.50	0.00
4	6.75	0.50
5	7.00	1.00

SUBCHANNEL SLOPE(FEET/FEET) = 0.005000
SUBCHANNEL MANNINGS FRICTION FACTOR = 0.030000

SUBCHANNEL FLOW(CFS) = 1.0
SUBCHANNEL FLOW AREA(SQUARE FEET) = 0.89
SUBCHANNEL FLOW VELOCITY(FEET/SEC.) = 1.128
SUBCHANNEL FROUDE NUMBER = 0.462
SUBCHANNEL FLOW TOP-WIDTH(FEET) = 4.81
SUBCHANNEL HYDRAULIC DEPTH(FEET) = 0.18

TOTAL IRREGULAR CHANNEL FLOW(CFS) WANTED = 1.00
COMPUTED IRREGULAR CHANNEL FLOW(CFS) = 1.00

ESTIMATED IRREGULAR CHANNEL NORMAL DEPTH WATER SURFACE
ELEVATION..... 0.37

NOTE: WATER SURFACE IS BELOW EXTREME
LEFT AND RIGHT BANK ELEVATIONS.

** RESULTS OF IRREGULAR CHANNEL ANALYSIS **
CALCULATIONS BASED ON MANNINGS EQUATION
WITH ALL DIMENSIONS IN FEET OR FEET AND SECONDS

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********** DESCRIPTION OF STUDY **********
* HYDRAULIC ANALYSIS OF CROSS-SECTION 'B' TO DETERMINE FLOWRATE IN THE *
* BRAIDED CHANNEL BELOW THE RIX PLANT OUT BEFORE REDUCTION OF DISCHARGE. *
* W.O. 99-0013 SRH 9913B.OUT *

TIME/DATE OF STUDY: 16:19 06/28/2001

* ENTERED INFORMATION FOR SUBCHANNEL NUMBER 1 :

NODE NUMBER	"X" COORDINATE	"Y" COORDINATE
1	0.00	0.50
2	0.25	0.25
3	2.00	0.00
4	9.75	0.25
5	10.00	0.50

SUBCHANNEL SLOPE(FEET/FEET) = 0.025000
SUBCHANNEL MANNINGS FRICTION FACTOR = 0.030000

SUBCHANNEL FLOW(CFS) = 7.5
SUBCHANNEL FLOW AREA(SQUARE FEET) = 2.44
SUBCHANNEL FLOW VELOCITY(FEET/SEC.) = 3.080
SUBCHANNEL FROUDE NUMBER = 1.086
SUBCHANNEL FLOW TOP-WIDTH(FEET) = 9.76
SUBCHANNEL HYDRAULIC DEPTH(FEET) = 0.25

TOTAL IRREGULAR CHANNEL FLOW(CFS) WANTED = 7.50
COMPUTED IRREGULAR CHANNEL FLOW(CFS) = 7.51

ESTIMATED IRREGULAR CHANNEL NORMAL DEPTH WATER SURFACE
ELEVATION..... 0.38

NOTE: WATER SURFACE IS BELOW EXTREME
LEFT AND RIGHT BANK ELEVATIONS.

** RESULTS OF IRREGULAR CHANNEL ANALYSIS **
CALCULATIONS BASED ON MANNINGS EQUATION
WITH ALL DIMENSIONS IN FEET OR FEET AND SECONDS

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********** DESCRIPTION OF STUDY **********
* HYDRAULIC ANALYSIS OF CROSS-SECTION 'B' TO DETERMINE FLOWRATE IN THE *
* BRAIDED CHANNEL BELOW THE RIX PLANT OUT AFTER REDUCTION OF DISCHARGE. *
* W.O. 99-0013 SRH 9913B1.OUT *
****

TIME/DATE OF STUDY: 16:21 06/28/2001

* ENTERED INFORMATION FOR SUBCHANNEL NUMBER 1 :

NODE NUMBER	"X" COORDINATE	"Y" COORDINATE
1	0.00	0.50
2	0.25	0.25
3	2.00	0.00
4	9.75	0.25
5	10.00	0.50

SUBCHANNEL SLOPE(FEET/FEET) = 0.025000
SUBCHANNEL MANNINGS FRICTION FACTOR = 0.030000

SUBCHANNEL FLOW(CFS) = 1.1
SUBCHANNEL FLOW AREA(SQUARE FEET) = 0.69
SUBCHANNEL FLOW VELOCITY(FEET/SEC.) = 1.628
SUBCHANNEL FROUDE NUMBER = 0.931
SUBCHANNEL FLOW TOP-WIDTH(FEET) = 7.22
SUBCHANNEL HYDRAULIC DEPTH(FEET) = 0.10

TOTAL IRREGULAR CHANNEL FLOW(CFS) WANTED = 1.00
COMPUTED IRREGULAR CHANNEL FLOW(CFS) = 1.12

ESTIMATED IRREGULAR CHANNEL NORMAL DEPTH WATER SURFACE
ELEVATION..... 0.19

NOTE: WATER SURFACE IS BELOW EXTREME
LEFT AND RIGHT BANK ELEVATIONS.

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==========================================================================
              ** RESULTS OF IRREGULAR CHANNEL ANALYSIS **
                CALCULATIONS BASED ON MANNINGS EQUATION
             WITH ALL DIMENSIONS IN FEET OR FEET AND SECONDS

==========================================================================
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 ************************** DESCRIPTION OF STUDY **************************
* HYDRAULIC ANALYSIS OF CROSS-SECTION 'C' TO DETERMINE FLOWRATE IN THE     *
 * BRAIDED CHANNEL BELOW THE RIX PLANT OUT BEFORE REDUCTION OF DISCHARGE.   *
 * W.O. 99-0013        SRH        9913C.OUT                                 *
 ***************************************************************************

    TIME/DATE OF STUDY: 16:26 06/28/2001
--------------------------------------------------------------------------
           * ENTERED INFORMATION FOR SUBCHANNEL NUMBER  1 :
           NODE NUMBER      "X" COORDINATE     "Y" COORDINATE

                1                 0.00               0.42
                2                 0.25               0.25
                3                 0.50               0.00
                4                 6.75               0.25
                5                 7.00               0.42
           SUBCHANNEL SLOPE(FEET/FEET) = 0.025000
           SUBCHANNEL MANNINGS FRICTION FACTOR = 0.030000

..........................................................................
        SUBCHANNEL FLOW(CFS) =        4.1
        SUBCHANNEL FLOW AREA(SQUARE FEET) =       1.48
        SUBCHANNEL FLOW VELOCITY(FEET/SEC.) =    2.786
        SUBCHANNEL FROUDE NUMBER =  1.053
        SUBCHANNEL FLOW TOP-WIDTH(FEET) =       6.79
        SUBCHANNEL HYDRAULIC DEPTH(FEET) =    0.22

--------------------------------------------------------------------------
--------------------------------------------------------------------------
        TOTAL IRREGULAR CHANNEL FLOW(CFS) WANTED =       4.00
        COMPUTED IRREGULAR CHANNEL FLOW(CFS) =       4.11

        ESTIMATED IRREGULAR CHANNEL NORMAL DEPTH WATER SURFACE
        ELEVATION.............................      0.35


             NOTE: WATER SURFACE IS BELOW EXTREME
                   LEFT AND RIGHT BANK ELEVATIONS.
```

** RESULTS OF IRREGULAR CHANNEL ANALYSIS **
CALCULATIONS BASED ON MANNINGS EQUATION
WITH ALL DIMENSIONS IN FEET OR FEET AND SECONDS

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********** DESCRIPTION OF STUDY **********
* HYDRAULIC ANALYSIS OF CROSS-SECTION 'C' TO DETERMINE FLOWRATE IN THE *
* BRAIDED CHANNEL BELOW THE RIX PLANT OUT AFTER REDUCTION OF DISCHARGE. *
* W.O. 99-0013 SRH 9913C1.OUT *
****

TIME/DATE OF STUDY: 16:29 06/28/2001

* ENTERED INFORMATION FOR SUBCHANNEL NUMBER 1 :

NODE NUMBER	"X" COORDINATE	"Y" COORDINATE
1	0.00	0.42
2	0.25	0.17
3	0.50	0.00
4	6.75	0.17
5	7.00	0.42

SUBCHANNEL SLOPE(FEET/FEET) = 0.025000
SUBCHANNEL MANNINGS FRICTION FACTOR = 0.030000

SUBCHANNEL FLOW(CFS) = 1.2
SUBCHANNEL FLOW AREA(SQUARE FEET) = 0.68
SUBCHANNEL FLOW VELOCITY(FEET/SEC.) = 1.724
SUBCHANNEL FROUDE NUMBER = 0.940
SUBCHANNEL FLOW TOP-WIDTH(FEET) = 6.54
SUBCHANNEL HYDRAULIC DEPTH(FEET) = 0.10

TOTAL IRREGULAR CHANNEL FLOW(CFS) WANTED = 1.00
COMPUTED IRREGULAR CHANNEL FLOW(CFS) = 1.18

ESTIMATED IRREGULAR CHANNEL NORMAL DEPTH WATER SURFACE
ELEVATION..... 0.19

NOTE: WATER SURFACE IS BELOW EXTREME
LEFT AND RIGHT BANK ELEVATIONS.

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==========================================================================
              ** RESULTS OF IRREGULAR CHANNEL ANALYSIS **
                CALCULATIONS BASED ON MANNINGS EQUATION
              WITH ALL DIMENSIONS IN FEET OR FEET AND SECONDS
==========================================================================
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```
 ************************** DESCRIPTION OF STUDY **************************
* HYDRAULIC ANALYSIS OF CROSS-SECTION 'D' TO DETERMINE FLOWRATE IN THE     *
 * BRAIDED CHANNEL BELOW THE RIX PLANT OUT BEFORE REDUCTION OF DISCHARGE.  *
 * W.O. 99-0013        SRH        9913D.OUT                                *
 **************************************************************************

    TIME/DATE OF STUDY: 17:05 06/28/2001
--------------------------------------------------------------------------
           * ENTERED INFORMATION FOR SUBCHANNEL NUMBER  1 :
           NODE NUMBER      "X" COORDINATE     "Y" COORDINATE

                1                0.00              2.00
                2                5.00              0.00
                3               10.00              0.75
                4               24.50              1.00
                5               25.00              2.00
           SUBCHANNEL SLOPE(FEET/FEET) = 0.002670
           SUBCHANNEL MANNINGS FRICTION FACTOR = 0.030000

..........................................................................
        SUBCHANNEL FLOW(CFS) =      59.6
        SUBCHANNEL FLOW AREA(SQUARE FEET) =      24.02
        SUBCHANNEL FLOW VELOCITY(FEET/SEC.) =    2.480
        SUBCHANNEL FROUDE NUMBER =  0.440
        SUBCHANNEL FLOW TOP-WIDTH(FEET) =      24.31
        SUBCHANNEL HYDRAULIC DEPTH(FEET) =    0.99

--------------------------------------------------------------------------
--------------------------------------------------------------------------
        TOTAL IRREGULAR CHANNEL FLOW(CFS) WANTED =      58.90
        COMPUTED IRREGULAR CHANNEL FLOW(CFS) =      59.56

        ESTIMATED IRREGULAR CHANNEL NORMAL DEPTH WATER SURFACE
        ELEVATION.....................      1.77


            NOTE: WATER SURFACE IS BELOW EXTREME
                  LEFT AND RIGHT BANK ELEVATIONS.
```

** RESULTS OF IRREGULAR CHANNEL ANALYSIS **
CALCULATIONS BASED ON MANNINGS EQUATION
WITH ALL DIMENSIONS IN FEET OR FEET AND SECONDS

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********** DESCRIPTION OF STUDY **********
* HYDRAULIC ANALYSIS OF CROSS-SECTION 'D' TO DETERMINE FLOWRATE IN THE *
* BRAIDED CHANNEL BELOW THE RIX PLANT OUT AFTER REDUCTION OF DISCHARGE. *
* W.O. 99-0013 SRH 9913D1.OUT *

TIME/DATE OF STUDY: 17:08 06/28/2001

* ENTERED INFORMATION FOR SUBCHANNEL NUMBER 1 :

NODE NUMBER	"X" COORDINATE	"Y" COORDINATE
1	0.00	2.00
2	5.00	0.00
3	10.00	0.75
4	24.50	1.00
5	25.00	2.00

SUBCHANNEL SLOPE(FEET/FEET) = 0.002670
SUBCHANNEL MANNINGS FRICTION FACTOR = 0.030000

SUBCHANNEL FLOW(CFS) = 41.1
SUBCHANNEL FLOW AREA(SQUARE FEET) = 18.98
SUBCHANNEL FLOW VELOCITY(FEET/SEC.) = 2.166
SUBCHANNEL FROUDE NUMBER = 0.426
SUBCHANNEL FLOW TOP-WIDTH(FEET) = 23.68
SUBCHANNEL HYDRAULIC DEPTH(FEET) = 0.80

TOTAL IRREGULAR CHANNEL FLOW(CFS) WANTED = 40.60
COMPUTED IRREGULAR CHANNEL FLOW(CFS) = 41.10

ESTIMATED IRREGULAR CHANNEL NORMAL DEPTH WATER SURFACE
ELEVATION..... 1.56

NOTE: WATER SURFACE IS BELOW EXTREME
LEFT AND RIGHT BANK ELEVATIONS.

** RESULTS OF IRREGULAR CHANNEL ANALYSIS **
CALCULATIONS BASED ON MANNINGS EQUATION
WITH ALL DIMENSIONS IN FEET OR FEET AND SECONDS

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********** DESCRIPTION OF STUDY **********
* HYDRAULIC ANALYSIS OF CROSS-SECTION 'E' TO DETERMINE FLOWRATE IN THE *
* BRAIDED CHANNEL BELOW THE RIX PLANT OUT BEFORE REDUCTION OF DISCHARGE. *
* W.O. 99-0013 SRH 9913E.OUT *

TIME/DATE OF STUDY: 17:12 06/28/2001

* ENTERED INFORMATION FOR SUBCHANNEL NUMBER 1 :

NODE NUMBER	"X" COORDINATE	"Y" COORDINATE
1	0.00	2.00
2	5.00	0.00
3	10.00	0.75
4	24.50	1.00
5	25.00	2.00

SUBCHANNEL SLOPE(FEET/FEET) = 0.002670
SUBCHANNEL MANNINGS FRICTION FACTOR = 0.030000

SUBCHANNEL FLOW(CFS) = 67.3
SUBCHANNEL FLOW AREA(SQUARE FEET) = 25.97
SUBCHANNEL FLOW VELOCITY(FEET/SEC.) = 2.592
SUBCHANNEL FROUDE NUMBER = 0.444
SUBCHANNEL FLOW TOP-WIDTH(FEET) = 24.55
SUBCHANNEL HYDRAULIC DEPTH(FEET) = 1.06

TOTAL IRREGULAR CHANNEL FLOW(CFS) WANTED = 66.40
COMPUTED IRREGULAR CHANNEL FLOW(CFS) = 67.31

ESTIMATED IRREGULAR CHANNEL NORMAL DEPTH WATER SURFACE
ELEVATION..... 1.85

NOTE: WATER SURFACE IS BELOW EXTREME
LEFT AND RIGHT BANK ELEVATIONS.

** RESULTS OF IRREGULAR CHANNEL ANALYSIS **
CALCULATIONS BASED ON MANNINGS EQUATION
WITH ALL DIMENSIONS IN FEET OR FEET AND SECONDS

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********** DESCRIPTION OF STUDY **********
* HYDRAULIC ANALYSIS OF CROSS-SECTION 'E' TO DETERMINE FLOWRATE IN THE *
* BRAIDED CHANNEL BELOW THE RIX PLANT OUT AFTER REDUCTION OF DISCHARGE. *
* W.O. 99-0013 SRH 9913E1.OUT *
****

TIME/DATE OF STUDY: 17:15 06/28/2001

* ENTERED INFORMATION FOR SUBCHANNEL NUMBER 1 :

NODE NUMBER	"X" COORDINATE	"Y" COORDINATE
1	0.00	2.00
2	5.00	0.00
3	10.00	0.75
4	24.50	1.00
5	25.00	2.00

SUBCHANNEL SLOPE(FEET/FEET) = 0.002670
SUBCHANNEL MANNINGS FRICTION FACTOR = 0.030000

SUBCHANNEL FLOW(CFS) = 41.9
SUBCHANNEL FLOW AREA(SQUARE FEET) = 19.21
SUBCHANNEL FLOW VELOCITY(FEET/SEC.) = 2.181
SUBCHANNEL FROUDE NUMBER = 0.427
SUBCHANNEL FLOW TOP-WIDTH(FEET) = 23.71
SUBCHANNEL HYDRAULIC DEPTH(FEET) = 0.81

TOTAL IRREGULAR CHANNEL FLOW(CFS) WANTED = 41.60
COMPUTED IRREGULAR CHANNEL FLOW(CFS) = 41.91

ESTIMATED IRREGULAR CHANNEL NORMAL DEPTH WATER SURFACE
ELEVATION..... 1.57

NOTE: WATER SURFACE IS BELOW EXTREME
LEFT AND RIGHT BANK ELEVATIONS.

** RESULTS OF IRREGULAR CHANNEL ANALYSIS **
CALCULATIONS BASED ON MANNINGS EQUATION
WITH ALL DIMENSIONS IN FEET OR FEET AND SECONDS

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********** DESCRIPTION OF STUDY **********
* HYDRAULIC ANALYSIS OF CROSS-SECTION 'F' TO DETERMINE FLOWRATE IN THE *
* BRAIDED CHANNEL BELOW THE RIX PLANT OUT BEFORE REDUCTION OF DISCHARGE. *
* W.O. 99-0013 SRH 9913F.OUT *

TIME/DATE OF STUDY: 17:20 06/28/2001

* ENTERED INFORMATION FOR SUBCHANNEL NUMBER 1 :

NODE NUMBER	"X" COORDINATE	"Y" COORDINATE
1	0.00	1.00
2	0.25	0.50
3	10.00	0.00
4	39.75	0.50
5	40.00	1.00

SUBCHANNEL SLOPE(FEET/FEET) = 0.011000
SUBCHANNEL MANNINGS FRICTION FACTOR = 0.030000

SUBCHANNEL FLOW(CFS) = 68.5
SUBCHANNEL FLOW AREA(SQUARE FEET) = 20.58
SUBCHANNEL FLOW VELOCITY(FEET/SEC.) = 3.329
SUBCHANNEL FROUDE NUMBER = 0.816
SUBCHANNEL FLOW TOP-WIDTH(FEET) = 39.77
SUBCHANNEL HYDRAULIC DEPTH(FEET) = 0.52

TOTAL IRREGULAR CHANNEL FLOW(CFS) WANTED = 66.40
COMPUTED IRREGULAR CHANNEL FLOW(CFS) = 68.49

ESTIMATED IRREGULAR CHANNEL NORMAL DEPTH WATER SURFACE
ELEVATION..... 0.77

NOTE: WATER SURFACE IS BELOW EXTREME
LEFT AND RIGHT BANK ELEVATIONS.

** RESULTS OF IRREGULAR CHANNEL ANALYSIS **
CALCULATIONS BASED ON MANNINGS EQUATION
WITH ALL DIMENSIONS IN FEET OR FEET AND SECONDS

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********** DESCRIPTION OF STUDY **********
* HYDRAULIC ANALYSIS OF CROSS-SECTION 'F' TO DETERMINE FLOWRATE IN THE *
* BRAIDED CHANNEL BELOW THE RIX PLANT OUT AFTER REDUCTION OF DISCHARGE. *
* W.O. 99-0013 SRH 9913F1.OUT *
****

TIME/DATE OF STUDY: 17:23 06/28/2001

* ENTERED INFORMATION FOR SUBCHANNEL NUMBER 1 :

NODE NUMBER	"X" COORDINATE	"Y" COORDINATE
1	0.00	1.00
2	0.25	0.50
3	10.00	0.00
4	39.75	0.50
5	40.00	1.00

SUBCHANNEL SLOPE(FEET/FEET) = 0.011000
SUBCHANNEL MANNINGS FRICTION FACTOR = 0.030000

SUBCHANNEL FLOW(CFS) = 42.5
SUBCHANNEL FLOW AREA(SQUARE FEET) = 15.41
SUBCHANNEL FLOW VELOCITY(FEET/SEC.) = 2.759
SUBCHANNEL FROUDE NUMBER = 0.780
SUBCHANNEL FLOW TOP-WIDTH(FEET) = 39.64
SUBCHANNEL HYDRAULIC DEPTH(FEET) = 0.39

TOTAL IRREGULAR CHANNEL FLOW(CFS) WANTED = 41.60
COMPUTED IRREGULAR CHANNEL FLOW(CFS) = 42.53

ESTIMATED IRREGULAR CHANNEL NORMAL DEPTH WATER SURFACE
ELEVATION..... 0.64

NOTE: WATER SURFACE IS BELOW EXTREME
LEFT AND RIGHT BANK ELEVATIONS.

** RESULTS OF IRREGULAR CHANNEL ANALYSIS **
CALCULATIONS BASED ON MANNINGS EQUATION
WITH ALL DIMENSIONS IN FEET OR FEET AND SECONDS

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********** DESCRIPTION OF STUDY **********
* HYDRAULIC ANALYSIS OF CROSS-SECTION 'G' TO DETERMINE FLOWRATE IN THE *
* SANTA ANA RIVER BELOW THE RIX PLANT OUT BEFORE REDUCTION OF DISCHARGE. *
* W.O. 99-0013 SRH 9913G.OUT *

TIME/DATE OF STUDY: 17:30 06/28/2001

* ENTERED INFORMATION FOR SUBCHANNEL NUMBER 1 :

NODE NUMBER	"X" COORDINATE	"Y" COORDINATE
1	0.00	1.00
2	0.50	0.50
3	30.00	0.00
4	59.50	0.50
5	60.00	1.00

SUBCHANNEL SLOPE(FEET/FEET) = 0.008000
SUBCHANNEL MANNINGS FRICTION FACTOR = 0.030000

SUBCHANNEL FLOW(CFS) = 82.0
SUBCHANNEL FLOW AREA(SQUARE FEET) = 29.56
SUBCHANNEL FLOW VELOCITY(FEET/SEC.) = 2.773
SUBCHANNEL FROUDE NUMBER = 0.693
SUBCHANNEL FLOW TOP-WIDTH(FEET) = 59.50
SUBCHANNEL HYDRAULIC DEPTH(FEET) = 0.50

TOTAL IRREGULAR CHANNEL FLOW(CFS) WANTED = 80.40
COMPUTED IRREGULAR CHANNEL FLOW(CFS) = 81.96

ESTIMATED IRREGULAR CHANNEL NORMAL DEPTH WATER SURFACE
ELEVATION..... 0.75

NOTE: WATER SURFACE IS BELOW EXTREME
LEFT AND RIGHT BANK ELEVATIONS.

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** RESULTS OF IRREGULAR CHANNEL ANALYSIS **
CALCULATIONS BASED ON MANNINGS EQUATION
WITH ALL DIMENSIONS IN FEET OR FEET AND SECONDS

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********** DESCRIPTION OF STUDY **********
* HYDRAULIC ANALYSIS OF CROSS-SECTION 'G' TO DETERMINE FLOWRATE IN THE *
* SANTA ANA RIVER BELOW THE RIX PLANT OUT AFTER REDUCTION OF DISCHARGE. *
* W.O. 99-0013 SRH 9913G1.OUT *
****

TIME/DATE OF STUDY: 18:09 06/28/2001

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* ENTERED INFORMATION FOR SUBCHANNEL NUMBER 1 :

NODE NUMBER	"X" COORDINATE	"Y" COORDINATE
1	0.00	1.00
2	0.50	0.50
3	30.00	0.00
4	59.50	0.50
5	60.00	1.00

SUBCHANNEL SLOPE(FEET/FEET) = 0.008000
SUBCHANNEL MANNINGS FRICTION FACTOR = 0.030000

.....

SUBCHANNEL FLOW(CFS) = 56.6
SUBCHANNEL FLOW AREA(SQUARE FEET) = 23.62
SUBCHANNEL FLOW VELOCITY(FEET/SEC.) = 2.395
SUBCHANNEL FROUDE NUMBER = 0.669
SUBCHANNEL FLOW TOP-WIDTH(FEET) = 59.30
SUBCHANNEL HYDRAULIC DEPTH(FEET) = 0.40

TOTAL IRREGULAR CHANNEL FLOW(CFS) WANTED = 55.60
COMPUTED IRREGULAR CHANNEL FLOW(CFS) = 56.58

ESTIMATED IRREGULAR CHANNEL NORMAL DEPTH WATER SURFACE
ELEVATION..... 0.65

NOTE: WATER SURFACE IS BELOW EXTREME
LEFT AND RIGHT BANK ELEVATIONS.

** RESULTS OF IRREGULAR CHANNEL ANALYSIS **
CALCULATIONS BASED ON MANNINGS EQUATION
WITH ALL DIMENSIONS IN FEET OR FEET AND SECONDS

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Analysis prepared by:

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********** DESCRIPTION OF STUDY **********
* HYDRAULIC ANALYSIS OF CROSS-SECTION 'H' TO DETERMINE FLOWRATE IN THE *
* SANTA ANA RIVER BELOW THE RIX PLANT OUT BEFORE REDUCTION OF DISCHARGE. *
* W.O. 99-0013 SRH 9913H.OUT *

TIME/DATE OF STUDY: 00:55 06/04/2001

* ENTERED INFORMATION FOR SUBCHANNEL NUMBER 1 :

NODE NUMBER	"X" COORDINATE	"Y" COORDINATE
1	0.00	2.00
2	4.00	1.50
3	8.50	0.00
4	22.00	1.25
5	51.00	2.00

SUBCHANNEL SLOPE(FEET/FEET) = 0.001200
SUBCHANNEL MANNINGS FRICTION FACTOR = 0.020000

SUBCHANNEL FLOW(CFS) = 72.1
SUBCHANNEL FLOW AREA(SQUARE FEET) = 35.55
SUBCHANNEL FLOW VELOCITY(FEET/SEC.) = 2.027
SUBCHANNEL FROUDE NUMBER = 0.426
SUBCHANNEL FLOW TOP-WIDTH(FEET) = 50.53
SUBCHANNEL HYDRAULIC DEPTH(FEET) = 0.70

TOTAL IRREGULAR CHANNEL FLOW(CFS) WANTED = 71.00
COMPUTED IRREGULAR CHANNEL FLOW(CFS) = 72.07

ESTIMATED IRREGULAR CHANNEL NORMAL DEPTH WATER SURFACE
ELEVATION..... 1.99

NOTE: WATER SURFACE IS BELOW EXTREME
LEFT AND RIGHT BANK ELEVATIONS.

** RESULTS OF IRREGULAR CHANNEL ANALYSIS **
CALCULATIONS BASED ON MANNINGS EQUATION
WITH ALL DIMENSIONS IN FEET OR FEET AND SECONDS

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Ver. 8.0 Release Date: 01/01/2000 License ID 1238

Analysis prepared by:

Albert A. Webb Associates
3788 McCray Street
Riverside, CA 92506
Phone (909) 686-1070 Fax (909) 788-1256

********** DESCRIPTION OF STUDY **********
* HYDRAULIC ANALYSIS OF CROSS-SECTION 'H' TO DETERMINE FLOWRATE IN THE *
* SANTA ANA RIVER BELOW THE RIX PLANT OUT AFTER REDUCTION OF DISCHARGE. *
* W.O. 99-0013 SRH 9913H1.OUT *
****

TIME/DATE OF STUDY: 10:20 06/21/2001

* ENTERED INFORMATION FOR SUBCHANNEL NUMBER 1 :

NODE NUMBER	"X" COORDINATE	"Y" COORDINATE
1	0.00	2.00
2	4.00	1.50
3	8.50	0.00
4	22.00	1.25
5	51.00	2.00

SUBCHANNEL SLOPE(FEET/FEET) = 0.001200
SUBCHANNEL MANNINGS FRICTION FACTOR = 0.020000

SUBCHANNEL FLOW(CFS) = 48.4
SUBCHANNEL FLOW AREA(SQUARE FEET) = 25.57
SUBCHANNEL FLOW VELOCITY(FEET/SEC.) = 1.891
SUBCHANNEL FROUDE NUMBER = 0.418
SUBCHANNEL FLOW TOP-WIDTH(FEET) = 40.27
SUBCHANNEL HYDRAULIC DEPTH(FEET) = 0.63

TOTAL IRREGULAR CHANNEL FLOW(CFS) WANTED = 47.70
COMPUTED IRREGULAR CHANNEL FLOW(CFS) = 48.35

ESTIMATED IRREGULAR CHANNEL NORMAL DEPTH WATER SURFACE
ELEVATION..... 1.77

NOTE: WATER SURFACE IS BELOW EXTREME
LEFT AND RIGHT BANK ELEVATIONS.

** RESULTS OF IRREGULAR CHANNEL ANALYSIS **
CALCULATIONS BASED ON MANNINGS EQUATION
WITH ALL DIMENSIONS IN FEET OR FEET AND SECONDS

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Analysis prepared by:

Albert A. Webb Associates
3788 McCray Street
Riverside, CA 92506
Phone (909) 686-1070 Fax (909) 788-1256

********** DESCRIPTION OF STUDY **********
* HYDRAULIC ANALYSIS OF CROSS-SECTION 'I' TO DETERMINE FLOWRATE IN THE *
* SANTA ANA RIVER BELOW THE RIX PLANT OUT BEFORE REDUCTION OF DISCHARGE. *
* W.O. 99-0013 SRH 9913I.OUT *
****

TIME/DATE OF STUDY: 01:17 06/04/2001

* ENTERED INFORMATION FOR SUBCHANNEL NUMBER 1 :

NODE NUMBER	"X" COORDINATE	"Y" COORDINATE
1	0.00	1.00
2	4.00	0.33
3	22.00	0.00
4	31.50	0.00
5	55.00	1.00

SUBCHANNEL SLOPE(FEET/FEET) = 0.001200
SUBCHANNEL MANNINGS FRICTION FACTOR = 0.020000

SUBCHANNEL FLOW(CFS) = 73.5
SUBCHANNEL FLOW AREA(SQUARE FEET) = 37.07
SUBCHANNEL FLOW VELOCITY(FEET/SEC.) = 1.984
SUBCHANNEL FROUDE NUMBER = 0.425
SUBCHANNEL FLOW TOP-WIDTH(FEET) = 54.71
SUBCHANNEL HYDRAULIC DEPTH(FEET) = 0.68

TOTAL IRREGULAR CHANNEL FLOW(CFS) WANTED = 72.10
COMPUTED IRREGULAR CHANNEL FLOW(CFS) = 73.54

ESTIMATED IRREGULAR CHANNEL NORMAL DEPTH WATER SURFACE
ELEVATION..... 0.99

NOTE: WATER SURFACE IS BELOW EXTREME
LEFT AND RIGHT BANK ELEVATIONS.

** RESULTS OF IRREGULAR CHANNEL ANALYSIS **
CALCULATIONS BASED ON MANNINGS EQUATION
WITH ALL DIMENSIONS IN FEET OR FEET AND SECONDS

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Analysis prepared by:

Albert A. Webb Associates
3788 McCray Street
Riverside, CA 92506
Phone (909) 686-1070 Fax (909) 788-1256

********** DESCRIPTION OF STUDY **********
* HYDRAULIC ANALYSIS OF CROSS-SECTION 'I' TO DETERMINE FLOWRATE IN THE *
* SANTA ANA RIVER BELOW THE RIX PLANT OUT AFTER REDUCTION OF DISCHARGE. *
* W.O. 99-0013 SRH 9913I1.OUT *
****

TIME/DATE OF STUDY: 10:23 06/21/2001

* ENTERED INFORMATION FOR SUBCHANNEL NUMBER 1 :

NODE NUMBER	"X" COORDINATE	"Y" COORDINATE
1	0.00	1.00
2	4.00	0.33
3	22.00	0.00
4	31.50	0.00
5	55.00	1.00

SUBCHANNEL SLOPE(FEET/FEET) = 0.001200
SUBCHANNEL MANNINGS FRICTION FACTOR = 0.020000

SUBCHANNEL FLOW(CFS) = 48.4
SUBCHANNEL FLOW AREA(SQUARE FEET) = 27.70
SUBCHANNEL FLOW VELOCITY(FEET/SEC.) = 1.749
SUBCHANNEL FROUDE NUMBER = 0.412
SUBCHANNEL FLOW TOP-WIDTH(FEET) = 49.40
SUBCHANNEL HYDRAULIC DEPTH(FEET) = 0.56

TOTAL IRREGULAR CHANNEL FLOW(CFS) WANTED = 47.70
COMPUTED IRREGULAR CHANNEL FLOW(CFS) = 48.45

ESTIMATED IRREGULAR CHANNEL NORMAL DEPTH WATER SURFACE
ELEVATION..... 0.81

NOTE: WATER SURFACE IS BELOW EXTREME
LEFT AND RIGHT BANK ELEVATIONS.

** RESULTS OF IRREGULAR CHANNEL ANALYSIS **
CALCULATIONS BASED ON MANNINGS EQUATION
WITH ALL DIMENSIONS IN FEET OR FEET AND SECONDS

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Ver. 8.0 Release Date: 01/01/2000 License ID 1238

Analysis prepared by:

Albert A. Webb Associates
3788 McCray Street
Riverside, CA 92506
Phone (909) 686-1070 Fax (909) 788-1256

********** DESCRIPTION OF STUDY **********
* HYDRAULIC ANALYSIS OF CROSS-SECTION 'J' TO DETERMINE FLOWRATE IN THE *
* SANTA ANA RIVER BELOW THE RIX PLANT OUT BEFORE REDUCTION OF DISCHARGE. *
* W.O. 99-0013 SRH 9913J.OUT *

TIME/DATE OF STUDY: 01:23 06/04/2001

* ENTERED INFORMATION FOR SUBCHANNEL NUMBER 1 :

NODE NUMBER	"X" COORDINATE	"Y" COORDINATE
1	0.00	1.33
2	6.00	0.00
3	13.00	0.00
4	20.00	0.33
5	29.00	1.33

SUBCHANNEL SLOPE(FEET/FEET) = 0.001600
SUBCHANNEL MANNINGS FRICTION FACTOR = 0.020000

SUBCHANNEL FLOW(CFS) = 71.3
SUBCHANNEL FLOW AREA(SQUARE FEET) = 25.95
SUBCHANNEL FLOW VELOCITY(FEET/SEC.) = 2.747
SUBCHANNEL FROUDE NUMBER = 0.512
SUBCHANNEL FLOW TOP-WIDTH(FEET) = 29.00
SUBCHANNEL HYDRAULIC DEPTH(FEET) = 0.89

TOTAL IRREGULAR CHANNEL FLOW(CFS) WANTED = 71.00
COMPUTED IRREGULAR CHANNEL FLOW(CFS) = 71.30

ESTIMATED IRREGULAR CHANNEL NORMAL DEPTH WATER SURFACE
ELEVATION..... 1.33

NOTE: WATER SURFACE IS BELOW EXTREME
LEFT AND RIGHT BANK ELEVATIONS.

** RESULTS OF IRREGULAR CHANNEL ANALYSIS **
CALCULATIONS BASED ON MANNINGS EQUATION
WITH ALL DIMENSIONS IN FEET OR FEET AND SECONDS

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Analysis prepared by:

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Phone (909) 686-1070 Fax (909) 788-1256

********** DESCRIPTION OF STUDY **********
* HYDRAULIC ANALYSIS OF CROSS-SECTION 'J' TO DETERMINE FLOWRATE IN THE *
* SANTA ANA RIVER BELOW THE RIX PLANT OUT AFTER REDUCTION OF DISCHARGE. *
* W.O. 99-0013 SRH 9913J1.OUT *

TIME/DATE OF STUDY: 09:00 06/29/2001

* ENTERED INFORMATION FOR SUBCHANNEL NUMBER 1 :

NODE NUMBER	"X" COORDINATE	"Y" COORDINATE
1	0.00	1.33
2	6.00	0.00
3	13.00	0.00
4	20.00	0.33
5	29.00	1.33

SUBCHANNEL SLOPE(FEET/FEET) = 0.001600
SUBCHANNEL MANNINGS FRICTION FACTOR = 0.020000

SUBCHANNEL FLOW(CFS) = 48.3
SUBCHANNEL FLOW AREA(SQUARE FEET) = 19.64
SUBCHANNEL FLOW VELOCITY(FEET/SEC.) = 2.461
SUBCHANNEL FROUDE NUMBER = 0.498
SUBCHANNEL FLOW TOP-WIDTH(FEET) = 25.89
SUBCHANNEL HYDRAULIC DEPTH(FEET) = 0.76

TOTAL IRREGULAR CHANNEL FLOW(CFS) WANTED = 47.70
COMPUTED IRREGULAR CHANNEL FLOW(CFS) = 48.35

ESTIMATED IRREGULAR CHANNEL NORMAL DEPTH WATER SURFACE
ELEVATION..... 1.10

NOTE: WATER SURFACE IS BELOW EXTREME
LEFT AND RIGHT BANK ELEVATIONS.

FINAL

RIX FACILITY RECYCLED

WATER SALES PROGRAM

PROGRAM ENVIRONMENTAL IMPACT REPORT

Prepared for:

City of San Bernardino
Municipal Water Department
300 North "D" Street, 5th Floor
San Bernardino, California 92418

Prepared by:

Tom Dodson & Associates
2150 North Arrowhead Avenue
San Bernardino, California 92405

January 2005

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TOM DODSON & ASSOCIATES
2150 N. ARROWHEAD AVENUE
SAN BERNARDINO, CA 92405
TEL (909) 882-3612 • FAX (909) 882-7015
E-MAIL tda@tstonramp.com



MEMORANDUM

October 10, 2003

To: Stacey Aldstadt

From: Tom Dodson

Subj: Completion of the Final Program Environmental Impact Report (PEIR) for the RIX Facility Recycled Water Sales Program

The city of San Bernardino Municipal Water Department (Department) received written comments on the Draft PEIR for the RIX Facility Recycled Water Sales Program from seven agencies, including the State Clearinghouse. The contents of a Final EIR are defined in Section 15132 of the State CEQA Guidelines and include: the Draft EIR; comments and recommendations received on the Draft; a list of parties commenting on the Draft EIR; responses to comments by the Lead Agency; and any other information added by the lead agency. The following agencies submitted written comments which are addressed in the attached Responses to Comments:

1. State of California Governor's Office of Planning and Research State Clearinghouse
2. City of Riverside Public Utilities, Water Division
3. Orange County Water District
4. State Water Resources Control Board
5. California Regional Water Quality Control Board, Santa Ana Region
6. U. S. Fish and Wildlife Service and California Department of Fish and Game
7. San Bernardino County Department of Public Works

This memorandum, combined with the Draft EIR, the above list, and the attached comments and responses, and the attached Mitigation Monitoring and Reporting Program constitute the Final EIR for the RIX Facility Recycled Water Sales Program. No significant adverse impacts were forecast to result from implementing the proposed project based on the Final EIR, so a Statement of Overriding Considerations will not be required to be adopted by the Department when it considers the Final EIR for certification and the proposed project for action. Do not hesitate to give me a call if you have any questions.

Tom Dodson

Tom Dodson
Attachments

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RESPONSES TO COMMENT LETTERS

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COMMENT LETTER #1

STATE OF CALIFORNIA

Governor's Office of Planning and Research

State Clearinghouse

Gray Davis
Governor

Tal Finney
Interim Director

April 28, 2003

RECEIVED
APR 30 2003
SBMWC
DEPUTY GENERAL MANAGER

Stacey R. Aldstadt
City of San Bernardino Municipal Water Department
300 North "D" Street
San Bernardino, CA 92418

Subject: Rix Facility Recycled Water Use Project
SCH#: 1999101088

Dear Stacey R. Aldstadt:

1-1 The State Clearinghouse submitted the above named Draft EIR to selected state agencies for review. The review period closed on April 25, 2003, and no state agencies submitted comments by that date. This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act.

Please call the State Clearinghouse at (916) 445-0613 if you have any questions regarding the environmental review process. If you have a question about the above-named project, please refer to the ten-digit State Clearinghouse number when contacting this office.

Sincerely,

Terry Roberts

Terry Roberts
Director, State Clearinghouse

RESPONSES TO COMMENTS
LETTER #1
Office of Planning and Research
State Clearinghouse

1-1 This is an acknowledgment letter verifying that the State Clearinghouse submitted the Draft PEIR to selected state agencies for review, and that no state agencies submitted comments by the close of the review period, April 25, 2003. This letter is for information only and does not require a formal response.

Document Details Report
State Clearinghouse Data Base

SCH# 1999101088
Project Title Rix Facility Recycled Water Use Project
Lead Agency San Bernardino Valley Municipal Water District

Type EIR Draft EIR

Description The City of San Bernardino currently discharges approximately 40 million gallons per day (mgd) from the Regional Rapid Infiltration and Extraction (RLX) Facility to the Santa Ana River. The City of San Bernardino, in conjunction with Western Water Company, intends to market the excess tertiary effluent from the RIX facility (currently estimated to be about 15 MGD, or 16,794 acre-feet per year) and sell the excess effluent for long-term beneficial uses to water users in the region. For the purpose of this environmental document, the proposed action is a Recycled Water Sale Project, of up to 18,000 acre-feet of RIX facility tertiary treated effluent, to potential water suppliers within the southern California region and support infrastructure required to deliver the recycled water to purchasers.

Lead Agency Contact

Name Stacey R. Aldstadt
Agency City of San Bernardino Municipal Water Department
Phone 909/384-7210 **Fax**
email
Address 300 North "D" Street
City San Bernardino **State** CA **Zip** 92418

Project Location

County San Bernardino, Riverside, Orange
City
Region
Cross Streets Agua Mansa Road
Parcel No.
Township 1S **Range** 5W **Section** 36 **Base** R5W

Proximity to:

Highways I-10
Airports
Railways
Waterways Santa Ana River
Schools
Land Use

Project Issues Aesthetic/Visual; Agricultural Land; Air Quality; Archaeologic-Historic; Flood Plain/Flooding; Geologic/Seismic; Noise; Public Services; Soil Erosion/Compaction/Grading; Solid Waste; Toxic/Hazardous; Traffic/Circulation; Vegetation; Water Quality; Water Supply; Wetland/Riparian; Wildlife; Growth Inducing

Reviewing Agencies Reclamation Board; Department of Fish and Game, Region 6; Department of Parks and Recreation; Department of Water Resources; Caltrans, District 8; Department of Health Services; State Water Resources Control Board, Clean Water Program; State Water Resources Control Board, Division of Water Quality; State Water Resources Control Board, Division of Water Rights; Regional Water Quality Control Board, Region 8; Native American Heritage Commission; State Lands Commission

Date Received 03/12/2003 **Start of Review** 03/12/2003 **End of Review** 04/25/2003

Note: Blanks in data fields result from insufficient information provided by lead agency.

COMMENT LETTER #1

STATE OF CALIFORNIA

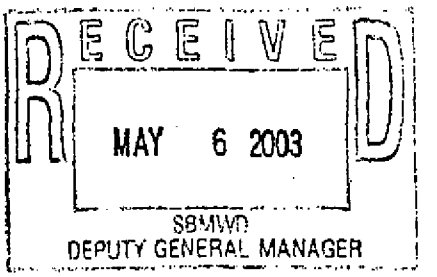
Governor's Office of Planning and Research

State Clearinghouse

Gray Davis
Governor

Tal Finney
Interim Director

May 2, 2003



Stacey R. Aldstadt
City of San Bernardino Municipal Water Department
300 North "D" Street
San Bernardino, CA 92418

Subject: Rix Facility Recycled Water Use Project
SCH#: 1999101088

Dear Stacey R. Aldstadt:

1-2

The enclosed comment (s) on your Draft EIR was (were) received by the State Clearinghouse after the end of the state review period, which closed on April 25, 2003. We are forwarding these comments to you because they provide information or raise issues that should be addressed in your final environmental document.

The California Environmental Quality Act does not require Lead Agencies to respond to late comments. However, we encourage you to incorporate these additional comments into your final environmental document and to consider them prior to taking final action on the proposed project.

Please contact the State Clearinghouse at (916) 445-0613 if you have any questions concerning the environmental review process. If you have a question regarding the above-named project, please refer to the ten-digit State Clearinghouse number (1999101088) when contacting this office.

Sincerely,

Terry Roberts

Terry Roberts
Senior Planner, State Clearinghouse

Enclosures
cc: Resources Agency

1400 TENTH STREET P.O. BOX 3044 SACRAMENTO, CALIFORNIA 95812-3044
(916)445-0613 FAX(916)323-3018 www.opr.ca.gov

1-2 This is follow-up correspondence to the above, indicating that the State Clearinghouse did receive some comments after the close of the review period. It states that CEQA does not require Lead Agencies to respond to late comments, but they should be incorporated into the final environmental document, with some consideration of them in the final action on the proposed project.

The comments will be addressed as though they were submitted within the review period, since many of them are reiterations of comments originally submitted in the NOP by the same agencies.

RIVERSIDE

PUBLIC UTILITIES

COMMENT LETTER #2

RECEIVED
APR 17 2003
SBMWD
DEPUTY GENERAL MANAGER

File: SAWPA RIX

April 14, 2003

Ms. Stacey R. Aldstadt
Deputy General Manager
City of San Bernardino Municipal Water Department
P.O. Box 710
San Bernardino, CA 92402

RE: Draft Program Environmental Impact Report (EIR) RIX Facility Recycled Water Use Project (SCH 1999101088)

We reviewed the Draft Program EIR (PEIR) dated March 10, 2003. The proposed project involves the marketing of up to 18,000 acre-feet per year of "excess" City of San Bernardino tertiary effluent to potential water suppliers within Southern California and support infrastructure to deliver water to the purchasers. Potential purchasers include Chino Basin Watermaster; Inland Empire Utilities Agency; Southern California Water Company; Jurupa Community Services District; Orange County Water District; and the Santa Margarita Water District (page 3-13). Potential facilities include flow splitter, reservoir, pump station, and recycled water transmission mains (pipelines).

2-1 Riverside believes that for the long term benefit of the river and the viability of the associated groundwater basins, the present RIX discharge point should not be changed and Riverside

2-2 would object to any delivery that diverts water from the Santa Ana River upstream of the Riverside Regional Water Quality Control Plant (RRWQCP). Riverside requests that an EIR

2-3 be prepared for any specific project that may develop from the proposed marketing plan.

Please notify us regarding the meeting date for considering the proposed project and certification of the Final EIR. Thank you for your consideration. If you have any questions regarding this submittal, please contact Zahra Panahi at (909)-826-5612.

Sincerely,

Tom Evans

Tom P. Evans
Director of Public Utilities
DPW/ZP/babs
xc: Dieter Wirtzfeld, City of Riverside
Zahra Panahi, City of Riverside
Joe Grindstaff, SAWPA

3900 MAIN STREET | RIVERSIDE CA | 92522 | PHONE (909) 826-5285 | FAX (909) 826-2498 | WWW.RIVERSIDEPUBLICUTILITIES.COM

RESPONSES TO COMMENTS
LETTER #2
City of Riverside

2-1 Your comment is noted and will be made available to the City decision-makers for consideration prior to a decision being made on the proposed project. The primary RIX discharge point is not being changed as a result of the proposed action. The outfall currently permitted under an NPDES permit will continue to be operated by the City's Municipal Water Department. Recycled water that is delivered to other parties in the future may or may not involve new discharge points, as the recycled water could be used directly for industrial operations. Where actual discharge of RIX recycled water will occur, subsequent environmental documentation will be completed and appropriate waste discharge requirements will be obtained from the Santa Ana Regional Water Quality Control Board.

2-2 Your comment is noted and will be made available to the City decision-makers for consideration prior to a decision being made on the proposed project. If the City decides to sell RIX recycled water, it cannot deny other agencies' the beneficial uses of this recycled water resource. There were no identified adverse impacts of the implementing the proposed action on the operations of the Riverside Regional Water Quality Control Plant.

2-3 Any second tier project of the RIX Recycled Water Sales Program will receive appropriate environmental review in compliance with the California Environmental Quality Act (CEQA). Sections 15162 and 15168 of the State CEQA Guidelines control second tier environmental reviews. An EIR may be required for some projects. In all cases, the PEIR will be the governing document, as it identifies several studies and mitigation measures that will be applied to individual projects. Section 3.1, page 3-3 of the PEIR states, "...each future sale of RIX Facility recycled water can be reviewed and approved under this environmental document as permitted by Section 15162 of the State CEQA guidelines." Riverside Public Utilities will be advised of the date for considering the proposed project and certification of the Final EIR and your agency will be retained on the notification list when specific second-tier projects are considered in the future.

COMMENT LETTER #3

Directors
PHILIP L. ANTHONY
WES BANNISTER
KATHRYN L. BARR
DENIS R. BILODEAU
RICHARD CHAVEZ
PAUL COOK
JAN DEBAY
BRETT FRANKLIN
LAWRENCE P. KRAEMER JR.
SHAWN NELSON

ORANGE COUNTY WATER DISTRICT

Orange County's Groundwater Authority

Officers
DENIS R. BILODEAU
President
PHILIP L. ANTHONY
First Vice President
BRETT FRANKLIN
Second Vice President
—
VIRGINIA GREBBIEN
General Manager
JANICE DURANT
District Secretary

April 28, 2003

Ms. Stacey R. Aldstadt
Deputy General Manager
City of San Bernardino Municipal Water Department
300 North "D" Street
San Bernardino, CA 92418

Subject: RIX Facility Recycled Water Use Project Draft Environmental Impact Report (SCH# 99101088)

Dear Stacey:

The Orange County Water District (OCWD) received a copy of the draft Environmental Impact Report (EIR) for the RIX Facility Recycled Water Use Project (SCH# 99101088). The draft EIR is dated March 2003.

OCWD appreciates the opportunity to review the Draft EIR and work cooperatively with the City of San Bernardino Water Department on issues related to the Santa Ana River. OCWD is a stakeholder in water quality and supply issues on the Santa Ana River since the river is the primary source of recharge water for the Orange County Groundwater Basin. Accordingly, OCWD reviews environmental documents regarding proposed recycled water projects in the Santa Ana River Watershed in light of potential impacts on the Santa Ana River. Issues that may affect habitat for endangered or threatened species in or near the river are also important to OCWD since OCWD is engaged in cooperative programs to protect and enhance endangered species habitat in the watershed.

Based on water quality monitoring data and modeling, the Draft EIR concludes that water quality impacts in the Santa Ana River from the proposed project will be less than significant. Given the level of uncertainty in the estimates made in the Draft EIR, OCWD is concerned that the proposed project may impact salt and nitrate concentrations in the Santa Ana River. OCWD requests that the City of San Bernardino develop and implement a water quality monitoring program to assess if future actual conditions in the river correspond to the estimates made in the Draft EIR.

3-1

The need for a monitoring program is illustrated by the fact that the project description in the draft EIR defines the project in terms of the potential reduced discharge to the Santa Ana River but does not describe the environmental conditions where the RIX water would be recycled or utilized (except in broad, general terms). Evaluations in the Draft EIR do not include detailed evaluations of the potential environmental impacts in the location(s) where the RIX water may

3-2

RESPONSES TO COMMENTS
LETTER #3
Orange County Water District

3-1 The estimates of project impact on salt (Total Dissolved Solids, TDS) and nitrate are characterized based on the best available data in Subchapter 4.4, Pages 4.4-16 through 4.4-26. The data utilized in making this forecast is abstracted from the Wildermuth's TIN/TDS study, which is included in the Technical Appendix. The District's concerns with potential impacts is noted and will be presented to the Municipal Water Department prior to a decision being made. In response to this comment for a monitoring program and other comments regarding the need for an adaptive management program, the Department will initiate a monitoring program as outlined in Attachment A to these responses. Note that extensive monitoring is already being conducted by various agencies and new regional monitoring programs are being developed. These monitoring programs are summarized in Attachment A to these responses and the additional monitoring that will be carried out by the Department is intended to fill in gaps or be specific to the proposed RIX sales program. If future monitoring data show divergence from the forecast contained in the program EIR, then adaptive management programs can be implemented as outlined in Attachment B to this document.

3-2 As clearly outlined in the Chapters 1-3 of the Draft EIR, this is a program environmental document. As such, it focuses on the program as defined at this stage of definition and examines cumulative effects related to the overall program implementation. The specific location of any RIX water sales has not yet been defined and therefore, this component of the project is not yet ripe for evaluation. The broad scope environmental issues regarding use of RIX recycled water at locations within the Santa Ana River drainage basin are addressed, but specific impacts of such activities must be examined in the future as second-tier projects when the Department sells recycled water to as yet unidentified users. This is not a piecemeal, but is a program that has been evaluated in a manner consistent with the level of detail known at this time. Future RIX recycled water sales will be evaluated in subsequent environmental documentation, consistent with the procedures outlined in Sections 15162 and 15168 of the State CEQA Guidelines. The District will be apprised of future water sales projects and afforded an opportunity to evaluate second-tier environmental documentation in accordance with the State CEQA Guidelines. Unless the recycled water is consumed as part of a future sales program (for example as part of manufacturing or other industrial operations), a water quality evaluation for the specific use and location will be a part of such documentation.

be recycled or utilized. OCWD's evaluation of the proposed project is hampered by the limited project description and associated evaluations, which give the appearance that the project is being planned and submitted for environmental review in a piecemeal fashion. It is OCWD's long-standing position that water within the Santa Ana River watershed remain in the watershed. Because of the incomplete project description, it is difficult for OCWD to evaluate the proposed project in terms of its overall impact, in particular with respect to the entire watershed. A monitoring program to assess actual impacts from the proposed project is therefore critical.

3-2 cont.

OCWD has the following additional specific comments on the Draft EIR:

1. Page 4.4.3 says "Generally, the river has little surface flow, except in storm events." This section should be revised to indicate that the some portions of the river have had essentially continuous flow for the last twenty years or more due to wastewater discharges.

3-3

2. On pages 4.4-5 and 4.4-16, the EIR should be revised to indicate that the 700 milligram per liter Basin Plan objective for total dissolved solids is for baseflow conditions.

3-4

3. On page 4.4-24, the Draft EIR references a "CH2M HILL Study (CH2M HILL 1998)." This reference was not found in the bibliography, Section 7.2, of the Draft EIR.

3-5

4. On page 4.4-24, the Draft EIR indicates that, as a result of the proposed project, the estimated TDS change at MWD Crossing in 2010 is a 27 milligram per liter increase, but that at below Prado Dam the estimated TDS change is a 3 milligram per liter decrease. It is not clear why a TDS increase is estimated for the Santa Ana River at MWD Crossing but a TDS decrease is estimated for the Santa Ana River at below Prado Dam. A detailed explanation should be provided to describe why this occurs.

3-6

5. On page 4.4-29, the Draft EIR says "Note also, that the recycled water sold to other entities has an actual benefit because it reduces the need to extract a comparable volume of groundwater (typically potable in quality) from aquifers in the area of use." The EIR should be revised to discuss that the "actual benefit" is not a new net benefit to the watershed since the water discharged by the RIX facility to the Santa Ana River is currently being recharged into the Orange County groundwater basin (and has been recharged into the Orange County groundwater basin since the RIX facility began operation in 1996). It has not been demonstrated that the proposed project creates a new water supply. The proposed project would relocate a portion of Orange County's water supply to a yet-to-be-determined location.

3-7

6. On page 4.4-29, the Draft EIR says "Additionally, in light of other agency reclamation projects, in particular Inland Empire Utilities Agency, specifically affecting the mainstem of the river, with and without the influence of the RIX facility, a short-term cumulative reduction of "outflows" (to 2010) will be countered by the long-term increase in recycled water production, or "inflows" in 2025 through 2050, based on updated individual water resources plans of these agencies (being compiled currently by SAWPA for its updated plan)." It is not appropriate to "counter" potential impacts from a proposed project using projected increases in wastewater discharges from other agencies such as the Inland Empire Utilities Agency. Additionally, discharges from the Inland Empire Utilities Agency occur downstream of the RIX Facility (outside of Reach 4 of the Santa Ana River).

3-8

3-3 The text following the sentence referenced in this comment does address ephemeral and perennial flows in sections of the river. This paragraph is revised in the Final EIR, for the purpose of clarification, as follows:

Generally, the river has little surface flow, except in storm events. Surface flow is comprised of base flow and storm flow. When base flow is zero excepting for storm events, ephemeral conditions exist. When base flow can be characterized as some value in cubic feet per second, perennial flow conditions exist. Rising groundwater in certain sections of the Santa Ana River creates perennial flows. The other major sources of surface flows in the river are discharges from wastewater treatment plants, which have created perennial flow conditions in some portions of the river, especially within the last twenty years. The locations of ephemeral and perennial sections in the upper Santa Ana River have changed historically. From 1960 to 1977, perennial flow occurred in the reach between Riverside Narrows and Prado Dam. Between 1978 and 1983, perennial flows extended to the Bunker Hill Basin along the river and Warm Creek. In 1996, when the City of San Bernardino moved its discharge point from the vicinity of E Street to the new RIX facility, the reach between the Bunker Hill Basin and the City of Rialto's reclaimed water discharge point became ephemeral (MJW, 1997).

3-4 This comment indicates that the EIR text should be revised to state that the 700 mg/l TDS Basin Plan objective is for baseflow conditions. This comment is in reference to water quality objectives taken from the Basin Plan. It is not necessary to include additional statements that water quality objectives are for baseflow conditions. Any surface water that is in the river would have to meet the TDS objective.

3-5 This reference was taken from Wildermuth text in Appendix A, Volume 2 of the EIR. The appropriate reference is: "Southern California Comprehensive Water Reclamation and Reuse Study", 1998, CH2M-Hill. It will be added to the bibliography in the Final EIR.

3-6 The text below was provided by Wildermuth Environmental, Inc. To replace the second, third and fourth paragraphs on page 4.4-24. The data below support the finding in the original text but expand upon the topic.

There are two investigations that describe the total dissolved solids (TDS) and total inorganic nitrogen (TIN) impacts in the Santa Ana River from future proposed recycling projects that would divert recycled water from the Santa Ana River to other uses. These studies are described in the following reports:

Estimate of TDS and TIN Impacts from the Diversion of San Bernardino Portion of RIX Effluent out the Santa Ana River Watershed Upstream of Prado, Wildermuth Environmental, Inc, March 2001.

TIN/TDS Study – Phase 2B of the Santa Ana Watershed, Wasteload Allocation Investigation, Final Technical Memorandum, Wildermuth Environmental, Inc., October, 2002.

The first report is referred to in the Draft Programmatic Environmental Impact Report (DPEIR) as the "technical report." The latter is cited in the DPEIR but the results were not discussed in detail. The Waste Load Allocation (WLA) investigation is much more detailed, rigorous, and scientifically defensible investigation than the assessment in the "technical report." The results of these investigations are summarized below in response to your comment.

The "Technical Report"

The "technical report" was commissioned by the City of San Bernardino in 2000 to estimate the TDS and TIN impacts of their proposed diversion of up to 18,000 acre-ft of recycled water from the Santa Ana River for other uses. The "technical report" is included as Appendix A in the DPEIR and presents a discussion on the analysis of various recycled water discharge and reuse alternatives. Alternative 7 in the "technical report" represents the proposed project and includes estimates of the maximum recycled water diversions away from the Santa Ana River by other recycled water dischargers. Alternative 8 is similar to Alternative 7 except that the diversion of recycled water by the other dischargers away from the River was assumed to be half of that assumed in Alternative 7.

RECYCLED WATER ASSUMED DIVERTED FROM THE SANTA ANA RIVER FROM THE "TECHNICAL REPORT" (acre-ft/yr)

Alternative	RIX		Other Dischargers		Ratio of RIX to Total Water Diverted	
	2010	2040	2010	2040	2010	2040
7	18,000	18,000	82,800	140,000	18%	11%
8	18,000	18,000	41,400	70,000	30%	20%

From the table above it can be seen that the fraction of recycled water diverted away from the River by the proposed project is always less than one third of the total recycled water diverted from the River and will likely be less.

Alternative 7 represents a liberal estimate of the recycled water diverted away from the River and the cumulative TDS and TIN impacts estimated with Alternative 7 can be characterized as a worst-case impact. Alternative 8 represents a more moderate diversion of recycled water by the other dischargers. Comparison of the TDS and TIN impacts of Alternatives 7 and 8 are used herein to characterize the relative impacts of the proposed project to the potential recycled water projects of the other recycled water dischargers.

WEI developed a monthly model for discharge, TDS and TIN for the Santa Ana River for the reach from "E" Street to Prado Dam. The hydrology for the model was

developed for the period 1989 through September 1999. The methodology, assumptions, and detailed presentation of the results are contained in the "technical report".

In addition to the Alternatives 7 and 8, a Baseline Scenario was created that corresponds to recycled water reuse that was occurring in 1998 and is essentially a "no new recycling" alternative. TDS and TIN impacts in the River were estimated by comparing the model projected TDS and TIN concentrations in the River for Alternatives 7 and 8 to the TDS and TIN concentrations estimated in the Baseline Alternative. The projected impacts are described below for Alternatives 7 and 8.

Change in Arithmetic Mean TDS Concentration. The arithmetic mean is simply the mean of the 120 monthly estimates of TDS concentration. The table below summarizes the TDS impacts of Alternatives 7 and 8 based on the arithmetic mean.

ARITHMETIC AVERAGE TDS AT MWD CROSSING AND AT BELOW PRADO DAM (mg/L)

Location	Baseline		Alternative 7		Difference		Alternative 8		Difference	
	2010	2040	2010	2040	2010	2040	2010	2040	2010	2040
MWD Crossing	534	819	561	532	27	13	555	528	21	9
Prado Dam	583	566	606	578	23	17	596	572	13	6

The diversion of recycle water away from the River upstream of the MWD Crossing will increase the average measured TDS at the MWD Crossing gauging station between 20 to 30 mg/L with most of the impact caused by the proposed project. At the below Prado Dam gauging station, the diversion of the recycled water will increase the measured TDS concentration between 10 to 20 mg/L with most of this impact not caused by the proposed project – that is, most of the TDS increase will be caused by the other recycling projects.

Flow-Weighted Average TDS Concentration. The arithmetic mean TDS concentration does not take into account the relationship of TDS concentration to discharge. The TDS concentration in the River is greater during dry-weather periods and is significantly less during stormwater events. This discharge-TDS relationship is recognized in the Basin Plan in Reach 2 TDS objective. The arithmetic mean does not describe the volume-weighted TDS and TIN recharge to groundwater and thus is not a useful metric to describe the impact on groundwater from the proposed diversions of recycled water away from the River. The Reach 2 objective, which is designed to protect the Orange County groundwater basin, is based on the average five-year, flow-weighted TDS concentration measured at the below Prado Dam gauging station. The Reach 2 objective is 650 mg/L. The model-projected maximum and minimum five-year, flow-weighted averages are shown below.

ESTIMATED FIVE-YEAR, FLOW-WEIGHTED AVERAGE TDS AT BELOW PRADO DAM (mg/L)

Statistic	Baseline		Alternative 7		Difference		Alternative 8		Difference	
	2010	2040	2010	2040	2010	2040	2010	2040	2010	2040
Maximum	540	542	528	531	-12	-11	535	538	-5	-4
Maximum	496	508	474	487	-22	-21	486	499	-10	-9

From the table above it is clear that the flow-weighted TDS concentration goes down with greater diversions of recycled water away from the River. This occurs because the relative amount of stormwater in the River increases with increased diversion of recycled water away from the River. Comparing the results of the above table to the Reach 2 objective of 650 mg/L it is clear that the proposed project will not cause the a violation of the Reach 2 objective.

"August-Only" TDS Concentration at Below Prado Dam. The Regional Board measures TDS and TIN concentrations at the below Prado Dam gauging station during the July to September period (hereafter the "August-only" period). The Regional Board computes the average TDS and TIN concentrations during this period and compares these values to the Reach 3 objective of 700 mg/L for TDS and 10 mg/L-N for TIN. The table below compares the model estimated August-only TDS concentration for Alternatives 7 and 8 to the Baseline.

AUGUST-ONLY TDS AT BELOW PRADO DAM (mg/L)

Location	Baseline		Alternative 7		Difference		Alternative 8		Difference	
	2010	2040	2010	2040	2010	2040	2010	2040	2010	2040
Mean	628	598	675	523	47	25	652	610	24	12
Maximum	659	616	736	657	77	41	696	635	37	19
Minimum	593	576	611	584	19	8	604	581	11	5

The model-projected TDS impact of the proposed project with varying amounts of other recycled water diversions away from the River will be to increase the TDS concentration during the "August-only" period. This occurs because the TDS concentration in RIX recycled water and some of the other recycled water discharges dilute the TDS concentration in other high-TDS recycled water discharges to the River and rising groundwater. If the "August-only" TDS measurements were to exceed the Reach 3 objective with regularity, the Regional Board could perform a TDS wasteload allocation among the recycled water dischargers to the River that would result in new TDS concentration permit requirements for all recycled water dischargers to the River.

The Wasteload Allocation Investigation

The WLA investigation was initiated by the TIN/TDS Task force that included the major recycled water dischargers in the Santa Ana watershed, Santa Ana Watershed Management Authority, and other water management entities in the watershed. The WLA analysis used models to estimate the discharge, TDS and TIN impacts to the Santa Ana River from current and future recycled water discharge alternatives. The modeling goals of the WLA investigation were:

" ... to estimate:

- Discharge and TDS and TIN concentrations in Santa Ana River and tributaries and in stream bed recharge
- TDS and TIN metrics at key locations and in streambed recharge for selected reaches

This was accomplished by estimating long-term daily discharge time histories and associated TDS and TIN concentrations for the Santa Ana River and major tributaries, assuming constant land use and POTW recycled water discharges for 2001 and 2010. Holding land use and POTW discharges constant and for a fifty-year precipitation period (1950 through 1999) results in a stationary time series that includes wet and dry periods and thus allows the determination of statistics that can used to evaluate the effectiveness of the current wasteload allocation included in the 1995 Basin plan. It also can be used to test the effectiveness of new wasteload allocations should the current wasteload allocation be found not protective of groundwater recharge beneficial use."

Two 2010 discharge alternatives were developed and evaluated that correspond to a modest recycled water reuse plan that was included in the 1995 Basin Plan (hereafter 2010A) and a maximum recycled water reuse plan (2010B). Both 2010 alternatives result in recycled more water diverted away from the Santa Ana River than has historically occurred. The recycled water discharged to the Santa Ana River for the alternatives in the WLA investigation are listed below.

RECYCLED WATER ASSUMED DIVERTED FROM THE SANTA ANA RIVER IN THE WLA INVESTIGATION (acre-ft/yr)

Alternative	RIX	Other Discharges	Ratio to RIX to Total Water Diverted
2001	100	13,900	1%
2010A	300	19,300	2%
2010B	24,100	97,200	20%

The 2010B alternative for RIX includes 18,000 acre-ft diversion of recycled water as described in the proposed project in the DPEIR and an additional 6,000 acre-ft/yr for reuse in the San Bernardino area and thus is larger recycled water reuse project than proposed by San Bernardino in the "technical report" and the DPEIR. Note also that the total recycled water diverted water away from the River is greater than assumed in the "technical report". The relative amount of recycling done by San

Bernardino is about the same as that assumed in the "technical report" (20 percent in the WLA investigation versus 18 percent in the "technical report").

WEI developed and calibrated a daily model for discharge, TDS and TIN for the Santa Ana River for the reach from Seven Oaks Dam to Prado Dam, and for some tributaries to the Santa Ana River. The hydrology for the model was developed for the period 1950 through September 1999. The methodology, assumptions and detailed presentation of the WLA results are contained in the WLA report cited above.

WLA MODEL-ESTIMATED STATISTICS FOR TDS AT BELOW PRADO DAM (mg/L)

Statistic	Alternative		
	2001	2010A	2010B
Mean Five-Year, Flow Weighted	573	557	582
Mean August-Only	605	587	612

The maximum values for the 50-year time series are always below their Basin Plan limits of 650 mg/L and 700 mg/L, respectively (see Tables 3-5, 3-11 and 3-12 from WLA report). The WLA investigation assumed a greater magnitude of recycled water reuse for 2010 than was assumed in the "technical report" and estimates that the TDS impacts will not result in an exceedence of the Basin Plan objectives.

Conclusions

The following conclusions can be made from the investigations reviewed above:

1. There are two recent modeling investigations that specifically evaluated the discharge, TDS, and TIN impacts of future recycled water discharge and reuse plans on the Santa Ana River.

2. The Reach 2 objective is 650 mg/L and is based on a five-year, volume-weighted average TDS concentration measured at below Prado Dam. Both investigations project that there will be no violation of the TDS objective for Reach 2.

3. The Reach 3 objective is 700 mg/L and is the numerical average of TDS concentration measurements of the Santa Ana River at the below Prado Dam during the period of July to September. The investigation documented in the "technical report" projects that there may be violations of the Reach 3 objective in some years. The WLA investigation projects that there will not be a violation of the Reach 3 objective. The WLA investigation is more rigorous, and scientifically more defensible. Thus, it is concluded that there will be no violation of the Reach 3 objective.

3-7 This comment raises several issues. First, the benefit would be a new benefit to the Department based on reuse of its treated effluent. The recycled water produced by RIX from the City of San Bernardino wastewater is primarily derived from the Bunker Hill groundwater basin. At this time the City/Department are not obtaining full benefit from this water resource for its customers. Orange County has been obtaining benefit from RIX discharges (by recharging it within the District's boundaries) with no value being provided to the City's water customers who fund its extraction for use and pay for the treatment. The proposed project would utilize a portion of the recycled water to the net benefit of the Department's customers, and funds generated by sale of the recycled water can offset some of the production and treatment costs for this water resource. To the extent that some losses (such as evapotranspiration and unrecovered water) occur from Orange County use of the discharged recycled water, the Department believes that some unquantifiable component should be considered to be "new water supply" that is a net overall benefit and offset to new water production.

3-8 Your comment is noted and will be made available to the City decision-makers for consideration prior to a decision being made on the proposed project. The comment is that it is not valid to use "projected" inflows and outflows into the River from other agency proposed projects to show minimal overall impacts. The intent of this section of text is not to "counter" potential impacts from the proposed RIX sales project by using projected increases in wastewater discharges from other agencies. The goal was to provide a cumulative context for considering the RIX recycled water sales project.

Section 4.4.3.5 of the Draft PeIR, and particularly Tables 4.4-13 and 4.4-14 show water projects that are proposed by several agencies, as well as overall inflows and outflows to the Santa Ana River to assess cumulative impacts. For the Draft PEIR, these were derived from the Santa Ana Watershed Project Authority's (SAWPA) 2002 Draft Water Resources Plan. This Plan has been finalized since this text was written and contains numerous projects not described in the previous document. Some updated information is presented as follows.

It is valid to show these inflows and outflow, as the projects are those proposed in individual agency-approved water plans. First of all, the SAWPA 2002 Water Resources Plan presents a similar analysis and tables to that presented in the Draft PEIR. Secondly, CEQA requires a cumulative impact analysis. Thirdly, commentors on the NOP for this PEIR requested this information.

SUMMARY OF PROJECTED FLOWS FROM PROPOSED PROJECTS IN RELATION TO RIX DISCHARGES

Flow Types	Flows by 2010 (MGD)	Flows by 2025 (MGD)	Flows by 2050 (MGD)
Recycled Water	130 Inflow (to SAR) -12%* 225 Outflow (use) +289%*	179 Inflow (to SAR) +21% 351 Outflow (use) +507%	217 Inflow (to SAR) +46% 383 Outflow (use) +563%
Water Storage	*To complete*	*To complete*	*To complete*
Stormwater Capture	*To complete*	*To complete*	*To complete*
Environmental Enhancement	*To complete*	*To complete*	*To complete*

* Comparisons to Base Year 200
Source: SAWPA 2002. Final IWRP. Table 7.1

Regarding the table above and recycled water SAWPA did not account for proposed RIX recycled water sales, i.e., all water produced by RIX would go to the River. This would be equivalent to the "total net flows of other projects" shown on Table 4.4-16 of the Draft PEIR. All proposed projects will decrease flows to the river up to 2010, but after then increased flows to the river will occur, due to increased recycled water production. This is the same trend shown in the Draft PEIR. The amounts in the SAWPA table are much more because many more water projects have been included

Thus, it is appropriate to place the proposed future RIX discharges in the context of future cumulative discharges in the upper portion of the Santa Ana River Basin. Growth forecasts for San Bernardino and Riverside County upstream of Prado indicate significant future growth in these two counties. Extrapolation of future increases of wastewater generation and discharge from this forecast population growth is appropriate, and it is clear that future wastewater generation will increase substantially in conjunction with this growth. The increase in flows is not identified as directly mitigating potential future RIX sales, but to demonstrate that future flows in the Santa Ana River downstream of Prado will continue to meet current obligations.

3-9 7. On page 4.4-37, the Draft EIR states "Based on the most current data, the residual flow to the Santa Ana River after sale of RIX recycled water is projected to be about 31,000 afy. This is considered sufficient to meet downstream water demand for all identified uses." OCWD disagrees with the statement in the Draft EIR "This is considered sufficient to meet downstream water demand for all identified uses.", since water demands in the Orange County groundwater basin continue to increase and a reduction of RIX discharge in the Santa Ana River will cause OCWD to search for other water sources to replace the reduction in RIX discharge. It could be that the residual flow to the Santa Ana River after sale of RIX water is sufficient to meet the legal obligations resulting from the 1969 Judgement, but it is not sufficient to meet downstream water demands.

3-10 8. On page 4.4-38, the Draft EIR discusses the proposed project with respect to the project's effect on water volumes and water quality within Reaches 3 and 4 of the Santa Ana River. The EIR should also discuss the effect on water volumes and water quality within Reach 2 of the Santa Ana River.

3-11 9. On page 4.4-38, the Draft EIR says "Based on the review provided above, which includes, the SAWPA evaluation of future use of recycled water for alternative uses within the Upper Santa Ana River Basin, the combined impacts of the current recycled water use/sales proposals is not forecast to cause cumulative impacts on the region's water resources or water quality. Generally, there will be increased discharges to the river in the long run, which will benefit the entire system, as shown in Tables 4.4-15 and 4.4-16." As discussed in the previous comment on page 4.4-29, it is not appropriate to "counter" potential impacts from a proposed project using projected increases in wastewater discharges from other agencies.

3-12 10. In Appendix A, "Estimate of TDS and TIN Impacts", page 6 of 9 of the letter report to Bernard C. Kersey from Mark Wildermuth says "The TIN in the wetlands effluent was assumed to be 1 mg/L (Personal communication with Gregg Woodside of OCWD, 2000)." As documented in the October 2002 TIN/TDS Study Phase 2B Final Technical Memorandum prepared by Wildermuth Environmental, in Greg Woodside's conservation with Mark Wildermuth, Mr. Woodside indicated that the nitrate concentration of effluent after wetlands treatment is seasonally variable and that this should be accounted for. Mr. Woodside also indicated to Mr. Wildermuth that he should calculate the nitrate removal rate based on the available data, rather than rely on an estimate provided by OCWD.

If you would like to discuss these comments further, please contact me at 714-378-3220.

Sincerely,

Virginia Grebbien, P.E.
General Manager

3-9 Within the context of the finding on page 4.4-37 (*adjudicated baseflow requirements are protective of groundwater recharge*), the Department believes that this comment is accurate. However, the District recognizes that past and future increased water demands in Orange County due to growth may not be met by the estimated 31,000 AFY residual flow. The District may need to acquire additional water resources from other sources or to purchase RIX recycled water from this sales program to meet changes in flow caused by sale and diversion of RIX recycled water to other upstream users.

3-10 Please refer to response to comment 3-6. Assuming that up to 18,000 acre-feet of RIX recycled water is diverted for sale, the total residual flow downstream of Prado Dam (Reaches 3 and 4 of the Santa Ana River) would be at least 162,000 acre-feet per year (see Table 4.4-13). If the approximate 23,000 acre-feet of recycled water diversion by IEUA is carried out over the same time period, the residual flow downstream of Prado is estimated to be about 139,000 acre-feet per year. The future water quality has been estimated in the TIN/TDS study and focused for the RIX project and is provided on pages 4.4-24 and 4.4-26. Water quality delivered below Prado Dam are forecast to be TDA of 532-536 mg/L and TIN of 7.2 and 6.7 at 2040 and 2010, respectively.

3-11 Please refer to response to comment 3-8.

3-12 Please refer to response to comment 3-6.

COMMENT LETTER #4

State Water Resources Control Board

Division of Water Rights
1001 I Street, 14th Floor • Sacramento, California 95814 • (916) 341-5300
Mailing Address: P.O. Box 2000 • Sacramento, California • 95812-2000
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Winston H. Hickox
Secretary for Environmental Protection

Gray Davis
Governor

APR 2 8 2003

Ms. Stacey R. Aldstadt
Municipal Water Department
City of San Bernardino
P.O. Box 710
San Bernardino, CA 92402

BY FAX WITH HARD COPY TO FOLLOW

April 28, 2003

RECEIVED
MAY 6 2003
SBMWD
DEPUTY GENERAL MANAGER

Dear Ms. Aldstadt:

COMMENTS ON DRAFT PROGRAM ENVIRONMENTAL IMPACT REPORT (DPEIR) (SCH# 991011088) FOR THE RIX FACILITY RECYCLED WATER SALES PROGRAM

Thank you for the opportunity to review and comment on the subject document. The Division of Water Rights (Division) is currently reviewing the proposed reduction of treated effluent release to the Santa Ana River of 400 acre-feet per annum (afa) from the Regional Rapid Infiltration and Extraction (RIX) Facility under Wastewater Recycling Application XW003052. The small amount of proposed flow reduction to the Santa Ana River to support a proposed composting facility should have, in our opinion, no significant impact on the natural resources of the Santa Ana River.

The Division has serious concerns about the findings in the DPEIR, however. The DPEIR describes a project involving sale of up to 18,000 afa of tertiary-treated wastewater to various potential water suppliers within the southern California region, rather than releasing this water into the Santa Ana River, as occurs at present. This project represents an approximate 40% reduction in annual releases to the Santa Ana River from the RIX Facility. The reach of the Santa Ana River between the RIX Facility and the Riverside Narrows supports important populations of the Santa Ana sucker (*Catostomus santaanae*) and the arroyo chub (*Gila orcutti*), as well as important riparian habitat. Yet the DPEIR finds that this reduction should have, with only minimal mitigation measures, no significant environmental effects on the natural resources of the Santa Ana River.

Hydrology

4-1 The Division questions the adequacy of the hydrological and biological analyses presented in the DPEIR. While the document presents substantial tables of historical flows, there is no presentation of modeled flows with the project operating at maximum release reduction rates. The only data of projected flow rates are found in Tables 4.4-15 and 4.4-16. The PDEIR suggests that there will be no long-term impacts to water quality (and, presumably, by extension, to the natural resources in the river corridor), because there will be long-term increase in river flow due to assumed water importation and population growth, resulting in higher wastewater releases to the river. However, this conclusion glosses over the data which indicate that, by the year 2010, there will be a reduction in river flow of 31,767 afa (Table 4.4-16, page 4.4-34). Fishery and riparian resources cannot be assumed to be protected in near future years by increased flows some 50 years in the future, while flows are significantly reduced in the interim.

Impacts to Santa Ana Sucker

4-2 The absence of any modeling data which present detailed estimates of monthly flows also tends to obscure the real effects of the proposed project and mitigation measures. For example, the mitigation

RESPONSES TO COMMENTS
LETTER #4
State Water Resources Control Board
Division of Water Rights

4-1 Your comment is noted and will be made available to the City decision-makers for consideration prior to a decision being made on the proposed project. This comment regarding water quality and quantity is based on the data in the referenced tables and on the TIN/TDS data contained in Attachment A to the Draft EIR. Attachment A contains a more detailed study which documents water quality and quantity data. The data indicate that in the short term there will be reductions in flow, but as noted in response to comment 3-10 above, overall flow will remain high through the short-term (2010) and will increase over the long-term. The conclusion regarding fishery and habitat resource impacts is based on the assumptions of reductions in flow contained in the Draft EIR. More than sufficient flows will be available to support the riparian habitat all along the river as described on pages 4.7-20 through 4.7-23. Adequate flows for the fishery are demonstrated on pages 4.7-12 through 4.7-20. Minimum continuous flows from the RIX facility will be adequate to maintain the existing riparian habitat and fishery, based on the best data available at this time.

4-2 The issues raised in this section are complex and are probably not capable of being addressed at this stage of the program review. As indicated above, the base flow requirements for habitat and species will be met by the proposed project. The RIX discharge will be available even during continued drought due to the continued generation of wastewater and the treatment of such flows. Therefore, the occurrence of the drought does not appear to create any additional constraint on the habitat or fishery. The second issue of timing of sales and maintenance of flows is more realistically only answerable through the implementation of the second tier environmental documentation for specific sales projects in the future. Please refer to response to comment 3-2 which further discusses this issue.

A model would be superfluous at this stage of the review because the specific nature of future sales cannot be known. The second tier reviews are obviously important because they will address the monthly flow issues in detail, and as sales accumulate in the future, the issues raised in this comment will be fully addressed, as is appropriate in a programmatic process. For example, sale of RIX recycled water will not happen all at once. On the other hand, flows from RIX will incrementally increase over the next few years. It is entirely possible that a small volume sale of RIX recycled water could be offset by increases in flows since 2001. Excluding the 1997-98 year (a wet year), RIX discharges grew about 6,600 AFY between the 1996-97 water year and the 2000-2001 water year. Thus, over 4 years the average growth in discharge has been 1,650 AFY, or about 3.8% per year. Further complicating issues is the type of recycled water sale, i.e., delivery may be the same each month, or in the case of use of recycled water for landscaping, the demand may peak during the summer and be less during the winter. These specific issues are too speculative at this time to fully address in a programmatic EIR

because there are too many underlying assumptions and conjectures, i.e. speculations. The RIX Water Sales Program has been appropriately structured in the EIR for review. The broad scope, cumulative issues have been addressed, but the specifics will be examined for each future RIX recycled water sale. The issues related to maintaining sufficient flow during the whole of the year for the habitat and fishery is more appropriately addressed when a specific sale of water is being considered. Prior to authorizing such a sale, the specific questions raised in this comment can be fully explored and addressed. All responsible agencies, including the State Water Board, will have an opportunity to review the project specific documentation.

proposed for potential impacts to Santa Ana sucker is to maintain a minimum flow of 40 cfs from the RIX Facility during the March to May spawning period. This proposed mitigation does not adequately consider two consequences of the proposed action:

1. The proposed mitigation still represents up to a 48% reduction from historical flows in the Santa Ana River below the RIX Facility, compared to the ranges of flows seen during the March to May period since the RIX Facility came on line in 1996 (Table 4.7-3, page 4.7-15). Considering that this facility has been operating during a major drought period in southern California, especially since 1998, such a reduction may represent a significant impact on the environment.
2. The maintenance of relatively higher flows during the March to May period means that flows will have to be reduced to lower levels during the rest of the year to deliver the total amount of 18,000 afa proposed to be sold by this project. Proposed diversion amounts are presented only as an annual total. There are no data presented to show the percentage reductions in river flow during other months of the year to see the expected changes in flow patterns. Therefore it is impossible to evaluate the actual short-term (monthly) effects of the proposed project.

4-2 cont.

The section of the DPEIR discussing the Santa Ana sucker also discusses a two-part study by Brant Allen on the effects of temporary shutdowns of the RIX Facility. Unfortunately the study was not completed before the DPEIR was issued, and we have not had an opportunity to review this report. While this study discusses temporary shutdowns, it would appear that it misses the point of the discussion, which is the effect of long-term reductions in flow. The fact that the report concludes that "non-native species have more of an impact on the Cucker [sic] than effluent flow change or water quality" (page 4.7-18) begs the question. The document does not quantify the relative impacts, and it does not indicate to what extent the impacts on the sucker by non-native species may be offset by better habitat conditions, more successful spawning, and other aspects of its life history which maintenance of higher flows might support.

4-3

The discussion of the sucker also notes that it prefers a gravel and cobble substrate, especially for spawning (page 4.7-12). The DPEIR goes on to state that reduction in flows could "affect available habitat for the sucker" (page 4.7-17). However, the document then suggests that there are so many environmental variables affecting the sucker that evaluation of the effects of the proposed project cannot really be done. The document suggests in one study from Technical Appendix F that lower flows might actually be beneficial for some life stages of the sucker (page 4.7-17). However, there is no description of what these benefits might be, and the Division did not receive the Technical Appendices with the DPEIR, so we cannot evaluate this statement. Generally speaking, however, it may be assumed that an average 40% reduction of flows will reduce the carrying capacity of the streamflow, and will result in increased sedimentation of habitat, especially during normal low-flow periods, which the higher flows presently maintain in a relatively silt-free condition. No detailed examination of these effects is presented in the DPEIR.

4-4

Impacts to Riparian Habitat

The DPEIR evaluates the potential impacts to riparian habitat (pages 4.7-19 to 4.7-23). The document concludes that even with reduced flows, sufficient water will be flowing down the river channel to maintain the present riparian habitat and to support possible future expansion. This conclusion appears to assume that the reduced flows will still be distributed equally, and in its present pattern, throughout the riparian corridor. There is no discussion of lowered water tables, reduced variation in stream channel morphology, or other effects of the proposed flow reduction. The PDEIR does not present adequate evidence in support of its conclusion of no significant impacts.

4-5

4-3 The PEIR already directly addresses this on page 4.7-17, paragraphs 2-4 and indirectly throughout the remainder of the Santa Ana Sucker discussion.

The key issue is how the reduction in flows will affect the various life history stages of the sucker and the projected long-term impacts of these effects. We cannot say with certainty what the long-term effects will be on the sucker. However, based on the known life-history attributes of the sucker (discussed briefly below), it appears that changes to the flow regime would have to be considerably more drastic than the maximum planned to cause harm to the sucker populations. The most recent report from the Santa Ana Sucker Conservation Program provides additional observations that support the PEIR and earlier statements on the sucker's habitat requirements (Haglund, et al., 2003), as summarized briefly below.

Spawning Habitat Needs—Based on the most recent observational data of sucker reproduction in Rialto Drain and Sunnyslope Creek, it appears that reproduction was occurring over gravel in approximately 0.5 m of water with velocities of 0.2 to 0.3 m/sec (Haglund et al., 2003). Spawning suckers were also observed using deeper pool areas for cover during spawning. This is consistent with past observations of the sucker in other streams (i.e., Greenfield et al., 1970).

Immature Sucker Habitat Needs—Fry appear in shallow (0.5 to 0.1 m), slow velocity habitats with sand or silt substrate, which may or may not be associated with vegetation or algae (Haglund et al., 2003). Juvenile fish have also been observed in shallower, low velocity areas.

Adult Habitat Needs—Habitat requirements for adult fish are still not well described, but have generally been associated with gravel and cobble substrate in depths often over a meter (Haglund et al., 2003).

These most recent data and observations from the Santa Ana River and elsewhere suggest that the Santa Ana Sucker can maintain healthy populations within a fairly narrow range of depth and flow conditions. If flows revert to pre-RIX conditions, there is no evidence that resultant changes in the depth or flow regime would be detrimental to the sucker.

Monitoring, as proposed in the appended *Draft Monitoring Program and Adaptive Management Strategy for the Santa Ana Sucker in Relation to Discharge Volumes from RIX* (See Appendix A), would directly address the potential for habitat and populations changes as a result of changes in RIX discharge. Such monitoring would allow discharges to be adjusted, if necessary, to avoid detrimental effects on the sucker population.

Reference: Haglund, T.R., J.N. Baskin, and C.C. Swift, 2003. Results of the Year 2 Implementation of the Santa Ana Sucker Conservation Program for the Santa Ana River. Draft Report Prepared by San Marino Environmental Associates (SMEA) for Santa Ana Watershed Project Authority (SAWPA), March.

4-4 The Santa Ana Sucker requires a variety of substrate types throughout its life cycle. Some reference information is given as follows:

- Preferred substrates are general coarse, with gravel, rubble, and boulders with growth of filamentous algae (Smith, 1966; Moyle, 1976).
- Occasionally found on sand/mud substrates (Moyle et al., 1995).
- Suckers spawn over medium gravel in water approximately 0.5 meters in depth, and with a flow of 0.20-0.24 m/sec (SMEA, 2003).
- Larval suckers are found in shall (5-10 cm) water, in low flow areas with a silt bottom (SMEA, 2003).
- Juvenile suckers are often found over mid-channel gravel or in deeper holes along the margins of the river, along with adults (SMEA, 2003).
- Fry are found along the edges of sand bars or banks, downstream from vegetation (SMEA, 2003).

Therefore, as stated on page 4.7-17 of the Draft PEIR, "*The overall habitat availability is dynamic in this river system and can change substantially between years and even within a single year. The Santa Ana River is subject to very high winter flows, which scour out new pools and fill in others on an annual basis. Due to this flow regime, "riffle" (or run) locations can change, as well as gravel/cobble and sand areas. Seasonal effects of herbaceous plant growth along channel margins and their roles in seasonal island development also play a role in habitat availability. All are likely important to the sucker-run habitat needed for feeding and spawning; pool habitat for cover; and gravel/cobble bottom for spawning. Therefore, a general diversity of habitat needs to be maintained, but would be difficult to achieve, with the flooding and scouring cycles of the river and ongoing maintenance activities for flood management.*"

It is further recommended in the PEIR that an annual assessment of substrate (as well as flow, depth and other factors) be conducted at the beginning of the spawning season in order to determine special needs for maintenance of optimum spawning conditions. As seen from above, and also in response to other comments, conditions for larvae, fry and juveniles should also be assessed. An "idealized" cross-section of habitat for the Santa Ana Sucker is given in SMEA, 2003 (p 68). Note that this report was not yet available during the preparation of the Draft PEIR; it contains much new and newly synthesized information on Santa Ana Sucker habitat preferences. The habitat cross-section includes: (1) a sunny, shallow silty bottom area with little flow for fry, (2) a shallow gravel area for adult spawning, (3) a deeper sandy substrate with small depressions for juveniles that is adjacent to the fry habitat, and (4) a deeper sand/gravel substrate for adults and juveniles that is near vegetation and an undercut riverbank.

Therefore, an annual stream morphology analysis should be included in the monitoring program to determine the existence of all of the above conditions in proximity to probable spawning substrate and conditions. This would become part of the adaptive management strategy, which would assess the "best" locations for Sucker spawning and development each year and then develop maintenance requirements for each identified area. SEE PROPOSED DRAFT MONITORING PROGRAM for more specifics.

A final note regards the part of the comment on "no detailed information provided on the impacts of changes in substrate (sedimentation)." As seen from the above, such changes could be beneficial in providing the habitat for some life stages of the sucker, i.e., sedimentation could provide shallower silty/sandy areas for fry and juveniles if also located near scoured, deeper areas for juveniles and adults.

References:

Alfred A. Webb Associates, 2001. Hydraulic Review of the RIX Plant Discharge to the Santa Ana River. Prepared for San Bernardino Municipal Water Dept. Riverside, CA. June. *(Technical Appendix to PEIR)*

Haglund et al., 2003. See 4-3 above.

Moyle, P.D., R.M. Yoshiyama, Jack E. Williams, and Eric D. Wikramanayake, 1995. Fish Species of Special Concern in California. The Resources Agency, Dept. of Fish and Game. Final Report for Contract No. 2128IF.

Moyle, P.D., 1976. Inland Fishes of California. University of California, Berkeley Press, Berkeley, CA 405 pp.

Smith, G.R., 1966. Distribution and Evolution of the North American Catastomid Fishes of the Subgenus *Pantosteus*, genus *Catostomus*. University of Michigan Museum of Zoology, Misc. Publ. 129:1-33.

4-5 Your comment is noted and will be made available to the City decision-makers for consideration prior to a decision being made on the proposed project. Please refer to the Webb "Hydraulic Review of the RIX Plant Discharge to the Santa Ana River" which is provided in the Technical Appendices to the Draft EIR. The extent and type of riparian habitat is shown on the aerial photos in Appendix 8.3 of the Draft EIR. Further, Table 4.4-14 illustrates that actual flows at the Riverside Narrows is high (over 60,000 AFY) which indicates a substantial volume of RIX flow is contributing to the flow at the Narrows. Thus, perhaps as much as 40,000 AFY **(Need to verify this value)**. Thus, the volume of recycled water presently being consumed between the RIX discharge point and the Narrows is consistent with the estimated volume of evapotranspiration (about 3,200 AFY and some percolation. Even with removal of 18,000 AFY for recycled water sales and with ignoring future increases in RIX discharges, perhaps as much as 1,600+ AFY, more than 22,000 AFY of flow (~32 cfs) will be contributed to the area downstream of the Narrows. The general data at this point do not support the contention in this comment that inadequate flows will be available for the habitat and fishery between the RIX discharge point and just downstream from the Narrows where the City of Riverside discharges its recycled water from the City treatment plant. The Municipal Water Department concludes that adequate data are available for this stage of the review to support the finding that the program's impacts to habitat and fishery will not be significantly adverse, particularly in light of future review of individual water sales projects.

Summary

4-6 The Division finds that the PDEIR does not adequately address the potential impacts of the proposed project on sensitive fishery and riparian resources in the Santa Ana River which are supported by the present rates of treated effluent discharges. These effects must be adequately addressed in the Final PEIR. We also recommend full consultation with the California Department of Fish and Game during preparation of the Final PEIR.

This completes our review and comments on the subject document. Should you have any questions, please contact me at (916) 341-5388, or by email at jsutton@waterrights.swrcb.ca.gov.

Sincerely,

James E. Sutton
Staff Environmental Scientist
Permitting Section

4-6 Your comment is noted and will be made available to the City decision-makers for consideration prior to a decision being made on the proposed project. The Department of Fish and Game and the U. S. Fish and Wildlife Service submitted a joint letter (see Letter #6) and they will be provided the information in these responses to comments ten days prior to any decision on the RIX recycled water sales project, as will be State Board. Both agencies will be provided an opportunity to review future second-tier environmental documentation for specific recycled water sales projects. If required, formal consultations will be initiated with either or both agencies when specific projects are being implemented in the future and if regulatory permits are required to implement the sales projects.

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COMMENT LETTER #5

California Regional Water Quality Control Board

Santa Ana Region

Winston H. Hickox
Secretary for Environmental Protection

Internet Address: http://www.swrcb.ca.gov
3737 Main Street, Suite 500, Riverside, California 92501-3339
Phone (909) 782-4130 ⊟ FAX (909) 781-6288

Gray Davis
Governor

April 29, 2003

Stacy R. Aldstadt
City of San Bernardino Municipal Water Department
300 N. "D" Street
San Bernardino, CA 92418

DRAFT ENVIRONMENTAL IMPACT REPORT FOR THE RIX FACILITY RECYCLED WATER USE PROJECT / STATE CLEARING HOUSE NUMBER 99101088

Dear Ms. Aldstadt:

Staff of the Regional Water Quality Control Board, Santa Ana Region (RWQCB), has reviewed the Draft Environmental Impact Report (DEIR) for the above-referenced project. The proposed project consists of the following: The City of San Bernardino currently discharges approximately 40 million gallons per day (mgd) of tertiary treated effluent from the Regional Rapid Infiltration and Extraction (RIX) Facility to the Santa Ana River. The City of San Bernardino, in conjunction with Western Water Company, intends to market and sell 15 MGD of the treated effluent produced by the RIX Facility to potential water suppliers within southern California.

Staff of this Regional Board have the following comments on this DEIR:

5-1 1. We are concerned about the potential for substantial degradation to riparian habitat and aquatic life in the Santa Ana River below the RIX Facility resulting from this project. The area of the River from the RIX Facility downstream to the MWD crossing provides habitat for the federally listed Santa Ana Sucker (*Catostomus santaanae*) and the state listed Arroyo Chub (*Gila orcutti*). In this area, these fish species are reproducing and the populations are healthy. This section of the river is an effluent dominated water-way during dry times of the year. According to the DEIR, RIX flows comprise up to 85 % of the total flows measured at the MWD crossing. The project proposes to divert up to 40% of the discharge effluent from the RIX Facility.

5-2 2. We are concerned that the project will result in Santa Ana River flow rates and levels that are insufficient to maintain healthy populations of the Santa Ana Sucker and the Arroyo Chub. Minimum flow requirements to maintain healthy populations of these sensitive fish species in the Santa Ana River must be determined. All appropriate measures must be taken to maintain the minimum flow requirement. Special considerations for assuring adequate flow during spawning periods must also be made.

If you have any questions, contact Mark Adelson at (909) 782-3234, or me at (909) 782-7960.

Sincerely,

David G. Woelfel
Regional Planning Programs Section

cc: Scott Morgan – State Clearing House

RESPONSES TO COMMENTS
LETTER #5
California Regional Water Quality Control Board
Santa Ana Region

5-1 Your comment is noted and will be made available to the City decision-makers for consideration prior to a decision being made on the proposed project. Potential degradation to the riparian habitat is already examined for adverse impact in the PEIR on page 4.7-22, paragraph 2 and on page 4.7-23, paragraph 1. Based on the calculations in the PEIR, flows will be more than sufficient to meet the water demands of the riparian zone. Damage to the riparian zone from invasive species and flood control activities are more immediate problems associated with the riparian zone outside the control of RIX facility operators. Also, please refer to response to comment 4-5.

Concerning degradation to aquatic life, those issues have been addressed previously (see text under comment 4-3). There is no evidence that reducing flows to pre-RIX levels will be detrimental to the Santa Ana Sucker, but habitat and sucker populations will be monitored as RIX recycled water sales are initiated.

5-2 Given the current data available on the sucker, the data are not available to establish a firm minimum flow requirement for the sucker in the Santa Ana River system. Traditionally, minimum flow requirements are developed using "instream flow incremental methodology" (IFIM) stream habitat/flow modeling combined with development of habitat suitability curves for each life stage of the species in question. The two efforts are then combined to develop a "time series" of habitat conditions over a 20-year period of recorded flow regime. Using these data, natural constrictions to habitat are determined and a conclusion is made for which life stage is limiting and what flow conditions limit that life stage. This effort has not been conducted for the Santa Ana Sucker or even been proposed, to our knowledge. As such, there is no formal way to determine what an appropriate minimum flow would be.

However, the sucker maintains good populations in other systems under much lower flows of 10-20 cfs. But, such information is stream-specific and may not be directly applicable to the Santa Ana River. In order to actually determine the minimum flow requirements for the Santa Ana Sucker, a more detailed analysis is needed to determine the changes in available habitat for specific life stages that would occur under different flow scenarios. The proposed monitoring program in Attachment A to these responses is a step towards obtaining such knowledge.

COMMENT LETTER #6

U.S. Fish and Wildlife Service
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Road
Carlsbad, California 92008
(760) 431-9440
FAX (760) 431-5902 + 9618

CA Dept. of Fish & Game
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In Reply Refer To:
FWS-SB-3061.3

RECEIVED
MAY 6 2003
SBMWD
DEPUTY GENERAL MANAGER
APR 29 2003

Stacey Aldstadt, Deputy General Manager
City of San Bernardino Municipal Water Department
300 North D Street
San Bernardino, California 92418

Re: Comments on the Program Environmental Impact Report for the Regional Rapid Infiltration and Extraction Facility Recycled Water Sales Program - SCH #99101088

Dear Ms. Alstadt:

The U.S. Fish and Wildlife Service (Service) and the California Department of Fish and Game (Department), hereafter collectively referred to as the Wildlife Agencies, offer the following comments and recommendations regarding project-associated biological impacts based on our review of the Programmatic Environmental Impact Report (PEIR) for the Regional Rapid Infiltration and Extraction (RIX) Facility Recycled Water Sales Program (Program). The PEIR proposes to divert up to 25.2 cubic feet per second (cfs) [16.27 million gallons per day (mgd) or 18,000 acre feet per year (afy)] of the RIX facility's current discharge to potential users in San Bernardino, Riverside, and Orange Counties. The proposed diversion is equivalent to approximately 40 percent of maximum discharge (62 cfs) of the RIX facility and approximately 33 to 46 percent of the current discharge (55 to 76 cfs). Your agency states that the Program will ensure that the RIX Facility continues to discharge 40 cfs (25.8 mgd) or discharge a volume equivalent to the volume produced prior to the establishment of RIX Facility operations during spawning period.

The primary concern and mandate of the Service is the protection of public fish and wildlife resources and their habitats. The Service has legal responsibility for the welfare of migratory birds, anadromous fish, and endangered animals and plants occurring in the United States. The Service is also responsible for administering the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*).

The Department is responding as a Trustee Agency, pursuant to the California Environmental Quality Act (CEQA) Guidelines Section 15386, and as a Responsible Agency regarding any discretionary actions pursuant to CEQA Guidelines Section 15381. The Department as a Trustee Agency has jurisdiction by law over natural resources affected by a project which are held in trust for the people of the State of California. The Department, as a Responsible Agency, is required to actively participate in the CEQA process and review and use the Lead Agency's CEQA

documents when taking any discretionary action (CEQA Guidelines Sec 15096), such as the issuance of a Streambed Alteration Agreement or a California Endangered Species Act (CESA) Incidental Take Permit.

6-1 We are concerned that the reduced discharge of effluent and construction activities that may result from the proposed Program may affect the federally endangered Delhi Sands flower-loving fly (*Rhaphiomidas terminatus abdominalis*, "DSF") and the San Bernardino kangaroo rat (*Dipodomys merriami parvus*, "SBKR"), the federally threatened Santa Ana sucker (*Catostomus santaanae*, "sucker") and coastal California gnatcatcher (*Polioptila californica californica*, "gnatcatcher"), the federally and State endangered southwestern willow flycatcher (*Empidonax traillii extimus*, "flycatcher"), the federally and State threatened least Bell's vireo (*Vireo bellii pusillus*, "vireo"), and the State endangered western yellow-billed cuckoo (*Coccyzus americanus occidentalis*, "cuckoo"). The Department is also concerned that the proposed Program will also impact aquatic and sensitive riparian species. Many sensitive species that are listed by the Department as Species of Special Concern are known to occur within the Santa Ana River and may be affected by the project including the Santa Ana sucker, Santa Ana speckled dace (*Rhinichthys osculus*), arroyo chub (*Gila orcutti*), western spadefoot toad (*Scaphiopus hammondii*), southwestern pond turtle (*Clemmys marmorata pallida*), Belding's savannah sparrow (*Passerculus sandwichensis beldingi*), tri-colored blackbird (*Agelaius tricolor*), yellow-breasted chat (*Icteria virens*), white-faced ibis (*Plegadis chihi*), white-tailed kite (*Elanus leucurus*), Swainson's hawk (*Buteo swainsoni*) and ferruginous hawk (*Buteo regalis*).

6-2

6-3 The Wildlife Agencies are concerned that neither of the options for discharge under the proposed Program will provide sufficient habitat to maintain current populations of the sucker. The Santa Ana River supports habitat for the sucker for approximately 34 miles. For approximately seven to ten of these miles, 80 percent of the water is supplied by discharges from the RIX Facility. Reviewing data from Chadwick Ecological Consultants provided in the PEIR, it appears that suckers were rarely observed before 1998 between the RIX outlet and the Metropolitan Water District (MWD) pipeline in the Santa Ana River (Sites labeled SAR3, SAR4 and SAR5). Since the RIX Facility began discharging in 1996, habitat in this stretch of the Santa Ana River has improved and currently supports a significant population of the sucker. We are concerned that a 40 percent reduction in this discharge could eliminate and/or degrade significant portions of sucker habitat. As stated in the PEIR, data do not exist to determine whether the proposed discharge flow of 40 cfs would be sufficient to maintain the sucker in this stretch of the Santa Ana River. In fact, the survey data for the sucker indicate that water quality and/or discharge quantity, which ranged from 37 to 49 cfs, prior to the establishment of the RIX Facility were insufficient to support sucker populations between the RIX Facility and the downstream MWD pipeline. Maintenance of flow in this area is particularly important because the RIX Facility provides a majority of the flow during the non-rainfall season. Therefore, we recommend that you address the quality and quantity of discharge required to maintain existing habitat for the sucker in a revised PEIR or similar document.

6-4 In addition, comparison of 1990 and 2002 aerial photographs indicated that the stream has increased significantly in length during this time because of the development of "meanders" and braided conditions. Therefore, we recommend that you determine, if possible, the minimum flow

RESPONSES TO COMMENTS
LETTER #6
U.S. Fish and Wildlife Service and
California Department of Fish and Game

6-1 The reduced discharge of RIX recycled water has no potential to directly or indirectly impact the Delhi sands flower-loving fly (DSF). No DSF supporting habitat occurs within the Santa Ana River channel. A limited potential does exist for future construction activities to affect DSF habitat which occurs west and north of the RIX facility. In most instances, pipelines and other support facilities will be installed within existing road rights-of-way where no suitable DSF habitat remains. However, if future infrastructure facilities will be extended through DSF habitat (primarily areas with Delhi sands underlaying an area), the Department will identify this impact in subsequent, second-tier environmental documents, which will include protocol surveys where required. The Service will have an opportunity to review such documentation, and where appropriate, mitigation will be identified, which will include acquisition of incidental take permits where appropriate. Either mitigation will be provided, or such habitat will be avoided.

The potential for adverse impact to the San Bernardino kangaroo rat (SBKR) is also very low because little disturbance will occur in habitat that supports this animal. Again, it is possible that locations where RIX recycled water may be used or infrastructure installed could provide habitat for the SBKR. As outlined above, subsequent environmental review will examine each proposed RIX recycled water sale and if SBKR habitat will be affected, mitigation will be identified and where necessary, incidental take permits will be obtained from the Service or California Department of Fish and Game (CDFG).

For the coastal California gnatcatcher (CAGN) the process will be the same. Based on the nature of the proposed project, it is very unlikely that CAGN habitat will be impacted by any aspect of the proposed project. However, as outlined above, subsequent environmental review will examine each proposed RIX recycled water sale and if CAGN habitat will be affected, mitigation will be identified and where necessary, incidental take permits will be obtained from the Service or California Department of Fish and Game (CDFG).

No project-related activities are envisioned within the Santa Ana river channel where riparian habitat would be directly affected. Based on the data contained in the Draft EIR, the riparian habitat will receive more than sufficient flows under the proposed project to ensure that indirect impacts to riparian species do not occur. Please refer to response to comment 4-5 for additional information.

6-2 Please refer to responses to comments 4-1 through 4-6. The available data indicate that the riparian habitat will not suffer from the proposed reduction in flows so the riparian habitat dependent species should not be adversely impacted by the proposed project. Based on the best data available at this time, the flows that will be maintained in the channel, as indicated in the Draft EIR and in these responses

to comments, will be sufficient to sustain all aquatic populations within the area of impact by the RIX discharges.

6-3 Your comment is noted and will be made available to the City decision-makers for consideration prior to a decision being made on the proposed project. The statement that no options will provide sufficient habitat to maintain current populations is unfounded, unless the agencies have developed minimum flow requirements or have other population/habitat information of which we are unaware. Also, the flows prior to construction of the RIX facility were of similar magnitude in this reach, resulting from the original San Bernardino and Colton discharges further upstream. It is true that, despite the available flows, Santa Ana suckers were rare to absent upstream of the MWD crossing (C&A, 1992), but they were found to be abundant in the reach between RIX and MWD prior to construction of RIX. Absence of the species was the attributed to poor water quality, as documented in the Santa Ana Use-Attainability Analysis (C&A, 1992), and not due to inadequate flows. Water quality will be maintained in the future (protective of the species) and the data available at this time indicates that sufficient flows will be maintained to sustain all of the aquatic species along the reach from RIX to the Riverside Narrows where the City of Riverside treatment plant discharges enter the river. Response to comment 4-2 further addresses process for evaluating future specific RIX recycled water sale project which will ensure that project specific impacts will be fully evaluated.

Reference: Chadwick & Associates, Inc., 1992. Santa Ana River Use-Attainability Analysis, Volume 2: Aquatic Biology, Habitat, and Toxicity Analysis. Prepared for SAWPA, Riverside, CA.

6-4 Responses to comments 4-2 and 4-4 address the issue raised in this comment. The channel dynamics, such as location of flows, is more controlled by winter storm flows than by the RIX discharges. The RIX discharges will follow the low points in the channel created by storm flows, and are not considered sufficient on their own to control future stream morphology. The Department believes that it has identified a volume of flow that will maintain the aquatic species populations in the Santa Ana River channel between the RIX discharge point and the Riverside Narrows. At the suggestion of several comments, the Department has developed an adaptive management monitoring program that will allow the monitoring of future incremental RIX recycled water sale projects.

6-4 cont. volume required to support the sucker within the Santa Ana River between the RIX Facility outlet and the MWD pipeline in a braided river configuration rather than as a straight streambed. We also suggest that you consider potential effects to sucker that may result from decreased water

6-5 flow such increased parasitic infection, effects from increased water temperature such as subsequent metabolic and behavioral changes, changes in water quality, and changes in predator and prey abundance and behavior, and develop measures to offset these potential impacts.

6-6 The PEIR states that your agency will ensure that the RIX Facility continue to discharge 40 cfs during the spawning period. We note that the spawning period for the sucker appears to be variable and spawning has been detected as late as July in recent years in the Santa Ana River. Therefore, any measures designed to protect the spawning period of the sucker should be focused between March 1 and July 30. In addition, the nursery period is especially important to fish as it is often the period when they are most susceptible to injury, starvation, and death. Therefore, it is important to not only address the spawning period to enable reproductive success, it is also important to address the nursery period that occurs from March 15 through October 30 to enable recruitment success.

6-7 We are also concerned that the reduction in flow from the RIX Facility may have an adverse effect on the riparian habitat that currently exists within the Santa Ana River upon which several previously listed federally and/or State listed and sensitive species are dependent. We recommend that you provide further clarification as to how discharge from the City of Riverside, City of Corona, and the Inland Empire Utilities Agency would be sufficient to support 6,245 acres of riparian habitat downstream of the Riverside Narrows (as stated on Page 4.7-3). This clarification should provide the assumptions and method of calculation for the analysis for the water consumption needs of riparian vegetation, including: 1) the amount of water that percolates into the underlying aquifer, 2) the depth and volume of the underlying aquifer, 3) the amount of water that is being used by existing vegetation, and 4) the amount of water that is removed due to evaporation. In addition, we recommend that you provide a rationale for the water consumption

6-8 values used for this analysis (i.e., what is the basis for the 5 percent downward adjustment).

6-9 We would also like a similar clarification of the assumptions and calculations used to indicate that the riparian habitat that exists between the RIX Facility and the MWD pipeline would be sustained on the proposed reduced discharges. Vireos have been detected in the vicinity of the MWD pipeline. Although flood control activity likely limits the growth of riparian habitat in some areas, the Martha Mclean Anza Narrows Park immediately upstream of the MWD pipeline supports more than 400 acres of riparian habitat that may be suitable for vireo.

6-10 We suggest that you incorporate an adaptive management strategy and long-term monitoring program for the area of the Santa Ana River between the RIX Facility and the MWD pipeline that would include periodic assessments of the amount of riparian habitat, depth of the underlying aquifer, depth of root systems for young and mature vegetation within the River, and vegetation surveys. We also encourage you to work with other water use agencies within the Santa Ana River watershed to implement a similar program downstream of the MWD pipeline.

6-5 Based on the best data available at this time, factors such as parasitic infection, metabolism and behavior modification as the result of increased water temperatures have not been addressed for the Santa Ana Sucker. Parasites and parasitic diseases in fish have shown little correlation with stream quality (Whittier et al., 1987; Steedman, 1991; and Simon and Emery, 1995). While the sucker is often described as living in cool, small streams, its historical and current occurrence near and downstream of the MWD pipeline suggest that the sucker can maintain populations in warm aquatic environments. In fact, temperature measurements and modeling conducted as part of the Santa Ana Use Attainability Analysis indicate that suckers are maintaining populations in portions of the Santa Ana River where temperatures are already approaching 30° C (C&A, 1992). Without quantifying temperature that will be associated with the flow reductions, it is not possible to even speculate if temperatures will reach levels which might induce physiological or behavioral changes in the sucker.

In regards to predators near the RIX facility (Riverside Road), the most current electrofishing data indicated that tilapia, mosquitofish, and fathead minnows were the only other species present (CEC unpublished data; USGS unpublished data). Near the MWD crossing, the number of introduced species is much higher, probably reflecting historically more consistent flows and habitat quality in this reach as a result of rising groundwater. Seven additional species have been documented at this site, including green sunfish, largemouth bass, black crappie, yellow and black bullhead, common carp, and sailfin molly (CEC unpublished data; USGS unpublished data). These data suggest that conditions at the MWD crossing continues to be more conducive to the establishment of introduced species than the reach directly below the RIX facility. A modified flow regime may aid in precluding exotic species, especially the piscivorous centrarchid and ictalurid species, which as associated with deeper pool habitats, thus, resulting in a potentially positive benefit for the sucker, with regard to predation by other fish.

Prey for the Santa Ana Sucker will not be negatively affected by the proposed discharge modifications. Detritus, algae, and diatoms dominate the diet of the Santa Ana Sucker (Greenfield et al., 1970). Reduced flows will aid in the availability of these food items.

References:

Chadwick & Associates, Inc. 1992. See 6-3 above.

Greenfield, D.W., S.T. Ross, and G.D. Deckert, 1970. Some aspects of the life history of the Santa Ana sucker, *Catostomus (Pantosteus) santaanae* (Snyder). California Fish and Game 56: 166-170.

Simon, T.P., and E.B. Emery, 1995. Modification and assessment of an index of biotic integrity to quantify water resource quality in great rivers. Regulated Rivers: Research and Management 11:283-298.

Steedman, R.J., 1988. Modification and assessment of an index of biotic integrity to quantify stream quality in southern Ontario. Canadian Journal of Fisheries and Aquatic Sciences 45: 492-501.

Whittier, T.R., D.P. Larsen, R.M. Hughes, C.M. Rohm, A.L. Gallant, and J.M. Omernik, 1987. The Ohio Stream Regionalization Project: A Compendium of Results. Document No. EPA/600/3-87/025. U.S. Environmental Protection Agency, Freshwater Research Laboratory, Corvallis, OR.

6-6 Spawning in the Santa Ana River basin has been described as occurring in mid-March through late April (Haglund et al., 2003). The comment regarding protracted spawning for this species may be from Moyle (1976). Protracted spawning is a characteristic that allows rapid recovery following severe flooding. This characteristic is common among fish species living in unpredictable aquatic environments. However, we are unaware of any evidence of the sucker spawning in the Santa Ana River as late as the dates suggest by the comment. As a species throughout its range, the sucker has demonstrated some degree of plasticity in timing of reproduction. This is a mechanism to avoid catastrophic reproductive failure due to severe flooding. But, it should not be used to define the spawning period of the sucker specific to the Santa Ana River, which has been described in a much narrower six week period in the spring.

The potential benefits to fry and juvenile suckers under the proposed flow regimes have previously been commented on. It is unlikely that rearing habitats will be adversely affected by the proposed reductions in flows.

Despite earlier statements that significant mainstem reproduction was occurring (Swift, 2001), more recent statements by the same researchers suggest that breeding may be occurring exclusively in tributaries early in the season (Haglund et al., 2003), a finding also suggested by the seasonal sampling which occurred during the Santa Ana Use Attainability Analysis (C&A, 1992). It appears that the extent that reproduction is occurring in the mainstem of the Santa Ana River is uncertain. Given the current state of knowledge of reproduction in the Santa Ana River, the contention that decreased flows will be detrimental to the sucker because of decreased flows during the spawning season is unfounded.

References:

Chadwick and Associates, Inc., 1992. See 6-3 above.

Haglund et al., 2003. See 4-3.

Moyle, P., 1976. See 4-4.

6-7 The referenced 6,245 acres of riparian habitat assuming a maximum of 4.1 acre-feet of water consumption per year (a conservative assumption) would consume an estimated 25,604.5 acre-feet of water per year. Table 4.4-14 shows that the volume of flow downstream of the Riverside Narrows (actual flows) for the water year 2000-

2001 is about 92,042 acre-feet. This is the volume of surface water actually measured in the channel, excluding percolation and other water losses up stream. The available water for the riparian habitat (from natural flows and other recycled water discharges) downstream of the Narrows is 92,042 acre-feet of water (153,915-61,872 = 92,042) which demonstrates that more than sufficient water is available to support 6,245 acres of riparian habitat.

6-8 The 5% reduction in calculated water consumption by riparian habitat is based on the different climatic conditions between the affected portion of the Santa Ana River and the Mojave River. The Mojave River experiences much greater solar insolation and higher average temperatures during the primary water consuming months (March through September). This section of the Santa Ana River (RIX to Riverside Narrows/MWD crossing) experiences significant overcast weather due to the intrusion of a marine layer during this period of time. Based on a general comparison in the two areas, a 5% reduction if consumption was selected as a conservative value for the project area.

6-9 The calculation of water consumption and adequacy of flows is shown on page 4.7-21 of the Draft EIR. In summary, 1,150 acres of riparian habitat was estimated (based on review of aerial photographs and both aerial and ground truthing of the habitat) to occur between the RIX discharge facility and the MWD Crossing/Riverside Narrows. Based on density of vegetation, the estimated annual water consumption of this riparian habitat is 3,129.5 acre-feet per year. The volume of RIX discharge supporting this habitat is presently about 49,407 acre-feet per year. After full implementation of the project (which is assumed to occur gradually over several years, see response to comment 4-2)), more than 31,000 acre-feet of discharge will continue to occur. Also, note that this calculation does not include the Rialto treatment plant flows of 8,346 acre-feet per year which, by itself, would provide sufficient water for the affected riparian habitat. The available data clearly indicate sufficient current and after project flows to sustain the riparian habitat between the RIX discharge point and the Narrows.

6-10 A draft monitoring and adaptive management plan has been compiled by the Department and is provided as Attachment A to these responses to comments. Please note that this plan was developed in the context of extensive ongoing and proposed monitoring within the Santa Ana River Basin. Specific monitoring by the Department will be focused on those parameters that are not already subject to routine monitoring.

PENDING APPLICATIONS TO APPROPRIATE WATER BY PERMIT IN THE SANTA ANA RIVER WATERSHED

Filing Agency and Application Number	Amount of Water Proposed for Diversion	Mainstem or Tributaries To Be Affected	Uses of Water to be Diverted	Other Specifics of Applications
San Bernardino Valley WMD and Western MWD No. 31165	50,000 acre-feet per year to surface storage at Seven Oaks Dam, 100,000 acre-feet per year to underground storage, and up to 800 cu.ft. per second by direct diversion	SAR mainstem, Bear Creek, Breakneck Creek, Keller Creek, and Alder Creek (Hemlock Creek)	Municipal, Industrial, Irrigation, Heat Control, Frost Protection, Recreation	--Not more than 100,000 Acre-feet in a year --To divert from Jan. 1- Dec. 31 --Place of Use within boundaries of both agencies
Orange County Water District No. 31174	Up to 149,000 acre-ft. per year by diversion to Prado Dam, Gypsum Canyon Reservoir and to GW basins, up to 800 cfs by direct diversion	SAR mainstem	Municipal, Industrial, Irrigation, Recreation	--Not more than 507,800 acre-feet in a year --To divert from July 1-June 30 --Place of Use within boundaries of district in Orange County
Chino Basin Watermaster No. 31369	97,000 acre-feet to underground storage	San Antonio Creek, Cucamonga Creek , Deer Creek, Etiwanda Creek, San Sevaine Creek, Declez Channel	Industrial, Irrigation, Stock-watering, Municipal	--Diversion to occur July 1-June 30 --Place of Use within Chino Basin
San Bernardino Valley MWD and Western MWD No. 31370	50,000 acre-feet per year to surface storage at Seven Oaks Dam, and 100,000 acre-feet per year to underground storage, and up to 1,500 cu.ft. per second by direct diversion	SAR mainstem, Bear Creek, Breakneck Creek, Keller Creek, and Alder Creek (Hemlock Creek)	Municipal, Industrial, Irrigation, Heat Control, Frost Protection, Recreation	--Total combined amount shall not exceed 200,000 within any year --Diversion to occur Jan. 1-Dec. 31 --Place of Use within San Bernardino County

PENDING APPLICATIONS TO APPROPRIATE WATER BY PERMIT IN THE SANTA ANA RIVER WATERSHED *(CONTINUED)*

Filing Agency and Application Number	Amount of Water Proposed for Diversion	Mainstem or Tributaries To Be Affected	Uses of Water to be Diverted	Other Specifics of Applications
San Bernardino Valley Water Conservation District No. 31371	150,065 acre-feet per year for surface storage	SAR mainstem, Mill Creek	Municipal, Domestic, Industrial, Irrigation, Frost Protection, Recreation, Fish and Wildlife	--Total combined storage shall not exceed 174,545 acre-ft. per yr. --Total surface storage shall not exceed150,065 acre-ft. per year --Diversion to occur Oct. 1 to Sept. 30
City of Riverside No. 31372	41,400 acre-feet per yr. or 75 cfs	SAR mainstem	Municipal, Industrial and Irrigation	--Place of Use within San Bernardino County --Diversion from Jan. 1-Dec. 1

6-11 We also request that an analysis of effects to federally and State listed species that exist within the Santa Ana River floodplain be conducted prior to approval of specific Program-related projects that include ground disturbing activities. These species include the gnatcatcher, DSF, vireo, SBKR, flycatcher, and cuckoo. Each of these species occupy habitats that are adjacent to or within the Santa Ana River and may be affected by projects proposed within or adjacent to their habitats.

6-12 The Department is concerned that the cumulative effects analysis was not adequate. On page 3-15 under "Related Projects" the PEIR refers to an application submitted by the Orange County Water District to the State Water Resources Control Board to obtain water rights to the flows of all water reaching Prado Basin. The Department recommends referencing the four pending applications for water rights within the Santa Ana Watershed submitted to the State Water Resources Control Board by the Chino Basin Watermaster, San Bernardino Municipal Water District and Western Municipal Water District, San Bernardino Valley Water Conservation District, and the City of Riverside. The Department recommends the revised PEIR discuss potential cumulative impacts to biological resources that may result from the reduction of water by all reasonably foreseeable actions in the Santa Ana River, including the current water right applications. The Department believes a significant reduction in water in the Santa Ana River will likely have a devastating effect upon existing populations of sensitive fish species.

6-13 The Wildlife Agencies are also concerned that the cumulative effect of additional water withdrawals will substantially decrease habitat that supports the sucker, vireo, and flycatcher. The Wildlife Agencies recommend that any proposed projects that will be using a portion of the RIX Facility water currently being discharged be considered in the cumulative effects analysis be included in a revised PEIR.

We encourage your agency to work with other water use agencies within the Santa Ana River watershed to assist in maintaining and restoring habitat for federally and State listed and sensitive species. We look forward to continuing our work with your agency and are available to assist you in addressing project effects to federally and State listed and sensitive species and their habitats. If you have any questions or comments regarding this letter, please contact Lucy Caskey (Service) at (760) 431-9440, extension 249 or Leslie MacNair (Department) at (949) 458-1754.

Sincerely,

for Karen A. Goebel
Assistant Field Supervisor
U. S. Fish and Wildlife Service

Leslie MacNair
Staff Environmental Scientist
Habitat Conservation Planning - Region 6
California Department of Fish and Game

cc: Regional Water Quality Control Board, Santa Ana Region
State Clearinghouse, Sacramento

6-11 As noted in responses to comments 6-1 through 6-3, all physical facility impacts will be examined for potential impacts to biological resources, with a focus on listed or sensitive species. This will be done for any facilities proposed within the river channel.

6-12 The comment requested additions to the cumulative impact analysis, particularly to include the other pending applications for water rights in the watershed (Chino Basin Watermaster, Western Municipal Water District, San Bernardino Valley Water Conservation District, and the City of Riverside.) What are the cumulative impacts to biological resources that may result from the reduction of water by all reasonably foreseeable actions, particularly on sensitive fish species.

There are currently six active major appropriation requests being processed through the State Water Resources Control Board (SWRCB). These are summarized in the table below. A letter of January 23, 2003 from the SWRCB indicated that all six of the applications will be consolidated and processed together, with no application receiving priority. Further, two Orders by the SWRCB, WR 2002-0006 and WR 2000-12, stipulated some conditions under which these applications would be considered. These conditions are important to addressing the comment, discussed as follows. The letter, the most recent order (which summarizes the previous order), and the six application notices are appended to this response document as Attachment B.

Until 2000, the Santa Ana Rive was considered "fully appropriated" in previous water rights decisions. In order for the SWRCB to accept and process any new applications, it was necessary for some party to file a petition to modify the declaration of fully appropriated stream for the Santa Ana River. In 1999, the Orange County Water District, San Bernardino Valley Water District and the Western Municipal Water District filed the necessary petition to modify the declaration of fully appropriated stream. The bases for the SWRCB's decision were threefold: (1) increased releases of treated wastewater, (2) increased runoff due to urbanization, and (3) increased availability of water during wet years above the values used in developing the 1969 judgement. The SWRCB also considers the construction of the Seven Oaks Dam a significant change in conditions, affecting downstream flow patterns after storm events and providing a new potential storage function, to store water for beneficial uses.

Despite the re-opening of the Santa Ana River for further appropriation, the SWRCB clearly takes the position that it has made no finding about a specific amount of water that may be available for appropriation under the specific applications, nor that the applications will be approved.

Significantly, the SWRCB states that the initial classification of the Santa Ana River as fully appropriated was <u>not</u> based upon a need to reserve or retain water in the river or its tributaries for instream uses. In other words, instream or environmental considerations were not relied upon as a basis for classifying the watercourse as

fully appropriated. Therefore, a decision to revise the status of the river did not have to include consideration or analysis of the instream or other environmental uses of the water sought to be appropriated. This will be handled during the processing of the applications, base don agency environmental reviews of the proposals contained in each application.

In terms of the comment, then, the water rights applications are being process for "new" water in the watershed, such that cumulative reductions in water available for aquatic or riparian habitat should not be an issue. Thus, the proposals for diversion of recycled water (wastewater) flows and stormwater flows from the river mainstem and its tributaries should not reduce baseflows. Also, it would be difficult to quantify the cumulative impacts of the implementation of the agencies' proposed actions at this point in time, since the environmental reviews are not completed for all of the applications and the quantity of water to be appropriated for various uses is certainly not decided. Including these applications in "all foreseeable actions" for a cumulative impacts analysis in this PEIR would be premature and speculative. Additionally, there promises to be significant opposition to some, if not all of the applications, and there is no assurance that they will be granted by the SWRCB, making analysis impractical. The PEIR focuses on those projects identified in water/wastewater agency approved planning documents, with the assumption that these are duplicative of the projects proposed in the applications, at least in terms of overall quantitative goals for reuse, storage, and habitat preservation or enhancement.

First of all, the Santa Ana River was "fully appropriated" in previous water rights decisions. In order for the SWRCB to accept and process any new applications, there must be unappropriated water. Therefore, for the purpose of processing these applications, the SWRCB now considers the Santa Ana to have additional water, based on (1) increased releases of treated wastewater, (2) increased runoff due to urbanization, and (3) increased availability of water during wet years above the values used in developing the 1969 judgement. The SWRCB also considers the construction of the Seven Oaks Dam a significant change in conditions, affecting downstream flow patterns after storm events and providing a new potential storage function, to store water for beneficial uses.

Secondly, the SWRCB clearly states that it has made no finding about a specific amount of water that may be available for appropriation under the specific applications, nor that the applications will be approved.

Thirdly, the SWRCB states that the classification of the Santa Ana River as fully appropriated was <u>not</u> based upon a need to reserve or retain water in the river or its tributaries for instream uses. In other words, instream or environmental considerations were not relied upon as a basis for classifying the water course as fully appropriated. Therefore, a decision to revise the status of the river does not have to include consideration or analysis of the instream or other environmental uses of the water sought to be appropriated. This will be handled during the processing of the applications, based on agency environmental reviews of the proposals contained in each application.

In terms of the comment, then, the water rights applications are being processed for "new" water in the watershed, such that cumulative reductions in water available for aquatic or riparian habitat should not be an issue. Thus, the proposals for diversion of recycled water (wastewater) flows and stormwater flows from the river mainstem and its tributaries should not reduce baseflows. Also, it would be difficult to quantify the cumulative impacts of the implementation of the agency's proposed actions at this point in time, since the environmental reviews are not completed for all of the applications and the quantity of water to be appropriated for the various uses is certainly not decided. Including these applications in "all foreseeable actions" for a cumulative impacts analysis in this PEIR would be premature. The PEIR focuses on those projects identified in water/wastewater agency approved planning documents, with the assumption that these are duplicative of the projects proposed in the applications (at least in terms of overall quantitative goals for reuse, storage, and habitat preservation or enhancement).

6-13 Please refer to responses to comments 6-3, 6-4 and 6-9. Adequate water is and will be available to support the existing riparian habitat utilized by the species of concern. Further, as outlined in responses to comments 6-1 through 6-3 and 6-9, subsequent environmental reviews will address the cumulative effects of future specific RIX recycled water sale projects.

DEPARTMENT OF PUBLIC WORKS COMMENT LETTER #7

FLOOD CONTROL • REGIONAL PARKS • SOLID WASTE MGMT • SURVEYOR • TRANSPORTATION

COUNTY OF SAN BERNARDINO
ECONOMIC DEVELOPMENT
AND PUBLIC SERVICES GROUP

825 East Third Street • San Bernardino, CA 92415-0835 • (909) 387-8104
Fax (909) 387-8130

KEN A. MILLER
Director of Public Works

RECEIVED
MAY 9 2003
SBMWD
DEPUTY GENERAL MANAGER

May 6, 2003

Ms. Stacey R. Aldstadt, Deputy General Manager
City of San Bernardino Municipal Water Department
300 North "D" Street
San Bernardino, CA 92418

File#10(ENV)-4.01

RE: NOTICE TO ADOPT A DRAFT PROGRAM ENVIRONMENTAL IMPACT REPORT – RIX FACILITY RECYCLED WATER SALES PROGRAM, CITY OF SAN BERNARDINO MUNICIPAL WATER DEPARTMENT

Dear Ms. Aldstadt:

Thank you for giving the San Bernardino County Department of Public Works the opportunity to comment on the above-referenced project. We apologize for the lateness of this letter.

The site is generally located southeast of Agua Mansa Road, in the City of Colton, and is in the historic overflow of two Flood Control District facilities, i.e. Rialto Channel and the Santa Ana River. Rialto Channel is an interim facility that is not capable of containing the flows from a 100-year storm event. Regarding the Santa Ana River, the construction of the Seven Oaks Dam has considerably reduced the floodplain in many areas along the Santa Ana River. However, according to the Upper Santa Ana River 100-Year With Project Floodway and Floodplain Delineation Plan View, prepared by the Corps of Engineers, it appears that several hundred feet beyond the River's northerly boundary (at this location) will continue to be within the 100-year overflow area upon completion of the dam.

The Water Resources Division's previous comments from November 8, 1999, on the Notice of Preparation and Initial Study are as follows:

1. The EIR should address the potential flood hazards from the Santa Ana River and Rialto Channel including overflow, erosion and debris deposition.
2. The EIR should address the adequacy of the Santa Ana River's levee at the site and upstream of Rialto Channel and the levee along the west bank of Rialto Channel.
3. The EIR should also address any effects the proposed construction will have on adjacent or downstream property.

7-2 4. It is assumed that the City of Colton will enforce the current FEMA floodproofing requirements.

7-3 5. We will recommend adequate building setback lines from District facilities if any habitable structures are proposed.

7-4 6. Prior to any activity on Flood Control District right-of-way, a permit will be required from the District, This permit may be subject to review and approval by the U.S. Army Corps of Engineers. Other improvements may be required which cannot be determined at this time.

The Water Resources Division's comments on the Program Environmental Impact Report are as follows:

7-1 The Program Enivronmental Impact Report addresses our previous comments 1, 2 & 3. Our Previous comments 4, 5 & 6 remain the same.

Board of Supervisors
First District
Second District
DENNIS HANSBERGER
FRED AGUIAR

RESPONSES TO COMMENTS
LETTER #7
San Bernardino County
Department of Public Works

7-1 Comments 4 through 6 in the notice of preparation response letter raised three issues. Regarding City of Colton FEMA flood proofing requirements, the Department intends to meet such requirements where future facilities may extend into flood hazard areas. At this time it is not clear whether any such facilities will be exposed to such hazards. Comment 5 indicates that the District will require setbacks from any habitable structures. No habitable structures are envisioned at this time, but if such facilities are proposed in the future, the Department will observe the recommended building setback lines from District facilities. Finally, comment 6 requires a right-of-way permit to be obtained before any activity in such rights-of-way. Again, it is not anticipated that facilities will be placed in District rights-of-way, but if they are, permits will be obtained and it is recognized that the Corps of Engineers may be involved in such review.

7-2 Refer to response to comment 7-1.

7-3 Refer to response to comment 7-1.

7-4 Refer to response to comment 7-1.

RE: NOTICE TO ADOPT A DRAFT PROGRAM ENVIRONMENTAL IMPACT REPORT – RIX FACILITY RECYCLED WATER SALES PROGRAM, CITY OF SAN BERNARDINO MUNICIPAL WATER DEPARTMENT

Should there be any changes to this project, please notify our Department so that we may have the opportunity to comment on the changes. If you have any questions or need additional information, please contact Kelly A. Rozich at (909) 387-8114.

Sincerely,

NARESH P. VARMA, Chief
Environmental Management Division

NV:KR/RIXFacility-Response

cc: Mike Fox, Water Resources
Kelly A. Rozich, EMD
KAM/PJM Reading File

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ATTACHMENT A

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MONITORING AND REPORTING PROGRAM FOR THE SANTA ANA SUCKER IN RELATION TO DISCHARGE VOLUMES FROM RIX

Purpose

The purpose of this monitoring and reporting program is to evaluate the reductions in recycled water discharge volume from the San Bernardino Municipal Water Department (SBMWD) RIX Facility to the Santa Ana River on an annual basis, in order to provide for more knowledge of optimum conditions for the "threatened" fish species, the Santa Ana Sucker.

1. Conduct physical, chemical, and biological surveys at specified times, either through participation in ongoing Santa Ana Sucker studies, through participation in other related studies, through independently supported studies, or through a combination of these alternatives. SBMWD will analyze at what level the studies should be conducted, in light of the information developed by the Santa Ana Sucker Conservation Team and others, on an annual basis and will informally meet and consult with the United States Fish and Wildlife Service to develop each annual survey. Additional surveys may need to be conducted after major flooding events.

2. Identification of critical areas for spawning and development. This information will be developed in conjunction with ongoing studies conducted by the Santa Ana Sucker Conservation Team. This assumes that other factors might be also be important in controlling sucker populations, such as winter storm events, invasive riparian species (Arundo donax), and flood control and maintenance activities.

Scope of Work

I. Surveys

A. Physical Surveys

In conjunction with the Santa Ana Sucker Conservation Team, SBMWD will recommend the following areas for study:

1. Determination of the amount of area immediately downstream of the RIX facility comprised of riffle, run and pool habitats.
2. Substrate composition (as a percentage) for each habitat type found above, by visual estimation and through sediment-sizing (sieve analyses) for each category found.
3. Water depth and flow velocity within each habitat type.
4. Riverbank and island vegetation, with open vs. shaded areas being noted.

B. Chemical Surveys

1. Once a year, field tests will be conducted on water (mid-stream and side-stream) for instantaneous measurement of: temperature, dissolved oxygen, pH, turbidity, electrical conductivity and transparency. Discrete water samples will be taken for further analysis of total dissolved solids, acidity/alkalinity, hardness, and nutrient series. The field tests will be conducted in the reach of the Santa Ana River immediately below the RIX outfall and down to the Riverside bridge. Results of the field tests will be transmitted to the Santa Ana Sucker Conservation Team, for use in the conservation program.

C. Biological Surveys

1. Participation in the Santa Ana Sucker Conservation Team biological surveys, including population estimates, at a minimum.
2. Vegetation analysis based on aerial photographs, to determine habitat impacts, on an annual basis.
3. Possible retention of a stream morphologist to determine impacts to habitat from major storm events.

II. Identification of Critical Areas

A. Evaluation of Survey Data

Any work conducted independently by SBMWD will be available for review within sixty (60) days of survey date(s). Data will be distributed to selected specialists for review. Final, QA/QC'd survey reports to be completed within two months of survey date(s), to be included in an annual report to be completed by January 31st of the next year.

The survey results will be used to assess overall conditions, which will be categorized according to two key items: (1) Did the habitat in the study areas generally improve or degrade from the previous year, in terms of sucker spawning and nursery values?, and (2) Were improvements or degradation in conditions due to natural causes (such as flooding events) or to manmade causes (flow and/or water quality changes)?

From this evaluation, recommendations for any changes in surveying methods will be made for the following year. It must be emphasized again that the Santa Ana River is expected to be in a state of "dynamic equilibrium." As such, while habitat may "degrade" at a specific study area from year to year, this may not mean that habitat was reduced; it simply could be a result of a particular habitat feature "relocating" upstream or downstream as flow and channel morphology changes occur.

B. Identification of Critical Areas

In conjunction with the Santa Ana Sucker Conservation Team, specialists will identify critical sucker spawning habitat areas and associated nursery areas for the year in this section of the river, with some attention to likely extent of downstream drift of young. This

assumes no major flooding event occurs, after which new surveys and re-evaluation would occur.

C. Definition of Conditions

In conjunction with the Santa Ana Sucker Conservation Team, specialists will attempt to define the conditions needed to maintain these areas for the year in terms of:

1. Minimum water depths needed to maintain shallow through deeper microhabitats of the habitat regime found at each important study area.
2. Current water depths found at each important study area, and, if more than minimum needed, relate to acceptable flow/water level reductions.
3. Identify other important factors (cover, substrate, food sources, characteristics of the sucker population, predators/competitors, water quality) at the identified important study area.
4. Identify likely changes in conditions throughout the year, both desirable and undesirable.

Reference:

Haglund, T.R., J.N. Baskin, and C.C. Swift, 2003. Results of the Year 2 Implementation of the Santa Ana Sucker Conservation Program for the Santa Ana River. Draft Report Prepared by San Marino Environmental Associates (SMEA) for Santa Ana Watershed Project Authority (SAWPA), March.

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ATTACHMENT B

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State Water Resources Control Board

Winston H. Hickox
Secretary for Environmental Protection

Executive Office
1001 I Street, 25th Floor, Sacramento, California 95814
P.O. Box 100, Sacramento, California 95812-0100
(916) 341-5615 • FAX (916) 341-5621 • www.swrcb.ca.gov

Gray Davis
Governor

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our website at www.swrcb.ca.gov.

JAN 23 2003

To: Santa Ana River Service List

The State Water Resources Control Board (SWRCB), Division of Water Rights (Division) is consolidating the processing of the six applications to appropriate water from the Santa Ana River and extending the protest period of the first two applications to the close of the protest period for the remaining four. This decision is based on the procedural status of the six applications that resulted from the bifurcated hearings on whether to revise the Fully Appropriated Streams (FAS) Declaration to allow for processing the applications. The consolidation will not prejudice the parties, and will effectuate the orderly administration of the proceeding on these applications.

San Bernardino Valley Municipal Water District and Western Municipal Water District (Muni/Western) and Orange County Water District (OCWD), filed two water right applications to appropriate water from the Santa Ana River. The SWRCB could not process the applications because the River is listed on the Fully Appropriated Streams (FAS) Declaration. Both Muni/Western and OCWD filed petitions to revise the Declaration in 1995 and 1999, respectively. The SWRCB held a hearing in December of 1999, and the SWRCB issued Order 2000-12 revising the Declaration for these two applications. The SWRCB subsequently received four additional petitions with accompanying water right applications, including another application filed by Muni/Western. Again, the SWRCB revised the FAS Declaration (Order 2002-0202) to allow for accepting and processing other applications to appropriate water on the Santa Ana River. Order 2000-12 and Order 2002-0202 state that the SWRCB is deferring any assignment of priority between the water right applications. The record contains numerous indications that the parties have agreed to a consolidated proceeding on the six applications.

Meanwhile, the first two applications (A31165 of Muni/Western and A31174 of OCWD) were publicly noticed on January 11, 2002. In order to integrate the processing of the six filings, the SWRCB extended the protest period until 15 days after the adoption of the second FAS Order. The SWRCB received seven protests on the Muni/Western application, and eight protests on the OCWD application. Two protestants filed protests after the July 17, 2002 deadline. All timely filed environmental protests have been held in abeyance pending the outcome of the California Environmental Quality Act (CEQA) documentation. The Division of Water Rights plans to notice the remaining four applications at the end of January.

Consolidation is necessary for the orderly administration of any future proceeding in this matter. The six applications present common issues of fact. The SWRCB did not assign a relative priority in the FAS proceedings for this very contingency. Moreover, there is agreement among

JAN 23 2003

the parties to consolidate the processing and any future hearing on these applications. For these reasons, the Division is consolidating the processing of all applications to appropriate water from the Santa Ana River and extending the protest period for the first two applications to the close of the protest period for the remaining four applications. While the SWRCB usually allows any interested party to participate in a hearing, in this case, the parties have a greater likelihood of settling their differences if allowed to have standing as protestants early on in the process. This will avoid undue confusion should these applications go to hearing. Extending the protest period of the first two applications to the close of the remaining four will not prejudice the parties. All timely filed environmental protests have been held in abeyance pending completion of CEQA documentation and no negotiations have thus far taken place. Notice has already been published in accordance with the Water Code and so the parties are not subject to additional publishing costs.

Accordingly, the SWRCB will consolidate the processing of all Santa Ana River applications, and extend the protest period for the first two applications to the close of the protest period for the remaining four applications.

Sincerely,

Harry M. Schueller
Chief Deputy Director

Attachment

bc: Art Baggett, EXEC
Celeste Cantu, EXEC
Harry Schueller, EXEC
Vicky Whitney, DWR
Larry Attaway, DWR
Jane Farwell, DWR
Mitchell Moody, DWR
Kathy Mrowka, DWR
Andy Sawyer, OCC
Debbie Matulis, OCC

SKOlson/mkschmidgall
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STATE OF CALIFORNIA
STATE WATER RESOURCES CONTROL BOARD

ORDER WRO-2002 - 0006

In the Matter of the Petitions to
Revise Declaration of Fully Appropriated Streams
To Allow Processing Specified Applications to
Appropriate Water from the Santa Ana River

SOURCE: Santa Ana River
COUNTIES: Riverside, San Bernardino, Orange

ORDER AMENDING DECLARATION AND DIRECTING DIVISION OF WATER RIGHTS TO PROCEED WITH PROCESSING SPECIFIED APPLICATIONS

1.0 INTRODUCTION

In Order WR 2000-12, the SWRCB acted on two petitions to revise the Declaration of Fully Appropriated Streams (Declaration) to allow for processing two applications to appropriate water from the Santa Ana River.[1] Based upon the evidence in the record, the SWRCB found that the Declaration, as adopted in Order WR 98-08, should be revised to allow for processing Applications 31165 and 31174. The SWRCB has received additional petitions since it issued Order WR 2000-12, requesting that the SWRCB revise the Declaration to allow for processing applications to appropriate water from the Santa Ana River stream system.

The findings required to approve the current petitions before the SWRCB are essentially identical to the SWRCB's previous findings in Order WR 2000-12. The SWRCB held a pre-hearing conference at which all parties agreed that the evidentiary record for the proceeding on the pending petitions would be limited to Order WR 2000-12 and 1999 evidentiary record that served as the basis for Order WR 2000-12. This order summarizes and incorporates by reference the findings and conclusions of Order WR 2000-12.

[1] The petitions were submitted by the San Bernardino Valley Municipal Water District (Municipal Water District), Western Municipal Water District of Riverside County (Western), and the Orange County Water District (OCWD), accompanied with hydrologic data demonstrating that new water exists since the Santa Ana stream system was designated as fully appropriated. The additional water that is potentially available for appropriation consists of flood flows that may be stored or regulated by the new Seven Oaks Dam flood control project, increased run-off due to upstream urbanization, and increased releases of treated wastewater into the stream system in the lower reaches of the Santa Ana River. The water right applications have since been accepted for processing based on Order WR 2000-12, and assigned application numbers 31165 and 31174.

Based on the evidence in the record, the SWRCB finds that the Declaration of Fully Appropriated Streams, as adopted in Order WR 98-08, should be revised to allow processing the water right applications specified below. All questions regarding the specific amount of water available for appropriation under the applications, the season of water availability, approval or denial of the applications, and the conditions to be included in any permits that may be issued on the applications will be resolved in further proceedings on each application pursuant to applicable provisions of the Water Code. In concluding that the specified applications should be processed, this order makes no finding regarding the relative priority of any rights that may be acquired under the specified applications and other rights or applications for water rights in the Santa Ana River Basin.

2.0 BACKGROUND

Section 3.0 of Order WR 2000-12 fully describes the Santa Ana River watershed and is hereby incorporated by reference. The statutory provisions governing the appropriation of water in California and the classification of the Santa Ana River as fully appropriated are described in detail in Sections 2.1 and 2.2 of Order WR 2000-12, and these sections are incorporated herein, by reference. Pursuant to Water Code sections 1205 through 1207, the SWRCB adopted a Declaration,[2] which contains a list of stream systems found to be fully appropriated in previous water right decisions. The statute prohibits the SWRCB from accepting any new applications to appropriate water from watercourses listed on the Declaration, except in accordance with the provisions of the Declaration. The Declaration includes the Santa Ana River stream system as fully appropriated on a year-round basis, based on a number of court judgments, two of which establish the overall framework for the division of rights and responsibilities among the major water users in the basin.[3] The discussion of the Santa Ana River court judgments is contained in section 4.0 of Order WR 2000-12 and is incorporated by reference.

3.0 ORDER WR 2000-12

The focus of the SWRCB's inquiry in Order WR 2000-12 was the narrow task of determining whether the evidentiary record supported revising the fully appropriated stream status of the Santa Ana River for the limited purpose of processing two water right applications. Based on the SWRCB's review of the record and the findings contained in Order WR 2000-12, the SWRCB concluded that the Declaration, as adopted by Order WR 98-08, should be revised to allow for processing the water right applications submitted by the Municipal Water District, Western, and the Orange County Water District.

In section 6.5 of Order WR 2000-12, the SWRCB found that increased releases of treated wastewater, increased runoff due to urbanization, and increased availability of water during wet

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[2] The Declaration was updated on November 19, 1998 in Order WR 98-05.

[3] In Order WR 89-25, the SWRCB cited State Water Rights Board Decision 1194 for the finding that no unappropriated water is available from the Santa Ana River watershed. Decision 1194 referred to the Court of Appeal decision in *Orange County Water Dist. v. City of Riverside* (1961) 188 Cal.App.2d 566 [10 Cal.Rptr. 899]. The subject of water rights was also addressed in two stipulated judgments entered into on April 17, 1969. (See *Orange County Water Dist. v. City of Chino et al.* (Super. Ct. Orange County, 1969, No. 117628); *Western Mun. Water Dist. v. East San Bernadino County Water Dist.* (Super. Ct. Riverside County, 1969, No. 78426).)

years, above the average used in developing the physical solution reflected in the 1969 *Orange County Water District* judgment, had substantially increased flows present in the Santa Ana River since entry of the 1969 judgment. The SWRCB also found that it was reasonable to expect a further increase in flows. In addition, the SWRCB found that the construction of the Seven Oaks Dam was a significant change in conditions that affect the flow patterns below the dam following storm events, making it feasible to divert more water for beneficial use. Finally, the SWRCB found that the possibility of using Seven Oaks Reservoir for water storage if federal approval can be obtained could further increase the quantity of water potentially available for appropriation in some years.

The hearing preceding Order WR 2000-12 focused narrowly on the issue whether to revise the Declaration to allow for processing the specified applications. Accordingly, Order WR 2000-12 states that all questions regarding the specific amount of water available for appropriation under the applications, the season of water availability, approval or denial of the applications, and the conditions to be included in any permits that may be issued on the applications will be resolved in further proceedings on each application pursuant to applicable provisions of the Water Code. In concluding that the specified applications may be processed, Order WR 2000-12 made no finding regarding the relative priority of the rights that may be acquired under the specified applications and other rights or applications for water rights in the Santa Ana River Basin.

4.0 DESCRIPTION OF PENDING PETITIONS AND APPLICATIONS

Following the hearing that resulted in Order WR 2000-12, the SWRCB received additional petitions requesting revision of the Declaration to allow for processing additional applications to appropriate water from the Santa Ana River stream system. The petitions cite the water availability information submitted in support of Order WR 2000-12 as the basis for revision of the Declaration. Each petitioner also submitted an application to appropriate the water identified in the petitions as follows:

1) Chino Basin Watermaster petition and application requesting a right to divert 97,000 acre-feet per annum (afa) to groundwater storage.

2) Municipal Water District and Western petition and application requesting a right to collect a maximum of 100,000 afa in surface and underground storage, and to directly divert at a maximum rate of 1,500 cubic feet per second (cfs). The maximum combined amount to be diverted for direct use and storage is 200,000 afa. The petition and application are in addition to the petition and application addressed in Order WR 2000-12

3) San Bernardino Valley Water Conservation District (Water Conservation District) petition and application proposing combined groundwater and surface storage of 174,545 afa, with the surface storage element not to exceed 150,065 afa.

4) City of Riverside petition and application proposing direct diversion of 75 cfs throughout the year, with a maximum direct diversion of 41,400 afa. The applicant seeks to divert treated wastewater from the applicant's Regional Water Quality Control Plant.

On its own motion, the SWRCB proposes a revision of the Declaration to allow for processing four minor applications that seek water from the West and East Forks of Cable Creek, which are located in the Santa Ana River watershed. Water is conveyed through an existing, common pipeline to the properties owned by the following four applicants:

1) Application 29216 of Eddie Evans filed March 17, 1988. The application requests: (a) direct diversion of 0.15 cfs throughout the year, with a maximum direct diversion of 45 afa; and (b) collection to storage of 2 afa from November 1 of each year through April 1 of the following year.

2) Application 29217 of Gloria Evans filed March 17, 1988. The application requests: (a) direct diversion of 4,000 gallons per day throughout the year; and (b) collection to storage of 4 afa from November 1 of each year through April 1 of the following year.

3) Application 29945 of Samual Kirtley filed June 27, 1988. The application requests: (a) direct diversion of 0.05 cfs throughout the year, with a maximum direct diversion of 24 afa; and (b) collection to storage of 1 afa from November 1 of each year through March 31 of the following year.

4) Application 29949 of James Quiroz filed March 26, 1990. The application requests direct diversion of 0.066 cfs throughout the year, with a maximum direct diversion of 26 afa.

5.0 *HEARING ON PETITIONS*

Section 871 of Title 23 of the California Code of Regulations provides that the SWRCB may revoke or revise the Declaration upon its own motion or upon petition of any interested person. In this instance, the SWRCB issued a Notice of Pre-Hearing Conference and Public Hearing dated March 19, 2002. The purpose of the pre-hearing conference was to determine whether the parties agree to rely solely upon the evidentiary record that served as the basis for Order WR 2000-12 as the evidentiary record for this proceeding. The March 19 notice states that the findings required to approve the current petitions before the SWRCB are essentially identical to the SWRCB's previous findings in Order WR 2000-12.

All parties that submitted Notices of Intent to Appear for the hearing attended the pre-hearing conference. Representatives of the following parties participated in the pre-hearing conference: Municipal Water District and Western, Orange County Water District, City of Riverside, Chino Basin Watermaster, Water Conservation District, East Valley Water District, Eddie Evans, Bear Valley Mutual Water Company, City of Redlands, California Sportfishing Protection Alliance, City of San Bernardino Municipal Water Department, Santa Ana River Local Sponsors, Department of Fish and Game.

All parties agreed that the 1999 evidentiary record for the December 7 and 8, 1999 hearing on petitions to revise the Declaration for the Santa Ana River stream system, and Order WR 2000-

12, shall comprise the entire evidentiary record for the July 3, 2002,[4] hearing on the pending petitions to revise the Declaration for the Santa Ana River stream system. (See Recorded Transcript at 26.) On this basis, the SWRCB waived further requirements to submit evidence and testimony for the July 3, 2002 hearing.[5]

6.0 EVIDENCE SUPPORTING REVISION OF FULLY APPROPRIATED STREAM DECLARATION

In Order WR 2000-12, the SWRCB found that the evidentiary record supported revising the fully appropriated stream status of the Santa Ana River for the limited purpose of processing two water right applications. The amount of water contemplated for appropriation by the water right applications in that hearing is less than the amount of water proposed for appropriation by the petitions currently before the SWRCB. Based on the combined diversion limits for each filing, the total amount of water proposed in the applications that accompanied the two petitions for the 1999 hearing was 607,800 afa (100,000 afa by Municipal Water District/Western and 507,800 afa by Orange County Water District). The total amount of water proposed in the applications accompanying the petitions before us is 413,027.2 afa (second Municipal Water District/Western filing for 100,000 afa; Chino Basin Watermaster for 97,000 afa; Water Conservation District for 174,545 afa; City of Riverside for 41,400 afa, and; SWRCB's motion on four applications for a total of 82.2 afa).[6] Moreover, the previous order expressly provided that it did not establish any priority among applications filed or other rights in the Santa Ana River Basin. Therefore, it is appropriate to rely on the findings made in Order WR 2000-12 for this proceeding, as the task and evidence before us are essentially identical. The evidence regarding changes in conditions that affect availability of water for appropriation in the Santa Ana River watershed is evaluated in section 6.0 of Order WR 2000-12 and the findings of that section are hereby incorporated by reference.

7.0 ENVIRONMENTAL ISSUES

The environmental issues associated with the projects proposed by Chino Basin Watermaster, Municipal Water District and Western, Water Conservation District, City of Riverside, Eddie Evans, Gloria Evans, Samual Kirtley and James Quiroz will be addressed by the SWRCB in the context of processing the water right applications. Prior to any potential approval or decision to proceed with a proposed project, these eight persons and entities and the SWRCB must fulfill their obligations under the California Environmental Quality Act ("CEQA," Public Resources Code section 21000 et seq.) In addition to meeting statutory responsibilities under CEQA, the

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[4] The hearing was originally noticed for July 3, 2002, and on June 17, 2002, the hearing date was changed to July 2, 2002.

[5] Three of the parties agreed to accept a written procedural stipulation in which the signatories also agreed to rely solely on the evidentiary record that served as the basis for water rights Order 2000-12 for the July 3, 2002 hearing. The SWRCB entered the stipulation into the record for the sole purpose of this cross-reference.

[6] The SWRCB made no finding in Order WR 2000-12 about the specific amount of water that may be available for appropriation under specific applications, and nor do we here. The amount of water referenced is relevant only to the extent that the prior proceeding was sufficiently similar to the present to rely on the previous findings.

SWRCB will comply with its obligations to consider environmental and public interest issues under the Water Code and the public trust doctrine in the context of processing the water right applications submitted by the petitioners.[7]

8.0 CONCLUSION

The task and evidence before us are virtually the same as that before the SWRCB when it issued Order WR 2000-12, which concluded that the evidentiary record supported revising the fully appropriated stream status of the Santa Ana River for the limited purpose of processing two water right applications. The amount of water proposed for appropriation by those two water right applications is similar to the amount contemplated by the petitions currently before us. The SWRCB has not approved either application, and Order WR 2000-12 does not commit the SWRCB to approve either application, it merely allows the applications to be processed. In addition, the SWRCB deferred any assignment of priority between water right applications or other rights to a later determination on the merits of any application. Therefore, our review of the current petitions involves essentially the same analysis as that conducted for Order WR 2000-12. If conditions have changed so as to support revisions of the Declaration of Fully Appropriated Streams to allow processing the two applications involved in Order WR 2000-12, those changed conditions should also allow processing of the applications involved in this proceeding, even if the SWRCB ultimately determines, in acting on the applications, that the total amount of water available for appropriation is insufficient to approve many of the applications. It is appropriate to rely on the SWRCB's findings in Order WR 2000-12 in this proceeding. Accordingly, we conclude that the Declaration, as adopted by Order WR 98-08, should be revised to allow for processing the water right applications submitted by Chino Basin Watermaster, Municipal Water District and Western, Water Conservation District, City of Riverside, Eddie Evans, Gloria Evans, Samual Kirtley and James Quiroz in accordance with the provisions of the Water Code and other applicable law. The SWRCB recognizes that processing the pending water right applications will require consideration of numerous issues not addressed in this order. However, as indicated in the hearing notice, the focus of our inquiry in this proceeding is on the relatively narrow task of determining if the evidentiary record supports revising the fully appropriated stream status of the Santa Ana River for the limited purpose of processing the water right applications identified in the Hearing Notice.

[7] Neither Order WR 89-25 nor subsequent revisions of the Declaration provide an extensive explanation of the basis for classifying the Santa Ana River as fully appropriated. However, there is no indication that the classification of the Santa Ana River as fully appropriated was based upon a need to reserve or retain water in the river or its tributaries for instream uses. Neither Order WR 89-25, nor Decision 1194 addresses the subject of retaining water in the river to meet instream needs. In an instance in which instream or environmental considerations were not relied upon as a basis for classifying a watercourse as fully appropriated, a decision to revise the fully appropriated designation to allow for processing new water right applications need not involve consideration and analysis of instream or other environmental uses of the water sought to be appropriated. Those issues can properly be addressed in the context of processing the applications once they are accepted for filing.

ORDER

IT IS HEREBY ORDERED, based upon the foregoing findings, that:

1. The Declaration of Fully Appropriated Streams, as adopted by SWRCB Order WR 98-08, is amended to allow for processing the following applications to appropriate water from the Santa Ana River stream system:

   (a) The application filed by Chino Basin Watermaster

   (b) The application filed by Municipal Water District and Western

   (c) The application filed by Water Conservation District

   (d) The application filed by City of Riverside

   (e) Application 29216 of Eddie Evans

   (f) Application 29217 of Gloria Evans

   (g) Application 29945 of Samual Kirtley

   (h) Application 29949 of James Quiroz

2. The SWRCB Division of Water Rights shall process the specified water right applications in accordance with applicable law.

CERTIFICATION

The undersigned, Clerk to the Board does hereby certify that the foregoing is a full, true, and correct copy of an order duly and regularly adopted at a meeting of the State Water Resources Control Board held on July 2, 2002.

AYE:	Arthur G. Baggett, Jr. Richard Katz Gary M. Carlton
NO:	None
ABSENT:	Peter S. Silva
ABSTAIN:	None

Maureen Marché
Clerk to the Board

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State Water Resources Control Board

Division of Water Rights

1001 I Street, 14th Floor • Sacramento, California 95814 • (916) 341-5300

Mailing Address: P.O. Box 2000 • Sacramento, California • 95812-2000

FAX (916) 341-5400 • Web Site Address: http://www.swrcb.ca.gov

Division of Water Rights: http://www.waterrights.ca.gov

NOTICE OF APPLICATION

TO APPROPRIATE WATER BY PERMIT

APPLICATION A031165 **DATE FILED:** March 21, 2001

Notice is hereby given that San Bernardino Municipal Valley Water District and Western Municipal Water District of Riverside County have filed an application for a water right permit for diversion of water from Santa Ana River thence Pacific Ocean and from Bear Creek, Breakneck Creek, Keller Creek and Alder Creek, tributary to Santa Ana River thence Pacific Ocean in San Bernardino County. The State Water Resources Control Board (SWRCB) will determine whether a water right permit should be issued for the application and, if so, whether conditions should be included in the permit to protect the environment and other downstream water users. This notice provides a description of the proposed project and also describes the procedure and time frame for submittal of a protest against the application. This notice and future notices of applications to appropriate water by permit, may be viewed and printed from the Division of Water Rights (Division) web-site at www.waterrights.ca.gov. Any correspondence to the applicant shall be mailed to:

San Bernardino Valley Municipal Water District and

Western Municipal Water District of Riverside County

c/o Mr. David R.E. Aladjem

555 Capitol Mall, 10th Floor

Sacramento, CA 95814-4686

DESCRIPTION OF THE PROJECT

The applicant seeks to appropriate a maximum of 50,000 acre-feet per annum (afa) to surface storage

behind the Seven Oaks Dam and up to 100,000 afa to 15 spreading facilities for underground storage and subsequent extraction and use. The applicant also requests the right to appropriate up to 800 cubic feet per second (cfs) by direct diversion. The project will operated so that the total annual amount of water appropriated as a combination of storage and direct diversion does not exceed 100,000 acre-feet (af) in any year. The water will be used within the Applicant's respective service areas for the purposes described below. The project is within an area that has been declared fully appropriated by the SWRCB. However, SWRCB Order WR 2000-12, dated September 21, 2000 amended SWRCB Order WR 98-08 (Declaration of Fully Appropriated Streams) to allow for the processing of this application.

According to Water Code section 1348, a minor project diverts less than or equal to 3 cfs by direct diversion or 200 af by storage. A major project diverts greater than 3 cfs by direct diversion or 200 af by storage.

This is a "major" project (greater than or equal to 3 cfs by direct diversion or 200 af by storage) *as defined by section 1348 of the* Water Code.

APPLICATION INFORMATION

The applicant proposes to divert water from:

POD #1, 2, 3, 4, 5, 8, 11, 12, 13, 14 and 15: Santa Ana River tributary to Pacific Ocean.

POD #6: Bear Creek tributary to Santa Ana.

POD #7: Breakneck Creek tributary to Santa Ana River.

POD #9: Keller Creek tributary to Santa Ana River.

POD #10: Alder Creek tributary to Hemlock Creek thence Santa Ana River.

Points of Diversion are located as follows as shown on a map on file with the SWRCB:

POD #1, 2, 3, 4, 11, 12, 13, 14 and 15: within Section 4, T1S, R2W, SBB&M.

POD #5, 6 and 7: within Section 19, T1N, R1W, SBB&M.

POD #8, 9 and 10: within Section 26, T1N, R2W, SBB&M.

The diversion and place of use are located within the County of San Bernardino.

Amount of water applied for:

(A) 800 cfs (Direct Diversion), not to exceed

a total of 100,000 afa.

A. 100,000 afa (Storage)

The total combined amount taken by direct diversion and/or storage shall not exceed 100,000 afa.

Water will be used for: Municipal, Industrial, Irrigation, Heat Control, Frost Protection and Recreation.

The applicant has requested to divert water from: January 1 to December 31.

The Place of Use is within the service area boundaries of the San Bernardino Valley Municipal Water District and Western Municipal Water District of Riverside County as shown on maps on file with the SWRCB.

ENVIRONMENTAL INFORMATION

According to the California Environmental Quality Act (CEQA) and its guidelines, San Bernardino Valley Municipal Water District/Western Municipal Water District of Riverside County is the lead agency and will be responsible for preparation of appropriate environmental documents for the project and for determining whether or not the project will cause a significant effect on the environment. If you are not filing a protest, but wish to submit information which indicates that the project may cause a significant effect on the environment, please send this information to the lead agency immediately and also to Mr. Mike Falkenstein, SWRCB, Division of Water Rights, P.O. Box 2000, Sacramento, CA 95812-2000. This information will be reviewed in accordance with CEQA.

PROCEDURE FOR SUBMITTING PROTESTS

Any person may file a protest against the application. Protests should be submitted on standard protest forms available from the SWRCB or on the Division's web site www.waterrights.ca.gov/forms, but can be submitted in letter form. A pamphlet that provides additional information relating to water rights and the procedure for filing protests can be obtained from the contact person listed below. The protest should be submitted to:

Mitchell Moody

State Water Resources Control Board

Division of Water Rights

P.O. Box 2000

Sacramento, CA 95812-2000

In addition, the protestant must send a copy of the protest to the applicant.

Protests filed in response to this notice must either be postmarked, or received in the office of the SWRCB's Division of Water Rights (1001 "I" Street, 14th Floor, Sacramento, CA) **by 4:00 p.m.** on the **60th day** after the date of this notice. Due to the constraints of the noticing period, protests may be filed

by FAX at (916) 341-5400. However, an original copy of all materials must be received for the SWRCB to consider your protest. For good cause, the SWRCB may grant an extension of time to file a protest. It is the protestant's responsibility to contact the engineer listed below and receive an extension of time to submit the protest prior to the final filing date and time. The SWRCB will respond to all protests within 60 days of the final day to file a protest.

PROTEST REQUIREMENTS

Parties may file protests based on any of the following factors:

- Injury to existing water rights.
- Adverse environmental impact.
- Not in the public interest.
- Contrary to law.
- Not within the jurisdiction of the SWRCB.

All protests must clearly describe the objections to approval of the application and the factual basis for those objections. If the objection is based on injury to existing water rights, the protest must describe the specific injury to the existing water right that would result from approval of the application. In addition, the party claiming injury to prior water rights must provide specific information that describes the basis of the existing right, the date the use began, the quantity of water used, the purpose of use and the place of use. Please note that any water right permit issued by the SWRCB is subject to and includes conditions to protect vested water rights.

If the protest is based on environmental grounds, or other factors listed above, the protest must be accompanied by a statement of facts supporting the basis of the protest. The protest shall include a description of any measures that could be taken to resolve the protest, including modification of the application (i.e., amount, season of diversion, etc.) or conditions (i.e., fish bypass flow, measuring device, etc.) that could be included in the water right permit. If sufficient information is not submitted, the SWRCB may reject the protest or request that the protestant submit additional information.

RESOLUTION OF PROTESTS

The protestant(s) and the applicant are encouraged to discuss methods that could be used to resolve the protest. If the protest(s) can not be resolved, the SWRCB may conduct a field investigation for minor projects, or hold a water right hearing for major projects.

CONTACT PERSON

To obtain additional information regarding this project, or to obtain copies of the protest forms or pamphlet, please contact *Mitchell Moody by phone at (916) 341-5383 or by electronic mail at* mmoody@waterrights.swrcb.ca.gov. Protest forms may also be obtained from our web-site at www.waterrights.ca.gov/forms/.

DATE OF NOTICE:

MSMoody:crios:10-15-01

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State Water Resources Control Board

Division of Water Rights

1001 I Street, 14th Floor • Sacramento, California 95814 • (916) 341-5300

Mailing Address: P.O. Box 2000 • Sacramento, California • 95812-2000

FAX (916) 341-5400 • Web Site Address: http://www.swrcb.ca.gov

Division of Water Rights: http://www.waterrights.ca.gov

NOTICE OF APPLICATION

TO APPROPRIATE WATER BY PERMIT

APPLICATION 31174 **DATE FILED:** April 20, 2001

Notice is hereby given that Orange County Water District has filed an application for a water right permit for diversion of water from Santa Ana River, tributary to Pacific Ocean in Orange and Riverside counties. The State Water Resources Control Board (SWRCB) will determine whether a water right permit should be issued for the application and, if so, whether conditions should be included in the permit to protect the environment and other downstream water users. This notice provides a description of the proposed project and also describes the procedure and time frame for submittal of a protest against the application. This notice and future notices of applications to appropriate water by permit, may be viewed and printed from at the Division of Water Rights (Division) web-site at www.waterrights.ca.gov. Any correspondence to the applicant shall be mailed to:

William R. Mills, Jr., P.E.

General Manager

Orange County Water District

10500 Ellis Avenue, P.O. Box 8300

Fountain Valley, CA 92728-8300

DESCRIPTION OF THE PROJECT

The applicant seeks to appropriate a maximum of 146,800 acre-feet per annum (afa) to storage in Prado

Dam, Gypsum Canyon Reservoir, Aliso Canyon Reservoir and various recharge facilities, and up to 506,800 afa to underground storage for subsequent extraction and use. The Applicant also requests the right to appropriate up to 800 cubic feet per second (cfs) by direct diversion. The project will be operated so that the total annual amount of water appropriated as a combination of storage and direct diversion does not exceed 507,800 acre-feet (af) in any year. The water will be used within the Applicant's service area for the purposes described below. The project is within an area that has been declared fully appropriated by the SWRCB. However, SWRCB Order WR 2000-12, dated September 21, 2000, amended SWRCB Order

WR 98-08 (Declaration of Fully Appropriated Streams) to allow for the processing of this application.

According to Water Code section 1348, a minor project diverts less than or equal to 3 cfs by direct diversion or 200 af by storage. A major project diverts greater than 3 cfs by direct diversion or 200 af by storage.

This is a "major" project (greater than or equal to 3 cubic feet per second by direct diversion or 200 af by storage) as defined by section 1348 of the Water Code.

APPLICATION INFORMATION

The applicant proposes to divert water from Santa Ana River tributary to Pacific Ocean.

The Points of Diversion (POD) are located:

POD #1: within the NW¼ of SE¼ of Section 10, T3S, R7W, SBB&M.

POD #2: within the SW¼ of SW¼ of Section 20, T3S, R7W, SBB&M.

POD #3: within the NE¼ of NW¼ of Section 2, T4S, R9W, SBB&M.

POD #4: within the SW¼ of NW¼ of Section 3, T4S, R9W, SBB&M.

POD #5: within the NE¼ of SE¼ of Section 5, T4S, R9W, SBB&M.

POD #6: within the SW¼ of SW¼, Section 5, T4S, R9W, SBB&M.

POD #7: within the NE¼ of NE¼ Section 7, T4S, R9W, SBB&M.

POD #8: within the NE¼ of NW¼ Section 2, T4S, R9W, SBB&M.

The diversion and place of use are located within the Counties of Orange and Riverside.

Amount of water applied for:

(A) 800 cfs (Direct Diversion), not to exceed

a total of 506,800 afa.

(B) 146,800 afa (Storage)

The total combined amount taken by direct diversion and/or storage shall not exceed 507,800 afa.

Water will be used for: Municipal, Irrigation, Recreation & Industrial.

The applicant has requested to divert water from: July 1 to June 30.

The Place of Use is within the service area boundaries of the Orange County Water District as shown on maps on file with the SWRCB.

ENVIRONMENTAL INFORMATION

According to the California Environmental Quality Act (CEQA) and its guidelines, Orange County Water District is the lead agency and will be responsible for preparation of appropriate environmental documents for the project and for determining whether or not the project will cause a significant effect on the environment. If you are not filing a protest, but wish to submit information which indicates that the project may cause a significant effect on the environment, please send this information to the lead agency immediately and also to Mr. Mike Falkenstein, SWRCB, Division of Water Rights, P.O. Box 2000, Sacramento, CA 95812-2000. This information will be reviewed in accordance with CEQA.

PROCEDURE FOR SUBMITTING PROTESTS

Any person may file a protest against the application. Protests should be submitted on standard protest forms available from the SWRCB or on the Division's web-site at www.waterrights.ca.gov/forms/, but can be submitted in letter form. A pamphlet that provides additional information relating to water rights and the procedure for filing protests can be obtained from the contact person listed below. The protest should be submitted to:

Mitchell Moody

State Water Resources Control Board

Division of Water Rights

P.O. Box 2000

Sacramento, CA 95812-2000

In addition, the protestant must send a copy of the protest to the applicant.

Protests filed in response to this notice must either be postmarked, or received in the office of the SWRCB's Division of Water Rights (1001 "I" Street, 14th Floor, Sacramento, CA) **by 4:00 p.m.** on the **60th day** after the date of this notice. Due to the constraints of the noticing period, protests may be filed by FAX at (916) 341-5400. However, an original copy of all materials must be received for the SWRCB to consider your protest. For good cause, the SWRCB may grant an extension of time to file a protest. It is the protestant's responsibility to contact the engineer listed below and receive an extension of time to

submit the protest prior to the final filing date and time. The SWRCB will respond to all protests within 60 days of the final day to file a protest.

PROTEST REQUIREMENTS

Parties may file protests based on any of the following factors:

- Injury to existing water rights.
- Adverse environmental impact.
- Not in the public interest.
- Contrary to law.
- Not within the jurisdiction of the SWRCB.

All protests must clearly describe the objections to approval of the application and the factual basis for those objections. If the objection is based on injury to existing water rights, the protest must describe the specific injury to the existing water right that would result from approval of the application. In addition, the party claiming injury to prior water rights must provide specific information that describes the basis of the existing right, the date the use began, the quantity of water used, the purpose of use and the place of use. Please note that any water right permit issued by the SWRCB is subject to and includes conditions to protect vested water rights.

If the protest is based on environmental grounds, or other factors listed above, the protest must be accompanied by a statement of facts supporting the basis of the protest. The protest shall include a description of any measures that could be taken to resolve the protest, including modification of the application (i.e., amount, season of diversion, etc.) or conditions (i.e., fish bypass flow, measuring device, etc.) that could be included in the water right permit. If sufficient information is not submitted, the SWRCB may reject the protest or request that the protestant submit additional information.

RESOLUTION OF PROTESTS

The protestant(s) and the applicant are encouraged to discuss methods that could be used to resolve the protest. If the protest(s) can not be resolved, the SWRCB may conduct a field investigation for minor projects, or hold a water right hearing for major projects.

CONTACT PERSON

To obtain additional information regarding this project, or to obtain copies of the protest forms or pamphlet, please contact Mitchell Moody by phone at (916) 341-5383 or by electronic mail at Mmoody@waterrights.swrcb.ca.gov. Protest forms may also be obtained from our web-site at www.waterrights.ca.gov/forms/ .

DATE OF NOTICE:

State Water Resources Control Board

Winston H. Hickox
Secretary for Environmental Protection

Division of Water Rights
1001 I Street, 14th Floor • Sacramento, California 95814 • (916) 341-5300
Mailing Address: P.O. Box 2000 • Sacramento, California • 95812-2000
FAX (916) 341-5400 • Web Site Address: http://www.swrcb.ca.gov
Division of Water Rights: http://www.waterrights.ca.gov

Gray Davis
Governor

NOTICE OF APPLICATION TO APPROPRIATE WATER BY PERMIT

APPLICATION: 31369 **DATE FILED:** November 4, 2002

Notice is hereby given that Chino Basin Watermaster has filed an application for a water right permit for diversion of water from Deer Creek, Day Creek, Etiwanda Creek, San Sevaine Creek, Chino Creek, San Antonio Creek and Cucamonga Creek, tributary to Santa Ana River in San Bernardino and Riverside Counties. The State Water Resources Control Board (SWRCB) will determine whether a water right permit should be issued for the application and, if so, whether conditions should be included in the permit to protect the environment and other downstream water users. This notice provides a description of the proposed project and also describes the procedure and time frame for submittal of a protest against the application. This notice and future notices of applications to appropriate water by permit, may be viewed and printed from the Division of Water Rights (Division) web-site at www.waterrights.ca.gov. Any correspondence to the applicant shall be mailed to:

Chino Basin Watermaster
c/o Michael Fife
Hatch & Parent
21 E. Carrillo Street
Santa Barbara, CA 93101

Special Note: Pursuant to the Division's consolidation order dated January 24, 2003, the protest period for related Applications 31165 of San Bernardino Valley Municipal Water District and Western Municipal Water District and 31174 of Orange County Water District is extended to the close of the protest period for this application. In addition to other requirements, protestants should specify which objections in the protest apply to which applications.

DESCRIPTION OF THE PROJECT

On July 2, 2002 the SWRCB adopted Order WR 2002-0006 amending SWRCB Order WR 98-08 (Declaration of Fully Appropriated Streams) to allow for the processing of this application.

The applicant proposes to divert to underground storage 97,000 acre-feet of water for the purposes of industrial, irrigation, stockwatering (dairy use), and municipal use. The project will utilize an existing system of channels, diversion structures and percolation basins designed to capture storm flows and recycled water flows in the Chino Basin. Additional recharge facilities are also proposed to be constructed in the upper half of the Chino Basin.

"The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our Web-site at http://www.swrcb.ca.gov."
Additional copies of this form and water right information can be obtained at www.waterrights.ca.gov.

According to Water Code section 1348, a minor project diverts less than or equal to 3 cubic feet per second (cfs) by direct diversion or 200 acre-feet (af) per year by storage. A major project diverts greater than 3 cfs by direct diversion or 200 af per year by storage. **This is a "major" project (greater than 3 cfs by direct diversion or 200 af per year by storage) as defined by section 1348 of the Water Code.**

APPLICATION INFORMATION

The applicant proposes to divert water to underground storage at the following facilities:

San Antonio Creek System

Point of Diversion (POD) #1 ("College Heights" and "Upland Basin"): San Antonio Creek Channel tributary to Chino Creek, thence Santa Ana River, thence Pacific Ocean. The Point of Diversion is located within the NW¼ of NW¼ of Section 11, T1S, R8W, SBB & M.

POD#2-6 ("Montclairs"): Unnamed stream tributary to San Antonio Creek Channel, thence Chino Creek, thence Santa Ana River thence Pacific Ocean. The Points of Diversion 2 & 3 are located within the NE¼ of NE¼ of Section 15. Points of Diversion 4 & 6 are located within the NW¼ of SE¼ of Section 15. Point of Diversion 5 is located within the SW¼ of NE¼ of Section 15. All PODs are within T1S, R8W, SBB & M.

POD#7 ("Brooks"): San Antonio Creek Channel tributary to Chino Basin Creek thence Santa Ana River thence Pacific Ocean. The Point of Diversion is located within the NW¼ of NW¼ of Section 27, T1S, R8W, SBB & M.

Cucamonga Creek System

POD#8 ("8th Street"): Unnamed stream tributary to Cucamonga Creek thence Mill Creek, thence Santa Ana River, thence Pacific Ocean. The Point of Diversion is located within the NE¼ of NE¼ of Section 17, T1S, R7W, SBB & M.

POD#9 ("7th Street"): Unnamed stream tributary to Cucamonga Creek thence Mill Creek, thence Santa Ana River, thence Pacific Ocean. The Point of Diversion is located within the NE¼ of NE¼ of Section 17, T1S, R7W, SBB & M.

POD#10 ("Ely Basin" and "Grove Street"): Unnamed stream tributary to Cucamonga Creek thence Mill Creek, thence Santa Ana River, thence Pacific Ocean. The Point of Diversion is located within SW¼ of SE¼ of Section 33, T1S, R7W, SBB & M.

POD#11 ("Turner No. 1"): Unnamed stream tributary to Cucamonga Creek thence Mill Creek, thence Santa Ana River, thence Pacific Ocean. The Point of Diversion is located within the NW¼ of NE¼ of Section 22, T1S, R7W, SBB & M.

Deer Creek System

POD#12 ("Turner Nos. 2, 3 & 4"): Unnamed stream tributary to Cucamonga Creek thence Mill Creek, thence Santa Ana River, thence Pacific Ocean. The Point of Diversion is located within the NE¼ of NE¼ of Section 22, T1S, R7W, SBB & M.

POD#13 ("Turner Nos. 5,8 & 9"): Unnamed stream tributary to Cucamonga Creek thence Mill Creek, thence Santa Ana River, thence Pacific Ocean. The Point of Diversion is located within the NE¼ of

NW¼ of Section 23, T1S, R7W, SBB & M.
Day Creek System

POD#14 ("Lower Day"): Day Creek tributary to Santa Ana River thence Pacific Ocean. The Point of Diversion is located within the NE¼ of NE¼ of Section 31, T1N, R6W, SBB & M.

POD#15 ("Wineville"): Unnamed stream tributary to Day Creek thence Santa Ana River thence Pacific Ocean. The Point of Diversion is located within the SE¼ of NE¼ of Section 31, T1S, R6W SBB & M.

POD#16 ("Riverside"): Unnamed stream tributary to Day Creek thence Santa Ana River thence Pacific Ocean. The Point of Diversion is located within the SE¼ of NE¼ of Section 31, T1S, R6W, SBB & M.

POD#30 ("Etiwanda Conservation Ponds"): Unnamed stream tributary to Day Creek thence Santa Ana River thence Pacific Ocean. The Point of Diversion is located within the NW¼ of NW¼ of Section 21, T1S, R6W, SBB&M.

Etiwanda Creek System

POD#17 ("Etiwanda Spreading Grounds"): East Etiwanda Creek tributary to Santa Ana River thence Pacific Ocean. The point of Diversion is located within the SW¼ of NE¼ of Section 21, T1N, R6W, SBB & M.

POD#18 ("Etiwanda Debris Basin"): Unnamed Stream tributary to East Etiwanda Creek thence Santa Ana River thence Pacific Ocean. The Point of Diversion is located within the SW¼ of SE¼ of Section 21, T1N, R6W, SBB & M.

San Sevaine Creek System

POD#19 ("San Sevaine Nos. 1& 2"): San Sevaine Canyon tributary to Santa Ana River thence Pacific Ocean. The Point of Diversion is located within the NE¼ of NE¼ of Section 27, T1N, R6W, SBB & M.

POD#31 ("Unnamed Channel"): San Sevaine Canyon tributary to Santa Ana River thence Pacific Ocean. The Point of Diversion is located within the NE¼ of NE¼ of Section 27, T1N, R6W, SBB & M.

POD#20 ("Rich Basin"): San Sevaine Canyon tributary to Santa Ana River thence Pacific Ocean. The Point of Diversion is located within the NE¼ of NE¼ of Section 27, T1N, R6W, SBB & M.

POD#21-24 ("San Sevaine Nos. 3, 4 & 5"): San Sevaine Canyon Tributary to Santa Ana River thence Pacific Ocean. Point of Diversion #21 is located within the SW¼ of NE¼ of Section 23, T1N, R6W, SBB& M. Point of Diversion #22 is located within the SE¼ of NE¼ of Section 27, T1N, R6W SBB & M. Points of Diversion #23 and 24 are located within the SE¼ of NE¼ of Section 27, T1N, R6W, SBB & M.

POD#25 ("Victoria Basin"): Unnamed Stream tributary to San Sevaine Canyon thence Santa Ana River thence Pacific Ocean. The Point of Diversion is located within the SW¼ of NW¼ of Section 34, T1N, R6W, SBB & M.

POD#26 ("Hickory Basin"): San Sevaine Canyon tributary to Santa Ana River thence Pacific Ocean. The Point of Diversion is located within the SE¼ of SW¼ of Section 10, T1S, R6W, SBB & M.

POD#27 ("Jurupa Basin"): San Sevaine Canyon tributary to Santa Ana River thence Pacific Ocean. The Point of Diversion is located within the SW¼ of SE¼ of Section 28, T1S, R6W, SBB & M.

Declez Channel System

POD#28 ("Former RP3 Site"): Unnamed Stream tributary to San Sevaine thence Santa Ana River thence Pacific Ocean. The Point of Diversion is located within the SE¼ of NE¼ of Section 35, T1S, R6W, SBB & M.

POD#29 ("Declez Basin"): Unnamed Stream tributary to San Sevaine thence Santa Ana River thence Pacific Ocean. The Point of Diversion is located within the NE¼ of NW¼ of Section 3, T2S, R6W, SBB & M.

The diversion and place of use are located within the Counties of San Bernardino and Riverside.

Amount of water applied for: 97,000 af per year (Storage).

Water will be used for: Municipal, Industrial, Irrigation, Stockwatering (General Dairy Use).

The applicant has requested to divert water from: July 1 thru June 30.

Place of Use is within the boundaries of the Chino Basin Watermaster.

ENVIRONMENTAL INFORMATION

The lead agency will prepare the appropriate environmental documents for the project according to the California Environmental Quality Act (CEQA) and its guidelines, and will determine whether or not the project will cause a significant effect on the environment. If you are not filing a protest, but wish to submit information, which indicates that the project may cause a significant effect on the environment, please send this information to Ms. Jane Farwell, SWRCB, Division of Water Rights, P.O. Box 2000, Sacramento, CA 95812-2000. This information will be reviewed in accordance with CEQA.

PROCEDURE FOR SUBMITTING PROTESTS

Any person may file a protest against the application. Protests should be submitted on standard protest forms available from the Division's web-site at www.waterrights.ca.gov/forms/, but can be submitted in letter form. A pamphlet that provides additional information relating to water rights and the procedure for filing protests can be obtained from the contact person listed below. The protest should be submitted to:

Mitchell Moody
State Water Resources Control Board
Division of Water Rights
P.O. Box 2000
Sacramento, CA 95812-2000

In addition, the protestant must send a copy of the protest to the applicant.

Protests filed in response to this notice must either be postmarked, faxed to (916) 341-5400, or hand-delivered to the office of the SWRCB's Division of Water Rights (1001 "I" Street, 14th Floor, Sacramento, CA) **by 3:00 p.m. on the 60th day** after the date of this notice (the close of the protest period). If you choose to fax the protest due to the constraints of the noticing period, the fax must be followed by timely delivery of an original copy, either personally or by mail, to the Division of Water Rights in order for the

protest to be accepted. **Protests not submitted by the close of the protest period will be subject to rejection.**
For good cause, the SWRCB may grant an extension of time to file a protest. It is the protestant's responsibility to contact the engineer listed below to request the extension prior to the end of the protest period. The SWRCB will respond to all protests within 60 days of the final day to file a protest.

PROTEST REQUIREMENTS

Parties may file protests based on any of the following factors:

- Injury to existing water rights.
- Adverse environmental impact.
- Not in the public interest.
- Contrary to law.
- Not within the jurisdiction of the SWRCB.

All protests must clearly describe the objections to approval of the application and the factual basis for those objections. If the objection is based on injury to existing water rights, the protest must describe the specific injury to the existing water right that would result from approval of the application. In addition, the party claiming injury to prior water rights must provide specific information that describes the basis of the existing right, the date the use began, the quantity of water used, the purpose of use and the place of use. Please note that any water right permit issued by the SWRCB is subject to and includes conditions to protect vested water rights.

If the protest is based on environmental grounds, or other factors listed above, the protest must be accompanied by a statement of facts supporting the basis of the protest. The protest shall include a description of any measures that could be taken to resolve the protest, including modification of the application (i.e., amount, season of diversion, etc.) or conditions (i.e., fish bypass flow, measuring device, etc.) that could be included in the water right permit. If sufficient information is not submitted, the SWRCB may reject the protest or request that the protestant submit additional information.

RESOLUTION OF PROTESTS

The protestant(s) and the applicant are encouraged to discuss methods that could be used to resolve the protest. If the protest(s) can not be resolved, the SWRCB may conduct a field investigation for minor projects, or hold a water right hearing for major projects.

CONTACT PERSON

To obtain additional information regarding this project, or to obtain copies of the protest forms or pamphlet, please contact Mitchell Moody by phone at (916) 341-5383 or by electronic mail at mmoody@waterrights.swrcb.ca.gov. Protest forms and a copy of the January 24, 2003 consolidation order may also be obtained from the Division's website at www.waterrights.ca.gov.

DATE OF NOTICE: 1-31-03

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State Water Resources Control Board

Winston H. Hickox
Secretary for Environmental Protection

Division of Water Rights
1001 I Street, 14th Floor • Sacramento, California 95814 • (916) 341-5300
Mailing Address: P.O. Box 2000 • Sacramento, California • 95812-2000
FAX (916) 341-5400 • Web Site Address: http://www.swrcb.ca.gov
Division of Water Rights: http://www.waterrights.ca.gov

Gray Davis
Governor

NOTICE OF APPLICATION TO APPROPRIATE WATER BY PERMIT

APPLICATION: 31370 **DATE FILED:** November 4, 2002

Notice is hereby given that San Bernardino Municipal Water District and Western Municipal Water District of Riverside County (Muni/Western) have filed an application for a water right permit for diversion of water from Santa Ana River tributary to Pacific Ocean and from Bear Creek, Breakneck Creek, Keller Creek and Alder Creek, tributary to Santa Ana River in San Bernardino County. The State Water Resources Control Board (SWRCB) will determine whether a water right permit should be issued for the application and, if so, whether conditions should be included in the permit to protect the environment and other downstream water users. This notice provides a description of the proposed project and also describes the procedure and time frame for submittal of a protest against the application. This notice and future notices of applications to appropriate water by permit, may be viewed and printed from the Division of Water Rights (Division) web-site at www.waterrights.ca.gov. Any correspondence to the applicant shall be mailed to:

San Bernardino Municipal Water District and
Western Municipal Water District of Riverside County
c/o Mr. David R.E. Aladjem
555 Capitol Mall, 10th Floor
Sacramento, CA 95814-4686

Special Note: Pursuant to the Division's consolidation order dated January 24, 2003, the protest period for related Applications 31165 of San Bernardino Valley Municipal Water District and Western Municipal Water District and 31174 of Orange County Water District is extended to the close of the protest period for this application. In addition to other requirements, protestants should specify which objections in the protest apply to which applications.

DESCRIPTION OF THE PROJECT

Applicants seek a right to appropriate water from the flows of the Santa Ana River in accordance with the terms of certain court judgments allocating those flows. On July 2, 2002 the SWRCB adopted Order WR 2002-0006 amending SWRCB Order WR 98-08 (Declaration of Fully Appropriated Streams) to allow for the processing of this application. This is the second Application of Muni/Western to be processed under these proceedings in the Santa Ana River Watershed. SWRCB Order WR 2000-12 previously allowed for the processing of Application 31165 of Muni/Western and its public notice on January 11, 2002.

Specifically, the applicant seeks to appropriate a maximum of 50,000 acre-feet per annum (afa) to surface storage at Seven Oaks Dam and up to 100,000 afa to existing underground storage facilities for subsequent extraction and use. Applicant also requests the right to appropriate up to 1100 cubic feet per second (cfs) by direct diversion. The project will be operated so that the total combined water

appropriated as a combination of storage and direct diversion does not exceed 100,000 in any year. The water will be used for municipal, industrial, irrigation, heat control, frost protection and recreation within the applicant's respective districts.

According to Water Code section 1348, a minor project diverts less than or equal to 3 cubic feet per second (cfs) by direct diversion or 200 acre-feet (af) per year by storage. A major project diverts greater than 3 cfs by direct diversion or 200 af per year by storage. **This is a "major" project (greater than 3 cfs by direct diversion or 200 af per year by storage) as defined by section 1348 of the Water Code.**

APPLICATION INFORMATION

The applicant proposes to divert water at the following facilities:

POD #1, 2, 3, 4, 5, 8, 11, 12, 13,14, 15, 16 and 17: Santa Ana River tributary to Pacific Ocean.
POD #6: Bear Creek tributary to Santa Ana.
POD #7: Breakneck Creek tributary to Santa Ana River.
POD #9: Keller Creek tributary to Santa Ana River.
POD #10: Alder Creek tributary to Hemlock Creek thence Santa Ana River.

Points of Diversion are located as follows and as shown on a map on file with the SWRCB:

Within Section 4, T1S, R2W, SBB&M:
POD #1 & 11: within NE¼ of NW¼
POD #2 & 12: within SW¼ of SW¼
POD #3, 4, 13 & 14: within SE¼ of NW¼
POD #15: within SE¼ of NE¼
POD #16 & 17: within NW¼ of SW¼

Within Section 19, T1N, R1W, SBB & M:
POD #5 & 6: within SE¼ of NE¼
POD #7: within NW¼ of SE¼

Within Section 26, T1N, R2W, SBB & M:
POD #8: within SW¼ of NE¼
POD #9: within NW¼ of NE¼
POD #10: within NW¼ of NW¼

The diversion and place of use are located within the County of San Bernardino.

Amount of water applied for:
(A) 1100 cfs (Direct Diversion), not to exceed a total of 100,000 AFA.
(B) 100,000 AFA (Storage).

The total combined amount taken by direct diversion and/or storage shall not exceed 100,000 AFA.

The applicant has requested to divert water from: January 1 to December 31.

ENVIRONMENTAL INFORMATION

According to the California Environmental Quality Act (CEQA) and its guidelines, San Bernardino Valley Municipal Water District/Western Municipal Water District of Riverside County is the lead agency and will be responsible for preparation of appropriate environmental documents for the project and for determining whether or not the project will cause a significant effect on the environment. If you are not filing a protest, but wish to submit information which indicates that the project may cause a significant effect on the environment, please send this information to the lead agency immediately and also to Ms. Jane Farwell, SWRCB, Division of Water Rights, P.O. Box 2000 Sacramento, CA 95812-2000. This information will be reviewed in accordance with CEQA.

PROCEDURE FOR SUBMITTING PROTESTS

Any person may file a protest against the application. Protests should be submitted on standard protest forms available from the Division's web-site at www.waterrights.ca.gov/forms/, but can be submitted in letter form. A pamphlet that provides additional information relating to water rights and the procedure for filing protests can be obtained from the contact person listed below. The protest should be submitted to:

Mitchell Moody
State Water Resources Control Board
Division of Water Rights
P.O. Box 2000
Sacramento, CA 95812-2000

In addition, the protestant must send a copy of the protest to the applicant.

Protests filed in response to this notice must either be postmarked, faxed to (916) 341-5400, or hand-delivered to the office of the SWRCB's Division of Water Rights (1001 "I" Street, 14th Floor, Sacramento, CA) **by 3:00 p.m.** on the **60th day** after the date of this notice (the close of the protest period). If you choose to fax the protest due to the constraints of the noticing period, the fax must be followed by timely delivery of an original copy, either personally or by mail, to the Division of Water Rights in order for the protest to be accepted. **Protests not submitted by the close of the protest period will be subject to *rejection.***

For good cause, the SWRCB may grant an extension of time to file a protest. It is the protestant's responsibility to contact the engineer listed below to request the extension prior to the end of the protest period. The SWRCB will respond to all protests within 60 days of the final day to file a protest.

PROTEST REQUIREMENTS

Parties may file protests based on any of the following factors:

- Injury to existing water rights.
- *Adverse environmental impact.*
- Not in the public interest.
- Contrary to law.
- Not within the jurisdiction of the SWRCB.

All protests must clearly describe the objections to approval of the application and the factual basis for those objections. If the objection is based on injury to existing water rights, the protest must describe the specific injury to the existing water right that would result from approval of the application. In addition, the party claiming injury to prior water rights must provide specific information that describes the basis of the existing right, the date the use began, the quantity of water used, the purpose of use and the place of use. Please note that any water right permit issued by the SWRCB is subject to and includes conditions to protect vested water rights.

If the protest is based on environmental grounds, or other factors listed above, the protest must be accompanied by a statement of facts supporting the basis of the protest. The protest shall include a description of any measures that could be taken to resolve the protest, including modification of the application (i.e., amount, season of diversion, etc.) or conditions (i.e., fish bypass flow, measuring device, etc.) that could be included in the water right permit. If sufficient information is not submitted, the SWRCB may reject the protest or request that the protestant submit additional information.

RESOLUTION OF PROTESTS

The protestant(s) and the applicant are encouraged to discuss methods that could be used to resolve the protest. If the protest(s) can not be resolved, the SWRCB may conduct a field investigation for minor projects, or hold a water right hearing for major projects.

CONTACT PERSON

To obtain additional information regarding this project, or to obtain copies of the protest forms or pamphlet, please contact Mitchell Moody by phone at (916) 341-5383 or by electronic mail at mmoody@waterrights.swrcb.ca.gov. Protest forms and a copy of the January 24, 2003 consolidation order may also be obtained from the Division's website at www.waterrights.ca.gov.

DATE OF NOTICE: 1-31-03

Winston H. Hickox
Secretary for
Environmental
Protection

State Water Resources Control Board

Division of Water Rights
1001 I Street, 14th Floor • Sacramento, California 95814 • (916) 341-5300
Mailing Address: P.O. Box 2000 • Sacramento, California • 95812-2000
FAX (916) 341-5400 • Web Site Address: http://www.swrcb.ca.gov
Division of Water Rights: http://www.waterrights.ca.gov

Gray Davis
Governor

NOTICE OF APPLICATION TO APPROPRIATE WATER BY PERMIT

APPLICATION: 31371 **DATE FILED:** November 4, 2002

Notice is hereby given that San Bernardino Valley Water Conservation District has filed an application for a water right permit for diversion of water from Santa Ana River and Mill Creek tributary to Pacific Ocean in San Bernardino county. The State Water Resources Control Board (SWRCB) will determine whether a water right permit should be issued for the application and, if so, whether conditions should be included in the permit to protect the environment and other downstream water users. This notice provides a description of the proposed project and also describes the procedure and time frame for submittal of a protest against the application. This notice and future notices of applications to appropriate water by permit, may be viewed and printed from the Division of Water Rights (Division) web-site at www.waterrights.ca.gov. Any correspondence to the applicant shall be mailed to:

San Bernardino Valley Water Conservation District
c/o Mr. D. Burnell Cavender
1630 W. Redlands Boulevard, Suite A
Redlands, CA 92373-8032

Special Note: Pursuant to the Division's consolidation order dated January 24, 2003, the protest period for related Applications 31165 of San Bernardino Valley Municipal Water District and Western Municipal Water District and 31174 of Orange County Water District is extended to the close of the protest period for this application. In addition to other requirements, protestants should specify which objections in the protest apply to which applications.

DESCRIPTION OF THE PROJECT

The Applicant seeks an appropriative right to divert water to underground storage from the flows of the Santa Ana River and Mill Creek, based on its historical usage prior to 1914, riparian rights and additional water that may be made available from the operation of Seven Oaks Dam. On July 2, 2002 the SWRCB adopted Order WR 2002-0006 amending SWRCB Order WR 98-08 (Declaration of Fully Appropriated Streams) to allow for the processing of this application.

The stated objective of the Applicant in seeking this right is to 1) to maintain and enhance groundwater recharge and quality in the Bunker Hill Groundwater Basin, 2) make water available for numerous municipalities, agricultural and other users and 3) facilitate efforts to provide habitat preservation and enhancement of endangered plant and biotic communities on its land overlying the Bunker Hill Groundwater Basin.

Diversions to surface storage will take place at Seven Oaks Dam. Diversion to underground storage of natural and regulated flows and rediversion of surface storage will take place at numerous existing facilities (described below) located on Mill Creek and downstream of Seven Oaks Dam on the Santa Ana River. Access agreements will be necessary for facilities not currently owned or operated by the Applicant.

According to Water Code section 1348, a minor project diverts less than or equal to 3 cubic feet per second (cfs) by direct diversion or 200 acre-feet (af) per year by storage. A major project diverts greater than 3 cfs by direct diversion or 200 af per year by storage.

This is a "major" project (greater than 3 cfs by direct diversion or 200 af per year by storage) as defined by section 1348 of the Water Code.

APPLICATION INFORMATION

The applicant proposes to appropriate water at the following Points of Diversion (POD) and Rediversion (PORD):

POD #1, 3, 9, & 11: Santa Ana River tributary to Pacific Ocean.
PORD #2, 4, 5, 7, 8, 10 & 12: Santa Ana River tributary to Pacific Ocean.
POD #6: Mill Creek tributary to Santa Ana River thence Pacific Ocean.
POD #9 & 11; PORD #10 & 12: within NW ¼ of NW ¼, Section 18, T1S, R2W, SBB & M.

The Points of Diversion/Rediversion are located as follows as shown on a map on file with the SWRCB:
POD #1 & PORD #2: within NE¼ of NW¼, section 4, T1S, R2W, SBB & M.
POD #3, PORD #4 & 5: within SW¼ of SW¼, section 4, T1S, R2W, SBB &M.
POD #6; PORD #7 & 8: within NW¼ of NE¼, section 21, T1S, R2W, SBB & M.
POD #9 & 11; PORD #10 & 12: within NW ¼ of NW ¼, Section 18, T1S, R2W, SBB & M.

The diversion and place of use are located within the County of San Bernardino.

Amount of water applied for: 104,545 afa (Storage).

Total combined groundwater and surface storage shall not exceed 104,545 afa. Total surface storage shall not exceed 80,065 afa.

Water will be used for: Municipal, domestic, industrial, irrigation, frost protection, recreation and fish and wildlife preservation and enhancement.

The applicant has requested to divert water from: October 1 to September 30.

ENVIRONMENTAL INFORMATION

According to the California Environmental Quality Act (CEQA) and its guidelines, City of Riverside is the lead agency and will be responsible for preparation of appropriate environmental documents for the project and for determining whether or not the project will cause a significant effect on the environment. If you are not filing a protest, but wish to submit information which indicates that the project may cause a significant effect on the environment, please send this information to the lead agency immediately and also to **Ms. Jane Farwell**, SWRCB, Division of Water Rights, P.O. Box 2000 Sacramento, CA 95812-2000. *This information will be reviewed in accordance with CEQA.*

PROCEDURE FOR SUBMITTING PROTESTS

Any person may file a protest against the application. Protests should be submitted on standard protest forms available from the Division's web-site at www.waterrights.ca.gov/forms/, but can be submitted in letter form. A pamphlet that provides additional information relating to water rights and the procedure for filing protests can be obtained from the contact person listed below. The protest should be submitted to:

Mitchell Moody
State Water Resources Control Board
Division of Water Rights
P.O. Box 2000
Sacramento, CA 95812-2000

In addition, the protestant must send a copy of the protest to the applicant.

Protests filed in response to this notice must either be postmarked, faxed to (916) 341-5400, or hand-delivered to the office of the SWRCB's Division of Water Rights (1001 "I" Street, 14th Floor, Sacramento, CA) **by 3:00 p.m.** on the **60th day** after the date of this notice (the close of the protest period). If you choose to fax the protest due to the constraints of the noticing period, the fax must be followed by timely delivery of an original copy, either personally or by mail, to the Division of Water Rights in order for the protest to be accepted. **Protests not submitted by the close of the protest period will be subject to rejection.**

For good cause, the SWRCB may grant an extension of time to file a protest. It is the protestant's responsibility to contact the engineer listed below to request the extension prior to the end of the protest period. The SWRCB will respond to all protests within 60 days of the final day to file a protest.

PROTEST REQUIREMENTS

Parties may file protests based on any of the following factors:

- Injury to existing water rights.
- Adverse environmental impact.
- Not in the public interest.
- Contrary to law.
- Not within the jurisdiction of the SWRCB.

All protests must clearly describe the objections to approval of the application and the factual basis for those objections. If the objection is based on injury to existing water rights, the protest must describe the specific injury to the existing water right that would result from approval of the application. In addition, the party claiming injury to prior water rights must provide specific information that describes the basis of the existing right, the date the use began, the quantity of water used, the purpose of use and the place of use. Please note that any water right permit issued by the SWRCB is subject to and includes conditions to protect vested water rights.

If the protest is based on environmental grounds, or other factors listed above, the protest must be accompanied by a statement of facts supporting the basis of the protest. The protest shall include a description of any measures that could be taken to resolve the protest, including modification of the application (i.e., amount, season of diversion, etc.) or conditions (i.e., fish bypass flow, measuring device, etc.) that could be included in the water right permit. If sufficient information is not submitted, the SWRCB may reject the protest or request that the protestant submit additional information.

RESOLUTION OF PROTESTS

The protestant(s) and the applicant are encouraged to discuss methods that could be used to resolve the protest. If the protest(s) can not be resolved, the SWRCB may conduct a field investigation for minor projects, or hold a water right hearing for major projects.

CONTACT PERSON

To obtain additional information regarding this project, or to obtain copies of the protest forms or pamphlet, please contact Mitchell Moody by phone at (916) 341-5383 or by electronic mail at mmoody@waterrights.swrcb.ca.gov. . Protest forms and a copy of the January 24, 2003 consolidation order may also be obtained from the Division's website at www.waterrights.ca.gov.

DATE OF NOTICE: 1-31-03

State Water Resources Control Board

Division of Water Rights
1001 I Street, 14th Floor • Sacramento, California 95814 • (916) 341-5300
Mailing Address: P.O. Box 2000 • Sacramento, California • 95812-2000
FAX (916) 341-5400 • Web Site Address: http://www.swrcb.ca.gov
Division of Water Rights: http://www.waterrights.ca.gov

Winston H. Hickox
Secretary for Environmental
Protection

Gray Davis
Governor

NOTICE OF APPLICATION TO APPROPRIATE WATER BY PERMIT

APPLICATION: 31372 **DATE FILED:** November 6, 2002

Notice is hereby given that the City of Riverside has filed an application for a water right permit for diversion of water from Santa Ana River tributary to Pacific Ocean in Riverside County. The State Water Resources Control Board (SWRCB) will determine whether a water right permit should be issued for the application and, if so, whether conditions should be included in the permit to protect the environment and other downstream water users. This notice provides a description of the proposed project and also describes the procedure and time frame for submittal of a protest against the application. This notice and future notices of applications to appropriate water by permit, may be viewed and printed from the Division of Water Rights (Division) web-site at www.waterrights.ca.gov. Any correspondence to the applicant shall be mailed to:

City of Riverside
c/o Mr. Nicolas F. Bonsignore
Wagner & Bonsignore
444 N. Third St., Suite 325
Sacramento, CA 95814

Special Note: Pursuant to the Division's consolidation order dated January 24, 2003, the protest period for related Applications 31165 of San Bernardino Valley Municipal Water District and Western Municipal Water District and 31174 of Orange County Water District is extended to the close of the protest period for this application. In addition to other requirements, protestants should specify which objections in the protest apply to which applications.

DESCRIPTION OF THE PROJECT

The Applicant seeks the right to appropriate treated effluent from the applicant's regional water quality control plant, which currently flows into the Santa Ana River. On July 2, 2002 the SWRCB adopted Order WR 2002-0006 amending SWRCB Order WR 98-08 (Declaration of Fully Appropriated Streams) to allow for the processing of this application.

The treated effluent appropriated would be used for municipal irrigation of parks, schools, golf courses, commercial landscaping and other greenbelt areas. The effluent would also be used for agricultural irrigation, primarily citrus and nurseries on up to 5,600 acres within the Applicant's water service area. A small portion would be used for industrial uses.

The project will be developed in a phased manner. Phase 1 will involve the installation of up to 35,000 linear feet of buried, pressurized transmission pipelines. Ultimately the project would involve up to 52 miles of transmission pipeline, 3 regulatory storage tanks with a combined capacity of 7 million gallons, and 7 pump stations with a combined capacity of 21,300 gallons per minute.

According to Water Code section 1348, a minor project diverts less than or equal to 3 cubic feet per second (cfs) by direct diversion or 200 acre-feet (af) per year by storage. A major project diverts greater than 3 cfs by direct diversion or 200 af per year by storage.

This is a "major" project (greater than 3 cfs by direct diversion or 200 af per year by storage) as defined by section 1348 of the Water Code.

APPLICATION INFORMATION

The applicant proposes to divert water from the Santa Ana River tributary to Pacific Ocean.

The Point of Diversion is located within the SW¼ of SE¼ of section 25, T2S, R6W, SBB&M, as shown on a map on file with the SWRCB.

The diversion and place of use are located within the County of San Bernardino.

Amount of water applied for: 75 cfs (Direct Diversion).

The total combined amount taken by direct diversion shall not exceed 41,400 acre feet per annum.

Water will be used for: Municipal, Industrial and Irrigation.

The applicant has requested to divert water from: January 1 to December 31.

ENVIRONMENTAL INFORMATION

According to the California Environmental Quality Act (CEQA) and its guidelines, City of Riverside is the lead agency and will be responsible for preparation of appropriate environmental documents for the project and for determining whether or not the project will cause a significant effect on the environment. If you are not filing a protest, but wish to submit information which indicates that the project may cause a significant effect on the environment, please send this information to the lead agency immediately and also to **Ms. Jane Farwell**, SWRCB, Division of Water Rights, P.O. Box 2000 Sacramento, CA 95812-2000. This information will be reviewed in accordance with CEQA.

PROCEDURE FOR SUBMITTING PROTESTS

Any person may file a protest against the application. Protests should be submitted on standard protest forms available from the Division's web-site at www.waterrights.ca.gov/forms/, but can be submitted in letter form. A pamphlet that provides additional information relating to water rights and the procedure for filing protests can be obtained from the contact person listed below. The protest should be submitted to:

Mitchell Moody
State Water Resources Control Board
Division of Water Rights
P.O. Box 2000
Sacramento, CA 95812-2000

In addition, the protestant must send a copy of the protest to the applicant.

Protests filed in response to this notice must either be postmarked, faxed to (916) 341-5400, or hand-delivered to the office of the SWRCB's Division of Water Rights (1001 "I" Street, 14th Floor, Sacramento, CA) **by 3:00 p.m.** on the **60th day** after the date of this notice (the close of the protest period). If you choose to fax the protest due to the constraints of the noticing period, the fax must be followed by timely delivery of an original copy, either personally or by mail, to the Division in order for the protest to be accepted. **Protests not submitted by the close of the protest period will be subject to rejection.**

For good cause, the SWRCB may grant an extension of time to file a protest. It is the protestant's responsibility to contact the engineer listed below to request the extension prior to the end of the protest period. The SWRCB will respond to all protests within 60 days of the final day to file a protest.

PROTEST REQUIREMENTS

Parties may file protests based on any of the following factors:

- Injury to existing water rights.
- Adverse environmental impact.
- Not in the public interest.
- Contrary to law.
- Not within the jurisdiction of the SWRCB.

All protests must clearly describe the objections to approval of the application and the factual basis for those objections. If the objection is based on injury to existing water rights, the protest must describe the specific injury to the existing water right that would result from approval of the application. In addition, the party claiming injury to prior water rights must provide specific information that describes the basis of the existing right, the date the use began, the quantity of water used, the purpose of use and the place of use. Please note that any water right permit issued by the SWRCB is subject to and includes conditions to protect vested water rights.

If the protest is based on environmental grounds, or other factors listed above, the protest must be accompanied by a statement of facts supporting the basis of the protest. The protest shall include a description of any measures that could be taken to resolve the protest, including modification of the application (i.e., amount, season of diversion, etc.) or conditions (i.e., fish bypass flow, measuring device, etc.) that could be included in the water right permit. If sufficient information is not submitted, the SWRCB may reject the protest or request that the protestant submit additional information.

RESOLUTION OF PROTESTS

The protestant(s) and the applicant are encouraged to discuss methods that could be used to resolve the protest. If the protest(s) can not be resolved, the SWRCB may conduct a field investigation for minor projects, or hold a water right hearing for major projects.

CONTACT PERSON

To obtain additional information regarding this project, or to obtain copies of the protest forms or pamphlet, please contact Mitchell Moody by phone at (916) 341-5383 or by electronic mail at mmoody@waterrights.swrcb.ca.gov. Protest forms and a copy of the January 24, 2003 consolidation order may also be obtained from the Division's web-site at www.waterrights.ca.gov.

DATE OF NOTICE: 1-31-03

MITIGATION MONITORING AND REPORTING PROGRAM

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RIX FACILITY RECYCLED WATER SALES PROGRAM PROJECT
MITIGATION MONITORING AND REPORTING PROGRAM

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Verification	Status / Date / Initials
Land Use						
4.1-1	Following selection of alternative sites for construction of future facilities, each site shall be evaluated for potential incompatibility with adjacent existing or proposed land uses. Where pumping or other operations can create significant incompatibilities (lighting, noise, traffic, etc.) with adjacent uses, an alternative site shall be selected, or a technical report shall be prepared that identifies the specific measures that will be utilized to reduce potential incompatible activities or effects to below thresholds established in the general plan for the jurisdiction where the facility will be located.	Draft EIR	This measure shall be implemented prior to final selection of (commitment to) a site(s) for future facilities.	Municipal Water Department (MWD)	The final site selected and the basis for this selection, including the referenced technical report, shall be retained in the project file to justify selection of the facility site. Field inspection notes shall be retained in the project file to verify that the land use compatibility mitigation measures have been installed in accordance with the technical report.	
4.1-2	Where future facilities are proposed on locations that support agricultural operations on important farmlands, where feasible, alternative sites shall be selected that do not occupy such acreage (unless agricultural operations have already been terminated).	Draft EIR	This measure shall be implemented prior to final selection of (commitment to) a site(s) for future facilities.	MWD	The final site selected and the basis for this selection shall be retained in the project file to justify selection of an important farmland site which is currently in agricultural production.	

RIX FACILITY RECYCLED WATER SALES PROGRAM PROJECT
MITIGATION MONITORING AND REPORTING PROGRAM

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Verification	Status / Date / Initials
Geology and Soils						
4.3-1	A site-specific evaluation shall be conducted for all structures in conformance with the California Department of Conservation, Division of Mines and Geology Special Publication 117, Guidelines for Evaluation and Mitigating Seismic Hazards in California.	Draft EIR	The geotechnical study shall be compiled for pertinent structures for review and approval prior to completing the structure design.	MWD	A copy of the study shall be retained by the Department. Copies of the building blueprints incorporating the design requirements shall be retained in the project file. Field inspections during construction shall verify that the geotechnical design measures have been installed. Field inspection notes shall be retained in the project file.	
4.3-2	If evidence of faulting is identified at any specific facility site, then a further site-specific evaluation shall be conducted in conformance with the California Department of Conservation, Division of Mines and Geology Note 49, Guidelines for Evaluating the Hazard of Surface Fault Rupture. Facility location and design will be adjusted as necessary to provide structural setbacks. Additional measures may include strengthened foundations, other engineering design, and flexible utility connections.	Draft EIR	The fault study shall be compiled for pertinent structures for review and approval prior to completing the structure design.	MWD	A copy of the study shall be retained by the Department. Copies of the building blueprints incorporating the design requirements shall be retained in the project file. Field inspections during construction shall verify that the geotechnical design measures have been installed. Field inspection notes shall be retained in the project file.	

RIX FACILITY RECYCLED WATER SALES PROGRAM PROJECT
MITIGATION MONITORING AND REPORTING PROGRAM

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Verification	Status / Date / Initials
Geology and Soils (continued)						
4.3-3	Apply appropriate design and construction criteria to all structures subject to significant seismic ground shaking.	Draft EIR	The design and construction shall be compiled for pertinent structures for review and approval prior to completing the structure design.	MWD	A copy of the seismic design and construction criteria shall be retained by the Department for each affected facility. Copies of the building blueprints incorporating the design and construction requirements shall be retained in the project file. Field inspections during construction shall verify that the geotechnical design measures have been installed. Field inspection notes shall be retained in the project file.	
4.3-4	If evidence of liquefaction is identified at any facility sites, particularly those in identified hazard zones near the Santa Ana River, mitigation may include: • In-situ densification of susceptible soil. • Ground improvements such as removal and replacement of susceptible soils or dewatering. • Deep foundations designed to accommodate liquefaction. • Shallow foundation design to accommodate vertical and lateral ground displacement.	Draft EIR	The study identifying liquefaction mitigation shall be compiled for pertinent structures for review and approval prior to completing the structure design.	MWD	A copy of the study shall be retained by the Department. Copies of the building blueprints incorporating the design requirements shall be retained in the project file. Field inspections during construction shall verify that the liquefaction design measures have been installed. Field inspection notes shall be retained in the project file.	

RIX FACILITY RECYCLED WATER SALES PROGRAM PROJECT
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	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Verification	Status / Date / Initials
Geology and Soils (continued)						
4.3-5	Comprehensive geotechnical investigations shall be required prior to engineering and design development or structural and/or substantial rehabilitation of structures identified under Risk Class I & II, e.g., public facilities, as identified below: • Risk Class I & II, Structures Critically Needed after Disaster: Structures that are critically needed after a disaster include important utility centers, fire stations, police stations, emergency communication facilities, hospitals, and critical transportation elements such as bridges and overpasses and smaller dams. <u>Acceptable Damage</u>: Minor non-structural; facility should remain operational and safe, or be suitable for quick restoration of service. • Risk Class III: High occupancy structures; uses are required after disasters (i.e., places of assembly such as schools and churches). <u>Acceptable Damage</u>: Some impairment of function acceptable; structure needs to remain operational.	Draft EIR	The pertinent geotechnical investigation shall be compiled for pertinent structures for review and approval prior to completing the structure design.	MWD	A copy of the study shall be retained by the Department. Copies of the building blueprints incorporating the geotechnical design requirements shall be retained in the project file. Field inspections during construction shall verify that the geotechnical design measures have been installed. Field inspection notes shall be retained in the project file.	

RIX FACILITY RECYCLED WATER SALES PROGRAM PROJECT
MITIGATION MONITORING AND REPORTING PROGRAM

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Verification	Status / Date / Initials
Geology and Soils (continued)						
4.3-5 (cont.)	• Risk Class IV, Ordinary Risk Tolerance: The vast majority of structures in urban areas; most commercial and industrial buildings, small hotels and apartment buildings, and single family residences. Acceptable Damage: An "ordinary" degree of risk should be acceptable. The criteria envisioned by the Structural Engineers Association of California provide the best definition of the "ordinary" level of acceptable risk. These criteria require that buildings be able to: a. Resist minor earthquakes without damage; b. Resist moderate earthquakes without structural damage, but with some non-structural damage; or c. Resist major earthquakes, of the intensity or severity of the strongest experienced in California, without collapse, but with some structural, as well as non-structural damage.					

RIX FACILITY RECYCLED WATER SALES PROGRAM PROJECT
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	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Verification	Status / Date / Initials
Geology and Soils (continued)						
4.3-5 (cont.)	• Risk Class V, Moderate to High Risk Tolerance: Open space uses, such as farms, ranches and parks without high occupancy structures; warehouses with low intensity employment; and the storing of non-hazardous materials. Acceptable Damage: Not applicable.					
4.3-6	All structures previously identified in categories III through V shall be designed in accordance with the applicable multiplier factor seismic design provisions of the Seismic Safety Report to promote safety in the event of an earthquake.	Draft EIR	The geotechnical study shall be compiled for pertinent structures for review and approval prior to completing the structure design.	MWD	A copy of the study shall be retained by the Department. The multiplier factor for category III through V structures shall be clearly identified. Copies of the building blueprints incorporating the design requirements shall be retained in the project file. Field inspections during construction shall verify that the geotechnical design measures have been installed. Field inspection notes shall be retained in the project file.	

RIX FACILITY RECYCLED WATER SALES PROGRAM PROJECT
MITIGATION MONITORING AND REPORTING PROGRAM

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Verification	Status / Date / Initials
Geology and Soils (continued)						
4.3-7	The direct impacts of faults upon proposed projects shall be considered during preliminary planning processes and the engineering design phases.	Draft EIR	The geotechnical study shall be compiled for pertinent structures for review and approval prior to completing the structure design.	MWD	A copy of the study shall be retained by the Department. The potential for ground rupture due to the presence of a fault and design mitigation measures shall be clearly identified in the study. Copies of the building blueprints incorporating the design requirements shall be retained in the project file. Field inspections during construction shall verify that the geotechnical design measures have been installed. Field inspection notes shall be retained in the project file.	
4.3-8	All rehabilitation and new development projects implemented as a result of the proposed project shall be built in accordance with current and applicable Uniform Building Code (UBC) standards and all other applicable City, County, State and Federal laws, regulations and guidelines, which may limit construction and site preparation activities such as grading, and shall make provisions for appropriate land use restrictions, as deemed necessary, to protect residents	Draft EIR	The geotechnical study shall be compiled for pertinent structures for review and approval prior to completing the structure design.	MWD	A copy of the study shall be retained by the Department. The potential for inadequate soil conditions and seismically induced impacts shall be clearly identified in the study. Copies of the building blueprints incorporating the design requirements shall be retained in the project file. Field inspec-	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Verification	Status / Date / Initials
Geology and Soils (continued)						
4.3-8 (cont.)	and others from potential environmental safety hazards, either seismically induced or those resulting from other conditions such as inadequate soil conditions, which may exist in the proposed project's area of potential impact.				tion during construction shall verify that the geotechnical design measures have been installed. Field inspection notes shall be retained in the project file.	
4.3-9	Local grading and building codes that reflect measures to minimize possible seismic damage shall be considered in geotechnical reports prepared for future projects.	Draft EIR	The geotechnical study shall be compiled for pertinent structures for review and approval prior to completing the structure design.	MWD	A copy of the study shall be retained by the Department. The potential for local grading or building code requirements shall be clearly identified in the study. Copies of the building blueprints incorporating the design requirements shall be retained in the project file. Field inspections during construction shall verify that the geotechnical design measures have been installed. Field inspection notes shall be retained in the project file.	

RIX FACILITY RECYCLED WATER SALES PROGRAM PROJECT
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	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Verification	Status / Date / Initials
Geology and Soils (continued)						
4.3-10	If a conjunctive use program is implemented that would bring water levels up to a level that significantly increases the risk of liquefaction, a more detailed monitoring and geologic study focused on this issue will be conducted to determine whether or not liquefaction poses a hazard to surface structures and to human safety. If such a study finds the impacts to be significant, the volume of water permitted to be stored in the particular groundwater basin will be decreased sufficiently until a water level is achieved that does not pose any significant hazard to surface structures or people.	Draft EIR	The geotechnical hazard study for a conjunctive use program shall be compiled for review and approval prior to completing the facility design.	MWD	A copy of the study shall be retained by the Department. The potential for creating geotechnical hazards due to changes in the ground water table depth beneath the ground surface shall be clearly identified in the study. Specific monitoring requirements and limitations on recharge in support of a conjunctive use program shall be identified in the study. Field inspections during construction and operations shall verify that the conjunctive use program design limitations are being implemented. Field inspection notes shall be retained in the project file.	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Verification	Status / Date / Initials
Geology and Soils (continued)						
4.3-11	Add protective covering of mulch, straw or synthetic material (erosion control blankets, tacking will be required) to disturbed areas exposed to direct precipitation or concentrated surface runoff.	Draft EIR	During construction and following construction until a ground cover is established or an alternative ground cover (paving, gravel, etc.) is installed.	MWD	A copy of the construction specifications with this measure included shall be retained in the project file. Field inspections during construction and operations shall verify that this erosion control measure has been installed. Field inspection notes shall be retained in the project file.	
4.3-12	Limit the amount of area disturbed and the length of time slopes and barren ground are left exposed. For pipeline installation, soil shall be compacted to a ground surface level similar to pre-construction conditions.	Draft EIR	During construction planning, quality assurance review shall verify that area impacts and construction activities have been limited to the extent feasible and that the final grade for pipelines is restored to the pre-construction grade.	MWD	A note to the file documenting the quality assurance review shall be retained in the project file. A copy of the construction specifications with this measure included shall be retained in the project file. Field inspections during construction and operations shall verify that the final grade meets requirements. Field inspection notes shall be retained in the project file.	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Verification	Status / Date / Initials
Geology and Soils (continued)						
4.3-13	Construct diversion dikes and interceptor ditches shall be installed to divert water away from construction areas.	Draft EIR	The Storm Water Pollution Prevention Plan (SWPPP) shall be completed prior to construction and shall include diversion dikes and interceptor ditches where required.	MWD	A copy of the SWPPP shall be retained in the project file. Field inspections during construction shall verify that the SWPPP measures have been installed and are functioning correctly. Field inspection notes shall be retained in the project file.	
4.3-14	Install slope drains (conduits) and/or water-velocity-control devices to reduce concentrated high-velocity streams from developing.	Draft EIR	The Storm Water Pollution Prevention Plan (SWPPP) shall be completed prior to construction and shall include slope drains or velocity control devices where required.	MWD	A copy of the SWPPP shall be retained in the project file. Field inspections during construction shall verify that the SWPPP measures have been installed and are functioning correctly. Field inspection notes shall be retained in the project file.	
4.3-15	Any pipelines crossing certain areas, such as the western portion of the Prado Basin, could be subject to subsidence and ground rupture associated with the subsidence. Any construction of facilities in or pipelines crossing such zones is required to have detailed geotechnical and structural engineering studies to ensure designs that can safely accommodate, per building code requirements, the described ground movement(s).	Draft EIR	The geotechnical hazard study for a pipeline in hazard areas shall address subsidence and shall be compiled for review and approval prior to completing the pipeline design.	MWD	A copy of the study shall be retained by the Department. The potential for subsidence or other pipeline geotechnical hazards shall be clearly identified in the study. Copies of the pipeline construction plans incorporating the design requirements shall be	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Verification	Status / Date / Initials
Geology and Soils (continued)						
4.3-15 (cont.)					in the project file. Field inspections during construction shall verify that the geotechnical design measures have been installed. Field inspection notes shall be retained in the project file.	
4.3-16	Continue to identify and study subsidence hazards and susceptible areas, and propose mitigation technology that is appropriate to the findings of the monitoring study. The implementation of Water Sales Program facilities shall not in any way contribute to subsidence conditions in pre-existing subsidence zones. Implementation will not cause or contribute to any new, significant subsidence impacts greater than a total of six inches in magnitude over the planning period. Impacts less than six inches in new areas are considered to be less than significant.	Draft EIR	When facilities are installed in subsidence areas with a potential to contribute to greater subsidence, the Department shall initiate or participate in subsidence studies of the area and monitor water sales program effects on subsidence. This effort shall be conducted prior to installing such facilities and during their implementation.	MWD	A copy of the study shall be retained by the Department. After installation the monitoring data shall be retained and if adjustments in the water sales program are necessary to prevent subsidence from exceeding the six inch threshold they shall be implemented and documented for the project file.	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Verification	Status / Date / Initials
Geology and Soils (continued)						
4.3-17	Excavation and removal or recompaction of expansive soils shall be conducted for facilities at sites identified as having such constraints.	Draft EIR	The design requirement for managing expansive soils shall be identified prior to initiating construction and implemented during construction.	MWD	A copy of the expansive soil management requirements shall be retained by the Department. During construction these requirements shall be implemented. Field inspections during construction shall verify that the geotechnical design measures have been installed. Field inspection notes shall be retained in the project file.	
Hydrology and Water Quality						
4.4-1	SBMWD will provide adequate notice to purchaser if recycled water delivered does not meet Title 22 requirements, particularly coliform. SBMWD will provide all information available for TDS and TIN for determining groundwater recharge needs (such as long-term or corrective blending requirements) in affected groundwater basins. Prior to delivery of recycled water, the purchasing agency shall provide SBMWD with a report that verifies RIX recycled water will not cause significant water quality degradation or violation of water quality objectives for the use location.	Draft EIR	The notice regarding Title 22 compliance shall be provided within a few hours of obtaining the evidence. Data for groundwater recharge shall be provided prior to supplying water to a customer for recharge purposes and the agency determination that recharge of the	MWD	A copy of the Title 22 compliance notice shall be retained in the project file. A copy of the water quality data provided to water customers shall be retained in the project file. The purchasing agency's written determination that water quality objectives will not be violated shall be retained in the project file.	

RIX FACILITY RECYCLED WATER SALES PROGRAM PROJECT
MITIGATION MONITORING AND REPORTING PROGRAM

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Verification	Status / Date / Initials
Hydrology and Water Quality (continued)						
4.4-1 (cont.)			RIX recycled water will not cause violation of water quality objectives at the use location shall be provided to the Department prior to delivery.			
4.4-2	SBMWD will advise other agencies as needed in the engineering studies and standards for specific facilities developed under the program. Restoration of pre-existing conditions will be the minimum goal for surface runoff control. Copies of studies demonstrating compliance with standards shall be provided to SBMWD for review and retention.	Draft EIR	The engineering design input shall be provided prior to final design of facilities proposed by other agencies. Restoration of disturbed areas shall be verified in studies submitted to the Department by the recycled water recipient.	MWD and receiving agency	A copy of the engineering design input shall be retained in the project file. The verification submitted to the Department shall be retained in the project file.	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Verification	Status / Date / Initials
Hydrology and Water Quality (continued)						
4.4-3	For each project construction site, a SWPPP shall be prepared and implemented. Each plan shall identify the specific best management practices that will be used for the site to control pollutant discharges to a 60-percent or greater removal of sediment and other pollutants. In addition, the SWPPP shall identify those measures required to control accidental releases of chemicals or materials that could degrade water quality. Any accidental releases shall be cleaned up; the contaminated material properly disposed of; and the site returned to pre-discharge condition, or in full compliance with regulatory limits for the discharged material.	Draft EIR	The SWPPP shall be prepared prior to construction of any project related facility and the SWPPP measures shall be implemented during construction and operation.	MWD	A copy of the SWPPP shall be retained in the project file. Field inspections during construction shall verify that the SWPPP BMPs have been installed and are functioning successfully. Field inspection notes shall be retained in the project file.	
4.4-4	Pursuant to proposed DHS regulations, an engineering report must be submitted for each planned recycled water recharge project. The engineering report will include, at a minimum, a hydrogeologic study that will evaluate and describe, in detail, the vertical and horizontal extent of the underground zone that defines six months of underground retention of the applied recycled water and the 500 foot horizontal buffer zone around the recharge facility.	Draft EIR	The engineering report will be prepared prior to initiating any recycled water recharge project.	MWD and receiving agency	A copy of the engineering report shall be retained in the project file. Field inspections during construction and operation shall verify that the engineering requirements for a recycled water recharge project have been installed and are functioning successfully. Field inspection notes shall be retained in the project file.	

RIX FACILITY RECYCLED WATER SALES PROGRAM PROJECT
MITIGATION MONITORING AND REPORTING PROGRAM

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Verification	Status / Date / Initials
Air Quality						
4.5-1	Construction Limit construction equipment use to a mix of equipment that is substantially the same as that used for the estimation of pollutant emissions.	Draft EIR	All of the construction equipment measures shall be incorporated into the construction contract and the measures shall be implemented during construction.	MWD and/or water receiving agency	Copies of approved construction contract with the above construction equipment air quality mitigation measures shall be retained by the Department or agency. Field inspections during construction shall verify the measures are being implemented as identified in this document. Field inspection notes shall be retained in the project file.	
4.5-2	All equipment shall be properly tuned and maintained in accordance with manufacturer's specifications.					
4.5-3	General contractors shall maintain and operate construction equipment so as to minimize exhaust emissions.					
4.5-4	During construction, trucks and vehicles in loading and unloading queues would be kept with their engines off, when not in use, to reduce vehicle emissions.					
4.5-5	Construction activities should be phased and scheduled to avoid emissions peaks and discontinued during second-stage smog alerts.					

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Verification	Status / Date / Initials
Air Quality (continued)						
4.5-6	Fugitive Dust Water active grading sites at least twice daily and when dust is observed migrating from the site.	Draft EIR	All of the construction dust control measures shall be incorporated into the construction contract and the measures shall be implemented during construction.	MWD and/or water receiving agency	Copies of approved construction contract with the above fugitive dust control mitigation measures shall be retained by the Department or agency. Field inspections during construction shall verify the measures are being implemented as identified in this document. Field inspection notes shall be retained in the project file.	
4.5-7	Suspend all grading and excavation operations when wind speeds exceed 25 mph.					
4.5-8	Apply non-toxic chemical soil stabilizers according to manufacturers specifications to inactive construction areas (previously graded areas inactive for 10 days or more).					
4.5-9	Replace ground cover or pave disturbed areas immediately after construction is completed in the affected area.					
4.5-10	Sweep streets once per day and when soil material is observed on traveled roadways.					

RIX FACILITY RECYCLED WATER SALES PROGRAM PROJECT
MITIGATION MONITORING AND REPORTING PROGRAM

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Verification	Status / Date / Initials
Transportation / Circulation						
4.6-1	For each facilities development project that will increase trip generation by more than 50 vehicles during peak hour, the implementing agency shall prepare a traffic study that evaluates the impacts of this traffic on the local circulation system and identify project-specific or fair-share mitigation to maintain peak hour level of service at LOS "E" or better.	Draft EIR	Any required traffic study shall be completed prior to authorizing the proposed facility and any mitigation shall be implemented prior to the facility beginning operations.	MWD and/or water receiving agency	A copy of the traffic study shall be retained in the project file. Field inspections prior to initiating operation of the facility shall verify the mitigation has been implemented as identified in this document. Field inspection notes shall be retained in the project file.	
4.6-2	The implementing agency shall require the construction contractor to provide adequate traffic management resources during construction (signing, protective devices, flag persons, etc.) to maintain the safe flow of traffic, particularly emergency access, on local streets at all times.	Draft EIR	Any required traffic management actions or equipment shall be identified and in place prior to initiating construction within any roadway.	MWD and/or water receiving agency	Any required traffic management actions or equipment shall be identified and in place prior to initiating construction within any roadway.	
4.6-3	During construction, the implementing agency shall require traffic hazards for vehicles, bicycles, and pedestrians to be adequately identified and such traffic controlled to minimize hazards.	Draft EIR	Any required traffic management actions or equipment to minimize hazards shall be identified and in place prior to initiating construction within any roadway.	MWD and/or water receiving agency	A copy of the traffic hazard management actions and equipment shall be retained in the project file. Field inspections during construction shall verify the mitigation has been implemented as identified in this document. Field inspection notes shall be retained in the project file.	

RIX FACILITY RECYCLED WATER SALES PROGRAM PROJECT
MITIGATION MONITORING AND REPORTING PROGRAM

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Verification	Status / Date / Initials
Transportation / Circulation (continued)						
4.6-4	The implementing agency shall require the construction contractor to ensure that no open trenches or traffic safety hazards be left in roadways during period of time when construction personnel are not present (nighttime, weekends, etc.), without appropriate signing and protection to minimize hazards.	Draft EIR	Any required traffic management actions or equipment to minimize hazards shall be identified and in place prior to initiating construction within any roadway.	MWD and/or water receiving agency	A copy of the traffic hazard management actions and equipment for non-construction periods shall be retained in the project file. Field inspections during construction shall verify the mitigation has been implemented as identified in this document. Field inspection notes shall be retained in the project file.	
4.6-5	The implementing agency shall require all roads to be repaired adequately after construction activities to ensure that traffic can move in the same manner as before construction without damage to vehicles.	Draft EIR	Road repairs shall be completed immediately following installation of project related facilities in roadways.	MWD and/or water receiving agency	The road repair plans and contract shall be retained in the project file. Field inspections during construction shall verify the mitigation has been implemented as identified in this plans. Field inspection notes shall be retained in the project file.	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Verification	Status / Date / Initials
Transportation / Circulation (continued)						
4.6-6	The implementing agency shall emphasize transportation demand management or non-motorized transportation alternatives for specific project-related employees, to reduce demand for roadway use. If projects are not already identified in the agency's transportation management plans, they shall be included.	Draft EIR	After a new facility begins operation.	MWD and/or water receiving agency	The transportation demand management program shall be incorporated into facility operation plans and a copy retained in the project file. Periodic review of program implementation shall be placed in the project file.	
4.6-7	Roadway improvements to eliminate or reduce any circulation system impacts or traffic hazards, as associated with access to a permanent facility, shall be mitigated in accordance with standard agency requirements or prudent circulation system planning requirements. Strategies than can be considered for application include the following: • signalization, signing and striping improvements, • additional through or turn lanes as dictated by volume, • additional storage area for vehicle queuing (i.e., right-and left-turn bays), • increasing curb radii to accommodate higher turning radius trucks, • pavement/roadbed improvements,	Draft EIR	Prior to initiation of operations.	MWD and/or water receiving agency	The road improvement drawings shall be retained in the project file. Post construction inspection of the improvements shall verify installation in accordance with the drawings. Field inspection notes shall be retained in the project file.	

RIX FACILITY RECYCLED WATER SALES PROGRAM PROJECT
MITIGATION MONITORING AND REPORTING PROGRAM

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Verification	Status / Date / Initials
Transportation / Circulation (continued)						
4.6-7 (cont.)	• widening to provide sufficient land widths for trucks, and • improvements to enhance sight distances.					
4.6-8	The implementing agency shall conduct a detailed operational analysis for selected final site locations and, as necessary, develop conceptual design plans to accommodate specific facility traffic. The conceptual design plans should be oriented toward facilitating the movement of large trucks at facility driveways and nearby intersections.	Draft EIR	Prior to initiation of construction.	MWD and/or water receiving agency	The operational analysis and conceptual design plans for circulation at a facility shall be retained in the project file. Post construction inspection of the improvements shall verify installation in accordance with the drawings. Field inspection notes shall be retained in the project file.	
4.6-9	The implementing agency shall conduct additional analyses for each facility on the availability of rights-of-way, adjacent land uses and locations of driveways, existing improvement plans, roadway cross-sections and unique characteristics or needs for each project.	Draft EIR	Prior to initiation of construction.	MWD and/or water receiving agency	The right-of-way and constraints analysis for circulation on and adjacent to the facility site shall be retained in the project file. Post construction inspection of the improvements shall verify installation in accordance with the drawings. Field inspection notes shall be retained in the project file.	

RIX FACILITY RECYCLED WATER SALES PROGRAM PROJECT
MITIGATION MONITORING AND REPORTING PROGRAM

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Verification	Status / Date / Initials
Transportation / Circulation (continued)						
4.6-10	Any facilities developed under the program that are near airports will be evaluated for maintenance of access to airports and also reduction/elimination of any hazards to airport operations. Special mitigation to ensure access and prevent hazards will be incorporated into the project design.	Draft EIR	Prior to initiation of construction.	MWD and/or water receiving agency	The airport access and hazards analysis for a facility site shall be retained in the project file. Post construction inspection of the improvements shall verify installation in accordance with the drawings. Field inspection notes shall be retained in the project file.	
Biological Resources						
4.7-1	SBMWD will develop thresholds for corrective actions and management activities to minimize the take of suckers, building upon the adaptive management strategy for periodic operational shut-downs of the RIX facility. Particular attention will be paid to the spawning areas and period (March-May) of those populations downstream to MWD crossing. Flow reductions will not result in discharges less than 40 cfs or less than those produced prior to RIX operations during the spawning period. This value is considered conservative and will hold until additional data on overall stream hydrology and ecology are defined.	Draft EIR	Prior to delivery of recycled water to the first customer.	MWD	Thresholds for operations and corrective actions will be developed as part of the first water sales project and it shall include the 40 cfs minimum flow requirement. Ongoing monitoring by the Department shall verify that the thresholds are not being exceeded.	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Verification	Status / Date / Initials
Biological Resources (continued)						
4.7-2	SBMWD will participate in any ongoing river studies of the arroyo chub and derive any management activities for the Santa Ana sucker in context of potential improvements for chub populations.	Draft EIR	Ongoing from the time of program adoption.	MWD	Annual participation activities shall be documented as part of this program with a memorandum (memoranda) to the project file. This annual documentation shall be retained in the project file for a minimum of five years.	
4.7-3	The Biological Resources Overlays contained in the General Plans of Riverside County or San Bernardino County will be examined for identified special habitats for each facility to be developed under the program. For projects within such habitats, a biological survey will be conducted when any resources may be impacted by a proposed project, with a subsequent report prepared by a qualified biologist. The report will include identification of site-specific resources, mitigation measures to eliminate or reduce impacts to any sensitive species or communities (Note: Riverside County prefers non-disturbance, whereas San Bernardino County will allow disturbance if enhancement of populations/habitats is also a mitigation measure), and a mitigation monitoring program.	Draft EIR	When necessary, the biological resource studies shall be prepared prior to approval of a specific water sales activity involving new facilities.	MWD	A copy of the biological resource study shall be retained in the project file.	

RIX FACILITY RECYCLED WATER SALES PROGRAM PROJECT
MITIGATION MONITORING AND REPORTING PROGRAM

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Verification	Status / Date / Initials
Energy and Mineral Resources						
4.8-1	All pumping of recycled water shall occur during off-peak hours, unless a project specific evaluation of electricity demand demonstrates that it will not cause or contribute to cumulative significant impacts on the electricity generation or distribution systems.	Draft EIR	During recycled water pumping operations.	MWD	Electricity invoices shall verify pumping times and the project specific evaluation, if required, shall be retained in the project file.	
Hazards and Risk of Upset						
4.9-1	All contaminated material encountered during construction, particularly excavation, shall be delivered to a licensed treatment, disposal or recycling facility that has the appropriate systems to manage the contaminated material without significant impact on the environment.	Draft EIR	During construction activities.	MWD and/or water receiving agency	If contaminated material is discovered during construction, the Department or agency shall be notified in writing immediately (on the same day as the discovery). If remediation is required, a letter report summarizing all remediation activities up to the final disposal of the contaminated material shall be provided to the Department or agency within one week after final disposal is completed. The notification and letter report shall be retained in the project file.	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Verification	Status / Date / Initials
Hazards and Risk of Upset (continued)						
4.9-2	Before determining that an area contaminated as a result of an accidental release is fully remediated, specific thresholds of acceptable clean-up shall be established and sufficient samples shall be taken within the contaminated area to verify that these clean-up thresholds have been met.	Draft EIR	During construction activities.	MWD and/or water receiving agency	A copy of the specific thresholds of the cleanup and data verifying the cleanup thresholds have been met shall be provided to the City within one week of receipt of this information. A copy of the specific thresholds and verification data shall be retained in the project file.	
4.9-3	During construction activities within existing road rights-of-way or other easements where continuous access is required, a road operation management plan shall be prepared and implemented. At a minimum this plan shall define how to minimize the amount of time spent on construction activities; how to minimize disruption of vehicle and alternative modes of traffic at all times, but particularly during periods of high traffic volumes; adequate signage and other controls, including flagpersons, to ensure that traffic can flow adequately during construction; the identification of alternative routes that can meet the traffic flow requirements of a specific area, including communication (signs, webpages, etc.) with drivers and neighborhoods where	Draft EIR	The road operating management plan shall be prepared and approved by the local jurisdiction prior to initiating construction within a roadway. The management measures required by the plan shall be implemented during construction.	MWD and/or water receiving agency	The approved traffic management plan shall be retained in the project file and verified in the field during construction inspections. Inspection verification notes shall be retained in the project file.	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Verification	Status / Date / Initials
Hazards and Risk of Upset (continued)						
4.9-3 (cont.)	construction activities will occur; and at the end of each construction day roadways shall be prepared for continued utilization without any significant roadway hazards remaining.					
4.9-4	To the extent feasible, installation of pipelines or other construction activities in support of the Water Sales Program shall not be located on major evacuation or emergency response routes within any affected communities. Where construction on such routes is necessary, local emergency response providers shall be contacted and emergency access and evacuation requirements shall be maintained at a level sufficient to meet their needs.	Draft EIR	The decisions regarding pipeline alignments shall include consideration of major evacuation or emergency responses routes prior to final decision on the alignment, including consultation with local agencies. The road operation management shall include measures to maintain adequate access for evacuation or emergencies. The plan shall be implemented during construction.	MWD and/or water receiving agency	The evaluation of emergency and evacuation access for pipeline alignments shall be retained in the project file. The approved traffic management plan shall be retained in the project file and verified in the field during construction inspections. Inspection verification notes shall be retained in the project file.	

RIX FACILITY RECYCLED WATER SALES PROGRAM PROJECT
MITIGATION MONITORING AND REPORTING PROGRAM

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Verification	Status / Date / Initials
Noise						
4.10-1	Construction shall be limited to the hours of 7 a.m. to 7 p.m. on Monday through Friday, and between 9 a.m. to 6 p.m. on Saturday increase with sensitive receptors, and shall be prohibited on Sundays and federal holidays except in emergencies.	Draft EIR	These measures shall be implemented during construction.	MWD and/or water receiving agency	These measures shall be implemented through contract stipulations with the contractor(s) that construct the project. A copy of the stipulations shall be incorporated into each construction contract and verification shall be provided by the developer to the Department/agency in writing. Field inspections during construction shall verify that the noise measures have being implemented. Field inspection notes shall be retained in the project file.	
4.10-2	Utilize construction methods or equipment that will provide the lowest level of noise impact, i.e., use newer equipment that will generate lower noise levels.					
4.10-3	All construction vehicles and fixed or mobile equipment shall be equipped with properly operating and maintained mufflers.					
4.10-4	Schedule the construction such that the absolute minimum number of equipment would be operating at the same time.					
4.10-5	Maintain good relations with the school and community such as keeping people informed of the schedule, duration, and progress of the construction, to minimize the public objections of unavoidable noise. Communities should be notified in advance of the construction and the expected temporary and intermittent noise increases during the construction period.	Draft EIR	This measure shall be implemented during project construction.	MWD and/or water receiving agency	Copies of notification communications shall be retained in the project file.	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Verification	Status / Date / Initials
Noise (continued)						
4.10-6	All employees that will be exposed to noise levels greater than 75 dB over an 8-hour period shall be provided with adequate hearing protection devices to ensure no hearing damage will result from construction activities.	Draft EIR	This measure shall be implemented during project construction or operation.	MWD and/or water receiving agency	This measure shall be implemented through contract stipulations with the contractor(s) that construct the project. A copy of the stipulations shall be incorporated into each construction contract and verification shall be provided by the developer to the Department/agency in writing. Field inspections during construction shall verify that the noise measures have being implemented. Field inspection notes shall be retained in the project file.	
4.10-7	If equipment is being used that can cause hearing damage at adjacent noise receptor locations (distance attenuation shall be taken into account), portable noise barriers or other attenuation devices shall be installed that are demonstrated to be adequate to reduce noise levels at receptor locations below hearing damage thresholds.	Draft EIR	This measure shall be implemented during prior to project construction and during project construction or operation.	MWD and/or water receiving agency	Prior to implementing a project with equipment exceeding the referenced noise threshold, the Department/agency shall identify the specific noise attenuation barrier that will used. Field inspections during construction shall verify that the noise measures have being implemented. Field inspection notes shall be retained in the project file.	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Verification	Status / Date / Initials
Noise (continued)						
4.10-8	All pump stations in areas with sensitive noise receptors shall have their noise levels attenuated to 50 dBA CNEL at 50 feet from the well head.	Draft EIR	This measure shall be implemented during the design phase and during installation of any above ground pump stations.	MWD and/or water receiving agency	Prior to implementing a project with enclosure for above ground pump stations shall be designed. Field inspections during construction shall verify that the noise attenuation design has been implemented. Field tests shall verify the noise level at the exterior boundary of the property where the pump station is located. Field inspection notes shall be retained in the project file.	
4.10-9	Project facilities shall be constructed and operated so that noise levels from operations do not exceed 50 dB during night hours and 65 dB averaged over the 12 hours of day time when located adjacent to existing or future sensitive land uses. This can be achieved by siting relatively noisy operations a sufficient distance from sensitive noise receptors; by incorporating attenuation features in the facility or designing attenuation features at the boundary of the property.	Draft EIR	This measure shall be implemented during the design phase and during installation of any project facilities that generate noise above 50 dB.	MWD and/or water receiving agency	Prior to implementing a facility that generates noise above 50 dB the noise control structure shall be designed. Field inspections during construction shall verify that the noise attenuation design has been implemented. Field tests shall verify the noise level at the exterior boundary of the property where the facility is located. Field inspection notes shall be retained in the project file.	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Verification	Status / Date / Initials
Public Services						
4.11-1	Water Sales Program facilities shall be fenced or otherwise have access controlled to prevent illegal trespass to attractive nuisances, such as construction sites or tank sites.	Draft EIR	This measure shall be implemented during the design phase and during installation of any project facilities that may be exposed to trespass.	MWD and/or water receiving agency	Access controls to minimize trespass shall be installed prior to construction. Field inspections during construction shall verify that the access controls have been installed and are functioning. Field inspection notes shall be retained in the project file.	
4.11-2	Where feasible, vegetation removed from facility sites, including pipelines, shall be chipped and delivered to licensed composting facilities to minimize the volume of organic solid waste delivered to area landfills for disposal.	Draft EIR	This measure shall be implemented during the construction.	MWD and/or water receiving agency	This measure shall be implemented through contract stipulations with the contractor(s) that construct the project. A copy of the stipulations shall be incorporated into each construction contract and verification shall be provided by the developer to the Department/agency in writing. Field inspections during construction shall verify that the vegetation removal and management measures have being implemented. Field inspection notes shall be retained in the project file.	

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MITIGATION MONITORING AND REPORTING PROGRAM

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Verification	Status / Date / Initials
Utilities						
4.12-1	When electricity consuming facilities are installed in support of the project, the Department shall coordinate with SCE and other power companies regarding the location and phasing of required on-site electrical facilities.	Draft EIR	This measure shall be implemented during the design phase and during installation of any project facilities that may require electricity.	MWD and/or water receiving agency	Documentation of coordination regarding electricity consuming facilities shall be retained in the project file.	
4.12-2	Proposed structure construction should comply with Title 24 of the California Administrative Code (i.e., Uniform Building Code).				Documentation, including design drawings, of compliance with Title 24 design measures shall be retained in the project file.	
4.12-3	Onsite electrical lines should be installed underground.				Field inspections shall verify the electrical lines have been installed underground for project related facilities.	
4.12-4	Project planners and architects should consult with SCE or other electricity providers regarding current energy conservation techniques for any above ground facilities.				Consultation with electricity providers shall be retained in the project file. Field inspections shall verify the energy conservation measures have been installed for project related facilities.	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Verification	Status / Date / Initials
Utilities (continued)						
4.12-5	All project-related development/redevelopment projects, including exterior landscape elements, shall employ xeriscape plant design and water conservation concepts. At a minimum xeriscape requirements shall include the following: a. The use of drought-tolerant species, drip irrigation systems, soil moisture sensors, and automatic irrigation systems, when appropriate. b. Extensive use of mulch in all landscaped areas. Use of mulch will improve water holding capacities of the soil by reducing evaporation and erosion. c. A minimal use of lawn, except to accommodate-lawn dependent uses such as playing fields. Warm-season grasses shall be used.	Draft EIR	This measure shall be implemented during the design phase and during installation of any project facilities that may require landscaping or other water consuming facilities/activities.	MWD and/or water receiving agency	The landscape design or design of other water consuming facilities shall be retained in the project file with documentation that water conservation has been taken into consideration. Field inspections shall verify the water conservation measures have been installed for project related facilities.	
Aesthetics						
4.13-1	All surface areas disturbed by Water Sales Program construction activities, except those area containing structures or hardscapes, shall be revegetated, either with native vegetation in natural landscapes or in accordance with a landscape plan in man-made landscape areas (note that native vegetation is also eminently suited to man-made landscapes and requires less maintenance). Once	Draft EIR	The landscape/ revegetation plan shall be completed prior to construction; installed during construction; and maintained during operations.	MWD and/or water receiving agency	A copy of the approved landscape/revegetation plan drawings shall be retained by the Department/agency and field inspections during construction and operations shall verify the design measures are being implemented and main-	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Verification	Status / Date / Initials
Aesthetics (continued)						
4.13-1 (cont.)	construction is completed, revegetation shall begin immediately and, where a formal landscape plan is being implemented, it shall be coordinated with the local agency and the local design guidelines for consistency.				tained as identified in this document. Field inspection notes shall be retained in the project file.	
4.13-2	Where facilities are proposed to be located adjacent to scenic highways, corridors or other scenic features identified in local agency planning documents, Water Sales Program facility implementation will conform with design requirements established in planning documents for these designated scenic area.	Draft EIR	The design requirements shall be determined and integrated into facility design prior to initiating construction. The design measures shall be installed during construction.	MWD and/or water receiving agency	A copy of the design requirements and approved design drawings shall be retained by the Department/agency and field inspections during construction and operations shall verify the design measures are being implemented and maintained as identified in this document. Field inspection notes shall be retained in the project file.	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Verification	Status / Date / Initials
Aesthetics (continued)						
4.13-3	Where facilities will disrupt views from occupied areas with significant scenic vistas, a visual simulation analysis shall be performed of the facility's impact on the important view. If the analysis identifies a significant impact on a scenic vista, the facility shall be relocated, redesigned to reduce the impact to a non-significant level, or a subsequent environmental evaluation shall be prepared.	Draft EIR	Where required, the visual simulation shall be performed and the follow-on mitigation identified prior to initiating construction.	MWD and/or water receiving agency	A copy of any required visual simulation and approved mitigation design drawings shall be retained by the Department/agency and field inspections during construction and operations shall verify the design measures are being implemented and maintained as identified in this document. Field inspection notes shall be retained in the project file.	
4.13-4	When Water Sales Program above ground facilities are constructed in the future, the local agency design guidelines for the project site shall be followed to the extent that they do not conflict with the engineering and budget constraints established for the facility.	Draft EIR	The design requirements shall be determined and integrated into facility design prior to initiating construction. The design measures shall be installed during construction.	MWD and/or water receiving agency	A copy of the design requirements and approved design drawings shall be retained by the Department/agency and field inspections during construction and operations shall verify the design measures are being implemented and maintained as identified in this document. Field inspection notes shall be retained in the project file.	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Verification	Status / Date / Initials
Aesthetics (continued)						
4.13-5	All utilities for Water Sales Program facilities shall be placed underground unless such undergrounding is not technically feasible.	Draft EIR	The design requirements shall be determined and integrated into facility design prior to initiating construction. The design measures shall be installed during construction.	MWD and/or water receiving agency	A copy of the design requirements and approved design drawings shall be retained by the Department/agency and field inspections during construction and operations shall verify the design measures are being implemented and maintained as identified in this document. Field inspection notes shall be retained in the project file.	
4.13-6	Future project review and implementation shall implement the following: • Use of low pressure sodium lights where security needs require such lighting to minimize impacts of glare. • Height of lighting fixtures shall be lowered to the lowest level consistent with the purpose of the lighting to reduce unwanted illumination. • Directing light and shielding shall be used to minimize off-site illumination. • No light shall be allowed to intrude into sensitive light receptor areas.	Draft EIR	The design requirements shall be determined and integrated into facility design prior to initiating construction. The design measures shall be installed during construction.	MWD and/or water receiving agency	A copy of the design requirements and approved design drawings shall be retained by the Department/agency and field inspections during construction and operations shall verify the design measures are being implemented and maintained as identified in this document. Field inspection notes shall be retained in the project file.	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Verification	Status / Date / Initials
Cultural Resources						
4.14-1	Future facility improvements will avoid damaging cultural resources where feasible. Should avoidance prove not feasible, the importance of the site shall be evaluated by a qualified archaeologist, historian or paleontologist. The first step in the process shall be the conduct of a records search for known cultural resource sites within the area of potential effect (APE). If the records search indicates a potential for cultural resources to be located within the APE, the APE shall be surveyed by a qualified cultural resources professional. If resources are found, they shall be treated in accordance with measures outlined below. If determined necessary, the construction activities shall be monitored.	Draft EIR	The evaluation of cultural resources shall be provided during second-tier environmental document preparation. The evaluation of important resources shall be completed prior to initiating facility operations.	MWD and/or water receiving agency	A copy of the preliminary cultural resources evaluation shall be retained in the project file and a copy of the final report of findings shall be retained in the project file.	
4.14-2	A monitoring plan and discovery clause/ treatment plan, to be implemented during the earthmoving phase of project implementation, will be developed by the archaeologist specifying procedures to be implemented in the event archaeological remains are uncovered during earth moving activities. The plan will provide for evaluation of anticipated and unanticipated cultural resources, provide mitigation alternatives for unavoidable	Draft EIR	The monitoring plan and discovery clause/treatment plan shall be completed prior to completing project construction.	MWD and/or water receiving agency	A copy of the monitoring plan and discovery clause/treatment plan shall be retained in the project file and a copy of the final report of findings shall be retained in the project file.	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Verification	Status / Date / Initials
Cultural Resources (continued)						
4.14-2 (cont.)	archaeological impacts, and include contingency procedures for times when the archaeological monitor is not present on-site.					
4.14-3	The archaeological monitor will attend a pre-construction meeting to explain the mitigation program to construction contractor staff.	Draft EIR	Where required, the archaeological monitor shall attend the pre-construction meeting held before initiation of construction.	MWD and/or water receiving agency	The Department/agency shall document the attendance of the archaeological monitor at the pre-construction meeting by placing a note to the project file.	
4.14-4	An archaeological monitor, qualified in historical archaeology, shall be present during any demolition or earthmoving operations where a potential for significant cultural resources has been identified. The archaeological monitor shall be empowered to halt work to allow evaluation and removal of buried cultural remains. The monitor will complete a form daily summarizing the location being monitored, the nature of the work being done, soil conditions and other observations, and itemizing any cultural resources observed.	Draft EIR	The archaeological monitor shall be retained prior to initiating construction and shall perform monitoring duties during to construction.	MWD and/or water receiving agency	A copy of the monitor's contract shall be retained in the project file and weekly reports from the monitor shall document ongoing implementation of monitoring duties.	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Verification	Status / Date / Initials
Cultural Resources (continued)						
4.14-5	When the monitor observes other than minor, isolated archaeological resources, the monitor will request the construction contractor to divert activities within an area deemed large enough to encompass the deposit, feature, structure or other resource observed. The monitor will report the discovery to the lead agency.	Draft EIR	During construction.	MWD and/or water receiving agency	A copy of the monitor's findings when construction activities are halted or relocated shall be retained in the project file.	
4.14-6	If the resources are determined to be significant, based upon integrity or scientific potential, the supervising archaeologist will prepare a research design acceptable to the Department outlining measures to mitigate site impacts.	Draft EIR	The research design shall be prepared for review and approval by the Department immediately after discovery of the cultural resource.	MWD and/or water receiving agency	A copy of the research design shall be retained in the project file.	
4.14-7	Should any prehistoric sites or features be encountered during excavation, a Native American monitor from the list approved by the Native American Heritage Commission (NAHC) will be added. In the event human remains are encountered, all work will be halted in the vicinity of the observation, and the County Corner and NAHC will be contacted. Treatment of remains will be determined in consultation with the Native American monitor and appropriate tribe or ban of affected Native Americans.	Draft EIR	The addition of a Native American monitor will occur during construction after discovery of a prehistoric feature. Contact with the County Corner and NAHC will occur during construction if human remains are encountered.	MWD and/or water receiving agency	A copy of the contract with the Native American monitor and a note to the file documenting the discovery of human remains shall be placed in the project file.	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Verification	Status / Date / Initials
Cultural Resources (continued)						
4.14-8	Prior to any demolition of historic structures, an advertisement shall be placed in a newspaper of regional circulation and one or more historical societies, announcing the availability of the structures for relocation. The announcement shall provide a minimum 30-day period for submittal of proposals for removal of structures. Mutually satisfactory arrangements for removal of structures shall be negotiated. If no proposals are received, or if a mutually satisfactory arrangement cannot be negotiated, the demolition will proceed. Demolition at and below present grade will be monitored. In this case, the existing site records, or the records as they may be updated, are considered to fulfill any mitigation requirement.	Draft EIR	The advertisement shall be placed prior to demolition and monitoring shall occur during demolition.	MWD and/or water receiving agency	A copy of the advertisement shall be retained in the project file. The copy of the demolition monitoring contract shall be placed in the project file.	
4.14-9	Prior to authorizing second-tier projects when specific locations are known, the APE shall be assessed for paleontological resources by conducting a records check, literature review or a review of the APE by a qualified professional. If resources are found, they shall be treated in accordance with measures outlined below. If determined necessary, the construction activities shall be monitored.	Draft EIR	Area of Potential Effect evaluations for paleontological resources shall be completed prior to completion of the second-tier CEQA review process.	MWD and/or water receiving agency	A copy of the second-tier CEQA document with this information shall be retained in the project file.	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Verification	Status / Date / Initials
Cultural Resources (continued)						
4.14-10	Prior to any earthmoving at proposed sites, a qualified vertebrate paleontologist will develop a storage agreement with the local museums to allow for the permanent storage and maintenance of any fossil remains recovered at construction sites and for archiving of associated specimens and corresponding geologic and geographic site data.	Draft EIR	Prior to construction.	MWD and/or water receiving agency	A copy of the agreement for storage and maintenance of paleontological resources shall be retained in the project file.	
4.14-11	The paleontologist will develop a mitigation plan and discovery clause/treatment plan to be implemented during the earthmoving phase of project implementation. The treatment plan will allow for the recovery and subsequent treatment of any fossil remains and associated data recovered as a result of the mitigation program. This treatment plan will include approved procedures and lines of communication to be implemented if fossil remains are uncovered by earthmoving activities, including those times when the paleontological monitor is not present on the site.	Draft EIR	Prior to construction.	MWD and/or water receiving agency	A copy of the mitigation plan shall be retained in the project file.	
4.14-12	A qualified paleontologist monitor will attend a pre-construction meeting to explain the mitigation program to the construction contractor staff.	Draft EIR	Where required, the paleotological monitor shall attend the pre-construction meeting held before initiation of construction.	MWD and/or water receiving agency	The Department/agency shall document the attendance of the archaeological monitor at the pre-construction meeting by placing a note to the project file.	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Verification	Status / Date / Initials
Cultural Resources (continued)						
4.14-13	Paleontological monitoring of earthmoving will be conducted only in areas where previously undisturbed sedimentary rock or alluvial sediments will be disturbed by earthmoving activities. Monitoring will not be required in areas underlain by younger alluvium until earthmoving has reached a depth of four feet below current grade.	Draft EIR	Where required, the monitor will perform duties during construction.	MWD and/or water receiving agency	A copy of the paleontological monitor's contract shall be retained in the project file. Payment of fees for monitoring shall verify the presence of the monitor at sites where required.	
4.14-14	If fossil remains are found by the monitor, earthmoving activities will be diverted around the fossil site until the remains have been removed. If not already in effect, monitoring will be increased to full time in areas underlain by the fossil-bearing rock unit, at least in the immediate vicinity of the fossil site.	Draft EIR	The monitor will perform duties during construction.	MWD and/or water receiving agency	Documentation of fossil resources shall be retained in the project file and payment of fees will document full time monitoring when required.	
4.14-15	Any recovered fossil remains will be prepared to the point of identification and identified to the lowest taxonomic level feasible by knowledgeable paleontologists. The remains then will be curated (e.g., assigned and labeled with the local museum's specimen and corresponding site numbers; mounted and placed in vials, if necessary; and placed in specimen trays with completed specimen data cards) and catalogued. The specimen and corresponding geologic and geographic site data will be archived (specimen and site numbers and corresponding	Draft EIR	The recordation of paleontological resources will occur within one year of completion of the facility. Fossil remains will be stored in accordance with previous mitigation after completion of the project.	MWD and/or water receiving agency	Documentation of fossil resources shall be compiled in a detailed report and retained in the project file.	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Verification	Status / Date / Initials
Cultural Resources (continued)						
4.14-15 (cont.)	data entered into appropriate museum catalogs and computerized data bases) by a laboratory technician. The fossil remains then will be sent to the museum, where they will be permanently stored, maintained, and made available for future study by qualified investigators.					
4.14-16	A final report of findings with an inventory of recovered fossil specimens will be prepared by the paleontologist for submission to the lead agency and appropriate museum.	Draft EIR	The final report shall be completed and delivered to the Department/agency within one year of completion of the facility.	MWD and/or water receiving agency	A copy of the final report shall be retained in the project file.	
Recreation						
4.15-1	If future infrastructure facilities cause a significant loss of recreational capacity at any facility, the Department will offset the loss by providing comparable capacity either on or off the recreation site.	Draft EIR	If required, new recreational facilities shall be provided within one year of completion of the facility.	MWD and/or water receiving agency	A copy of the design for the recreational facility shall be retained in the project file. Field inspections after the new facilities are installed shall verify the design measures have been implemented. Field inspection notes shall be retained in the project file.	

Attachment C

Petition for Change
City of San Bernardino Municipal Water Department (SBMWD)

Photos

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SBWRP Outfall to the Santa Ana River, looking South-West.



1000-ft Upstream of the SBWRP Outfall, looking North-East.

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Just Upstream of the SBWRP Outfall, looking North-East.



Just Downstream of the SBWRP Outfall, looking South-West.

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RIX Outfall to the Santa Ana River, looking East.



Just Upstream of RIX Outfall, looking North.

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Upstream of the RIX Outfall, looking North. This is the City of Rialto's discharge to the Santa Ana River.



Just Downstream of the RIX Outfall, looking South. Confluence of the City of Rialto's discharge (left) and the RIX discharge (right).

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Waterman Recharge Facility, looking East.



East Twin Creek Recharge Facility, looking South.

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East Twin Creek Recharge Facility, looking North.



Devil Canyon Recharge Facility, looking South-West.

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Devil Canyon Recharge Facility, looking West.



Sweetwater Recharge Facility, looking East.

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Wildwood Park, looking North-West.



Meadowbrook Fields, looking North-West.

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Mountain View Cemetery, looking West.



Perris Hill Park, looking East.

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CITY OF SAN BERNARDINO
MUNICIPAL WATER DEPARTMENT

BOARD OF WATER COMMISSIONERS

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President

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Director of Water Reclamation
DON SHACKELFORD
Director of Finance
VALERIE HOUSEL
Director of Environmental & Regulatory Compliance

"Trusted, Quality Service since 1905"

June 7, 2010

Via E-Mail and First-Class Mail

Ms. Kathleen Groody
Division of Water Rights - Permitting Section
State Water Resources Control Board
P.O. Box 2000
Sacramento, CA 95812-2000
kgroody@waterboards.ca.gov

Re: Wastewater Petition WW-0059; County of Riverside, Santa Ana River

Dear Ms. Groody:

As discussed with your office, this letter encloses two replacement pages for the City of San Bernardino Municipal Water Department's (Petitioner) above-referenced petition filed on April 23, 2010. These replacement pages are submitted in order to clarify the amount of treated wastewater that is subject of the petition, as specified in Items 1 and 10 of the enclosed replacement pages. In this regard, Petitioner's proposed Clean Water Factory project will result in a change in place of use and purpose of use of up to 31,500 acre-feet annually (28 million gallons per day) of the Petitioner's current maximum treated wastewater discharge limit of 44,822 acre-feet annually (40 mgd).

As the SWRCB is aware, Petitioner is currently discharging at its RIX facility location pursuant to its Santa Ana Region RWQCB Order No. R8-2006-0052 and NPDES Permit No. CA8000304. Petitioner's NPDES permit provides for a maximum discharge at the RIX facility of 71,680 afa, which is comprised of up to 44,822 afa of treated wastewater discharges, with the balance from related groundwater extraction discharges. Accordingly, even after Petitioner's full implementation of its Clean Water Factory project, a substantial quantity of treated wastewater and extracted groundwater will continue to be discharged from Petitioner's RIX facility to the Santa Ana River.

300 North "D" Street, San Bernardino, California 92418 P.O. Box 710, 92402 Phone: (909) 384-5141
FACSIMILE NUMBERS: Administration: (909) 384-5215 Engineering: (909) 384-5532 Customer Service: (909) 384-7211
Corporate Yards: (909) 384-5260 Water Reclamation Plant: (909) 384-5258

If you have any questions regarding this matter, please do not hesitate to contact the undersigned at (909) 384-5091.

Sincerely,

City of San Bernardino
Municipal Water Department

Stacey Aldstadt

Stacey Aldstadt
General Manager

Enclosures

cc: Mark Wildermuth *(via email only)*
Michael Plinski *(via email only)*
Andrew M. Hitchings *(via email only)*

State of California
State Water Resources Control Board
DIVISION OF WATER RIGHTS
P.O. Box 2000, Sacramento, CA 95812-2000
Info: (916) 341-5300, FAX: (916) 341-5400, Web: http://www.waterrights.ca.gov

ENVIRONMENTAL INFORMATION FOR PETITIONS

(THIS IS NOT A CEQA DOCUMENT)

The following information will aid in the environmental review of your change petition as required by the California Environmental Quality Act (CEQA). IN ORDER FOR YOUR CHANGE PETITION TO BE ACCEPTED AS COMPLETED, ANSWERS TO THE QUESTIONS LISTED BELOW MUST BE COMPLETED TO THE BEST OF YOUR ABILITY. Failure to answer all questions may result in your change petition being returned to you, causing delays in processing. If you need more space, attach additional sheets. Additional information may be required from you to amplify further or clarify the information requested in this form.

DISCRIPTION OF CHANGES TO PROJECT

1. Provide a description of the proposed changes to your project, including but not limited to, type of construction activity, structures existing or to be built, area to be graded or excavated, changes in land use, and project operational changes, including changes in how the water will be used.

The City of San Bernardino Municipal Water Department (SBWMD) is proposing the reuse of recycled water in its service area and the marketing of surplus recycled water to water agencies outside the SBMWD service area. The SBMWD's proposed Clean Water Factory (CWF) will treat secondary effluent from the San Bernardino Water Reclamation Plant (SBWRP) to a quality approved for recharge–pursuant to the requirements of the California Department of Public Health (CDPH) and the Santa Ana Regional Water Quality Control Board (RWQCB) – and convey the recycled water to the Waterman Basins, the East Twin Creek Spreading Grounds, the Devil Canyon Basins, and the Sweetwater Basins for recharge by surface spreading. The locations of these facilities are shown in Figure 2. Recycled water spread at these facilities will recharge the Bunker Hill Groundwater Basin (Bunker Hill Basin) and, more specifically, the Bunker Hill A Management Zone, as described in the Water Quality Control Plan for the Santa Ana River Watershed. The CWF will also treat a side stream of SBWRP secondary effluent to tertiary standards for unrestricted irrigation uses in the SBMWD service area. Recycled water not recharged or directly used in the SBMWD service area will be treated to tertiary standards at the existing Rapid Infiltration and Extraction (RIX) Facility with some of this recycled water discharged to the Santa Ana River and some conveyed to the Inland Empire Utility Agency (IEUA) service area. Several water agencies in the IEUA service area have expressed interest in obtaining recycled water from the SBMWD. Recycled water conveyed to the IEUA service area will be used to meet non-potable direct uses and for groundwater recharge in the Chino Basin. The reuse of the SBMWD recycled water will reduce demand for imported water in the SBMWD service area and the other areas where its recycled water will be conveyed. The CWF project will result in a change in place of use and purpose of use of up to 31,500 acre-feet annually (28 million gallons per day) of the Petitioner's current maximum treated wastewater discharge limit of 44,822 acre-feet annually (40 mgd).

"The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our Web-site at http://www.swrcb.ca.gov."
Additional copies of this form and water right information can be obtained at www.waterrights.ca.gov.

9. Provide below an estimate of the type, number, and size (trunk/stem diameter at chest height) of trees and large shrubs that are planned to be removed or destroyed due to implementation of the proposed changes. Consider all aspects of your change petition, including changes in diversion structures, water distribution and use facilities, and changes in the place of use due to additional water development.

No trees or large shrubs will be removed or destroyed as a result of the implementation of the proposed project.

FISH AND WILDLIFE CONCERNS

10. Identify the typical species of fish which occur in the source(s) from which you propose to divert water and discuss whether or not any of these fish species or their habitat has been or would be affected by your proposed changes. (Note: See footnote denoted by * under Question 11 below):

There are no expected adverse impacts to fish, wildlife, or riparian habitat as a result of the implementation of this project. SBMWD is currently discharging at its RIX facility location pursuant to its Santa Ana Region RWQCB Order No. R8 2006 0052 and NPDES Permit No. CA8000304. SBMWD's NPDES permit provides for a maximum discharge at the RIX facility of 71,680 acre-feet annually, which is comprised of up to 44,822 afa of treated wastewater discharges, with the balance from related groundwater extraction discharges. Accordingly, even after SBMWD's full implementation of the CWF project (with a resulting reduction in discharges of up to 31,500 afa), a substantial quantity of water will continue to be discharged from SBMWD's RIX facility to the Santa Ana River. Moreover, SBMWD will maintain a minimum discharge to the Santa Ana River as may be required by the environmental document prepared for the CWF project.