

Appendix A

Urban Water Management Planning Act

CALIFORNIA WATER CODE DIVISION 6

PART 2.6. URBAN WATER MANAGEMENT PLANNING

All California Codes have been updated to include the 2010 Statutes.

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| CHAPTER 1. | GENERAL DECLARATION AND POLICY | 10610-10610.4 |
| CHAPTER 2. | DEFINITIONS | 10611-10617 |
| CHAPTER 3. | URBAN WATER MANAGEMENT PLANS | |
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WATER CODE

SECTION 10610-10610.4

10610. This part shall be known and may be cited as the "Urban Water Management Planning Act."

10610.2. (a) The Legislature finds and declares all of the following:

- (1) The waters of the state are a limited and renewable resource subject to ever-increasing demands.
- (2) The conservation and efficient use of urban water supplies are of statewide concern; however, the planning for that use and the implementation of those plans can best be accomplished at the local level.
- (3) A long-term, reliable supply of water is essential to protect the productivity of California's businesses and economic climate.
- (4) As part of its long-range planning activities, every urban water supplier should make every effort to ensure the appropriate level of reliability in its water service sufficient to meet the needs of its various categories of customers during normal, dry, and multiple dry water years.
- (5) Public health issues have been raised over a number of contaminants that have been identified in certain local and imported water supplies.
- (6) Implementing effective water management strategies, including groundwater storage projects and recycled water projects, may require specific water quality and salinity targets for meeting groundwater basins water quality objectives and promoting beneficial use of recycled water.
- (7) Water quality regulations are becoming an increasingly important factor in water agencies' selection of raw water sources, treatment alternatives, and modifications to existing treatment facilities.
- (8) Changes in drinking water quality standards may also impact the usefulness of water supplies and may ultimately impact supply reliability.
- (9) The quality of source supplies can have a significant impact

on water management strategies and supply reliability.

(b) This part is intended to provide assistance to water agencies in carrying out their long-term resource planning responsibilities to ensure adequate water supplies to meet existing and future demands for water.

10610.4. The Legislature finds and declares that it is the policy of the state as follows:

(a) The management of urban water demands and efficient use of water shall be actively pursued to protect both the people of the state and their water resources.

(b) The management of urban water demands and efficient use of urban water supplies shall be a guiding criterion in public decisions.

(c) Urban water suppliers shall be required to develop water management plans to actively pursue the efficient use of available supplies.

WATER CODE

SECTION 10611-10617

10611. Unless the context otherwise requires, the definitions of this chapter govern the construction of this part.

10611.5. "Demand management" means those water conservation measures, programs, and incentives that prevent the waste of water and promote the reasonable and efficient use and reuse of available supplies.

10612. "Customer" means a purchaser of water from a water supplier who uses the water for municipal purposes, including residential, commercial, governmental, and industrial uses.

10613. "Efficient use" means those management measures that result in the most effective use of water so as to prevent its waste or unreasonable use or unreasonable method of use.

10614. "Person" means any individual, firm, association, organization, partnership, business, trust, corporation, company, public agency, or any agency of such an entity.

10615. "Plan" means an urban water management plan prepared pursuant to this part. A plan shall describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation and demand management activities. The components of the plan may vary according to an individual community or area's characteristics and its capabilities to efficiently use and conserve water. The plan shall address measures for residential, commercial, governmental, and industrial water demand management as set forth in Article 2 (commencing with Section 10630) of Chapter 3. In addition, a strategy and time schedule for implementation shall be included in the plan.

10616. "Public agency" means any board, commission, county, city

and county, city, regional agency, district, or other public entity.

10616.5. "Recycled water" means the reclamation and reuse of wastewater for beneficial use.

10617. "Urban water supplier" means a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. An urban water supplier includes a supplier or contractor for water, regardless of the basis of right, which distributes or sells for ultimate resale to customers. This part applies only to water supplied from public water systems subject to Chapter 4 (commencing with Section 116275) of Part 12 of Division 104 of the Health and Safety Code.

WATER CODE

SECTION 10620-10621

10620. (a) Every urban water supplier shall prepare and adopt an urban water management plan in the manner set forth in Article 3 (commencing with Section 10640).

(b) Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.

(c) An urban water supplier indirectly providing water shall not include planning elements in its water management plan as provided in Article 2 (commencing with Section 10630) that would be applicable to urban water suppliers or public agencies directly providing water, or to their customers, without the consent of those suppliers or public agencies.

(d) (1) An urban water supplier may satisfy the requirements of this part by participation in areawide, regional, watershed, or basinwide urban water management planning where those plans will reduce preparation costs and contribute to the achievement of conservation and efficient water use.

(2) Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.

(e) The urban water supplier may prepare the plan with its own staff, by contract, or in cooperation with other governmental agencies.

(f) An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions.

10621. (a) Each urban water supplier shall update its plan at least once every five years on or before December 31, in years ending in five and zero.

(b) Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days prior to the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water

supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision.

(c) The amendments to, or changes in, the plan shall be adopted and filed in the manner set forth in Article 3 (commencing with Section 10640).

WATER CODE

SECTION 10630-10634

10630. It is the intention of the Legislature, in enacting this part, to permit levels of water management planning commensurate with the numbers of customers served and the volume of water supplied.

10631. A plan shall be adopted in accordance with this chapter that shall do all of the following:

(a) Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.

(b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a). If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan:

(1) A copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management.

(2) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition.

(3) A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(c) (1) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following:

- (A) An average water year.
- (B) A single dry water year.
- (C) Multiple dry water years.

(2) For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.

(d) Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.

(e) (1) Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors, including, but not necessarily limited to, all of the following uses:

- (A) Single-family residential.
- (B) Multifamily.
- (C) Commercial.
- (D) Industrial.
- (E) Institutional and governmental.
- (F) Landscape.
- (G) Sales to other agencies.
- (H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof.

(I) Agricultural.

(2) The water use projections shall be in the same five-year increments described in subdivision (a).

(f) Provide a description of the supplier's water demand management measures. This description shall include all of the following:

(1) A description of each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following:

- (A) Water survey programs for single-family residential and multifamily residential customers.
- (B) Residential plumbing retrofit.
- (C) System water audits, leak detection, and repair.
- (D) Metering with commodity rates for all new connections and retrofit of existing connections.
- (E) Large landscape conservation programs and incentives.
- (F) High-efficiency washing machine rebate programs.
- (G) Public information programs.
- (H) School education programs.
- (I) Conservation programs for commercial, industrial, and institutional accounts.

- (J) Wholesale agency programs.
- (K) Conservation pricing.
- (L) Water conservation coordinator.
- (M) Water waste prohibition.
- (N) Residential ultra-low-flush toilet replacement programs.

(2) A schedule of implementation for all water demand management measures proposed or described in the plan.

(3) A description of the methods, if any, that the supplier will use to evaluate the effectiveness of water demand management measures implemented or described under the plan.

(4) An estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the supplier's ability to further reduce demand.

(g) An evaluation of each water demand management measure listed in paragraph (1) of subdivision (f) that is not currently being implemented or scheduled for implementation. In the course of the evaluation, first consideration shall be given to water demand management measures, or combination of measures, that offer lower incremental costs than expanded or additional water supplies. This evaluation shall do all of the following:

(1) Take into account economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors.

(2) Include a cost-benefit analysis, identifying total benefits and total costs.

(3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost.

(4) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation.

(h) Include a description of all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs, other than the demand management programs identified pursuant to paragraph (1) of subdivision (f), that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in average, single-dry, and multiple-dry water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.

(i) Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.

(j) For purposes of this part, urban water suppliers that are members of the California Urban Water Conservation Council shall be deemed in compliance with the requirements of subdivisions (f) and (g) by complying with all the provisions of the "Memorandum of Understanding Regarding Urban Water Conservation in California,"

dated December 10, 2008, as it may be amended, and by submitting the annual reports required by Section 6.2 of that memorandum.

(k) Urban water suppliers that rely upon a wholesale agency for a source of water shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (c).

10631.1. (a) The water use projections required by Section 10631 shall include projected water use for single-family and multifamily residential housing needed for lower income households, as defined in Section 50079.5 of the Health and Safety Code, as identified in the housing element of any city, county, or city and county in the service area of the supplier.

(b) It is the intent of the Legislature that the identification of projected water use for single-family and multifamily residential housing for lower income households will assist a supplier in complying with the requirement under Section 65589.7 of the Government Code to grant a priority for the provision of service to housing units affordable to lower income households.

10631.5. (a) (1) Beginning January 1, 2009, the terms of, and eligibility for, a water management grant or loan made to an urban water supplier and awarded or administered by the department, state board, or California Bay-Delta Authority or its successor agency shall be conditioned on the implementation of the water demand management measures described in Section 10631, as determined by the department pursuant to subdivision (b).

(2) For the purposes of this section, water management grants and loans include funding for programs and projects for surface water or groundwater storage, recycling, desalination, water conservation, water supply reliability, and water supply augmentation. This section does not apply to water management projects funded by the federal American Recovery and Reinvestment Act of 2009 (Public Law 111-5).

(3) Notwithstanding paragraph (1), the department shall determine that an urban water supplier is eligible for a water management grant or loan even though the supplier is not implementing all of the water demand management measures described in Section 10631, if the urban water supplier has submitted to the department for approval a schedule, financing plan, and budget, to be included in the grant or loan agreement, for implementation of the water demand management measures. The supplier may request grant or loan funds to implement the water demand management measures to the extent the request is consistent with the eligibility requirements applicable to the water management funds.

(4) (A) Notwithstanding paragraph (1), the department shall

determine that an urban water supplier is eligible for a water management grant or loan even though the supplier is not implementing all of the water demand management measures described in Section 10631, if an urban water supplier submits to the department for approval documentation demonstrating that a water demand management measure is not locally cost effective. If the department determines that the documentation submitted by the urban water supplier fails to demonstrate that a water demand management measure is not locally cost effective, the department shall notify the urban water supplier and the agency administering the grant or loan program within 120 days that the documentation does not satisfy the requirements for an exemption, and include in that notification a detailed statement to support the determination.

(B) For purposes of this paragraph, "not locally cost effective" means that the present value of the local benefits of implementing a water demand management measure is less than the present value of the local costs of implementing that measure.

(b) (1) The department, in consultation with the state board and the California Bay-Delta Authority or its successor agency, and after soliciting public comment regarding eligibility requirements, shall develop eligibility requirements to implement the requirement of paragraph (1) of subdivision (a). In establishing these eligibility requirements, the department shall do both of the following:

(A) Consider the conservation measures described in the Memorandum of Understanding Regarding Urban Water Conservation in California, and alternative conservation approaches that provide equal or greater water savings.

(B) Recognize the different legal, technical, fiscal, and practical roles and responsibilities of wholesale water suppliers and retail water suppliers.

(2) (A) For the purposes of this section, the department shall determine whether an urban water supplier is implementing all of the water demand management measures described in Section 10631 based on either, or a combination, of the following:

(i) Compliance on an individual basis.

(ii) Compliance on a regional basis. Regional compliance shall require participation in a regional conservation program consisting of two or more urban water suppliers that achieves the level of conservation or water efficiency savings equivalent to the amount of conservation or savings achieved if each of the participating urban water suppliers implemented the water demand management measures. The urban water supplier administering the regional program shall provide participating urban water suppliers and the department with data to demonstrate that the regional program is consistent with this clause. The department shall review the data to determine whether the urban water suppliers in the regional program are meeting the eligibility requirements.

(B) The department may require additional information for any determination pursuant to this section.

(3) The department shall not deny eligibility to an urban water supplier in compliance with the requirements of this section that is participating in a multiagency water project, or an integrated regional water management plan, developed pursuant to Section 75026 of the Public Resources Code, solely on the basis that one or more of

the agencies participating in the project or plan is not implementing all of the water demand management measures described in Section 10631.

(c) In establishing guidelines pursuant to the specific funding authorization for any water management grant or loan program subject to this section, the agency administering the grant or loan program shall include in the guidelines the eligibility requirements developed by the department pursuant to subdivision (b).

(d) Upon receipt of a water management grant or loan application by an agency administering a grant and loan program subject to this section, the agency shall request an eligibility determination from the department with respect to the requirements of this section. The department shall respond to the request within 60 days of the request.

(e) The urban water supplier may submit to the department copies of its annual reports and other relevant documents to assist the department in determining whether the urban water supplier is implementing or scheduling the implementation of water demand management activities. In addition, for urban water suppliers that are signatories to the Memorandum of Understanding Regarding Urban Water Conservation in California and submit biennial reports to the California Urban Water Conservation Council in accordance with the memorandum, the department may use these reports to assist in tracking the implementation of water demand management measures.

(f) This section shall remain in effect only until July 1, 2016, and as of that date is repealed, unless a later enacted statute, that is enacted before July 1, 2016, deletes or extends that date.

10631.7. The department, in consultation with the California Urban Water Conservation Council, shall convene an independent technical panel to provide information and recommendations to the department and the Legislature on new demand management measures, technologies, and approaches. The panel shall consist of no more than seven members, who shall be selected by the department to reflect a balanced representation of experts. The panel shall have at least one, but no more than two, representatives from each of the following: retail water suppliers, environmental organizations, the business community, wholesale water suppliers, and academia. The panel shall be convened by January 1, 2009, and shall report to the Legislature no later than January 1, 2010, and every five years thereafter. The department shall review the panel report and include in the final report to the Legislature the department's recommendations and comments regarding the panel process and the panel's recommendations.

10632. (a) The plan shall provide an urban water shortage contingency analysis that includes each of the following elements that are within the authority of the urban water supplier:

(1) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions that are applicable to each stage.

(2) An estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic

sequence for the agency's water supply.

(3) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.

(4) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.

(5) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.

(6) Penalties or charges for excessive use, where applicable.

(7) An analysis of the impacts of each of the actions and conditions described in paragraphs (1) to (6), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.

(8) A draft water shortage contingency resolution or ordinance.

(9) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.

(b) Commencing with the urban water management plan update due December 31, 2015, for purposes of developing the water shortage contingency analysis pursuant to subdivision (a), the urban water supplier shall analyze and define water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, separately from swimming pools and spas, as defined in subdivision (a) of Section 115921 of the Health and Safety Code.

10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area, and shall include all of the following:

(a) A description of the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.

(b) A description of the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.

(c) A description of the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.

(d) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, indirect potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.

(e) The projected use of recycled water within the supplier's

service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.

(f) A description of actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.

(g) A plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.

10634. The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management strategies and supply reliability.

WATER CODE

SECTION 10635

10635. (a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.

(b) The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies no later than 60 days after the submission of its urban water management plan.

(c) Nothing in this article is intended to create a right or entitlement to water service or any specific level of water service.

(d) Nothing in this article is intended to change existing law concerning an urban water supplier's obligation to provide water service to its existing customers or to any potential future customers.

WATER CODE

SECTION 10640-10645

10640. Every urban water supplier required to prepare a plan pursuant to this part shall prepare its plan pursuant to Article 2 (commencing with Section 10630).

The supplier shall likewise periodically review the plan as required by Section 10621, and any amendments or changes required as a result of that review shall be adopted pursuant to this article.

10641. An urban water supplier required to prepare a plan may consult with, and obtain comments from, any public agency or state agency or any person who has special expertise with respect to water demand management methods and techniques.

10642. Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan. Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. The urban water supplier shall provide notice of the time and place of hearing to any city or county within which the supplier provides water supplies. A privately owned water supplier shall provide an equivalent notice within its service area. After the hearing, the plan shall be adopted as prepared or as modified after the hearing.

10643. An urban water supplier shall implement its plan adopted pursuant to this chapter in accordance with the schedule set forth in its plan.

10644. (a) An urban water supplier shall submit to the department, the California State Library, and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. Copies of amendments or changes to the plans shall be submitted to the department, the California State Library, and any city or county within which the supplier provides water supplies within 30 days after adoption.

(b) The department shall prepare and submit to the Legislature, on or before December 31, in the years ending in six and one, a report summarizing the status of the plans adopted pursuant to this part. The report prepared by the department shall identify the exemplary elements of the individual plans. The department shall provide a copy of the report to each urban water supplier that has submitted its plan to the department. The department shall also prepare reports and provide data for any legislative hearings designed to consider the effectiveness of plans submitted pursuant to this part.

(c) (1) For the purpose of identifying the exemplary elements of the individual plans, the department shall identify in the report those water demand management measures adopted and implemented by specific urban water suppliers, and identified pursuant to Section

10631, that achieve water savings significantly above the levels established by the department to meet the requirements of Section 10631.5.

(2) The department shall distribute to the panel convened pursuant to Section 10631.7 the results achieved by the implementation of those water demand management measures described in paragraph (1).

(3) The department shall make available to the public the standard the department will use to identify exemplary water demand management measures.

10645. Not later than 30 days after filing a copy of its plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours.

WATER CODE

SECTION 10650-10656

10650. Any actions or proceedings to attack, review, set aside, void, or annul the acts or decisions of an urban water supplier on the grounds of noncompliance with this part shall be commenced as follows:

(a) An action or proceeding alleging failure to adopt a plan shall be commenced within 18 months after that adoption is required by this part.

(b) Any action or proceeding alleging that a plan, or action taken pursuant to the plan, does not comply with this part shall be commenced within 90 days after filing of the plan or amendment thereto pursuant to Section 10644 or the taking of that action.

10651. In any action or proceeding to attack, review, set aside, void, or annul a plan, or an action taken pursuant to the plan by an urban water supplier on the grounds of noncompliance with this part, the inquiry shall extend only to whether there was a prejudicial abuse of discretion. Abuse of discretion is established if the supplier has not proceeded in a manner required by law or if the action by the water supplier is not supported by substantial evidence.

10652. The California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) does not apply to the preparation and adoption of plans pursuant to this part or to the implementation of actions taken pursuant to Section 10632. Nothing in this part shall be interpreted as exempting from the California Environmental Quality Act any project that would significantly affect water supplies for fish and wildlife, or any project for implementation of the plan, other than projects implementing Section 10632, or any project for expanded or additional water supplies.

10653. The adoption of a plan shall satisfy any requirements of state law, regulation, or order, including those of the State Water Resources Control Board and the Public Utilities Commission, for the preparation of water management plans or conservation plans; provided, that if the State Water Resources Control Board or the Public Utilities Commission requires additional information concerning water conservation to implement its existing authority, nothing in this part shall be deemed to limit the board or the commission in obtaining that information. The requirements of this part shall be satisfied by any urban water demand management plan prepared to meet federal laws or regulations after the effective date of this part, and which substantially meets the requirements of this part, or by any existing urban water management plan which includes the contents of a plan required under this part.

10654. An urban water supplier may recover in its rates the costs incurred in preparing its plan and implementing the reasonable water conservation measures included in the plan. Any best water management practice that is included in the plan that is identified in the

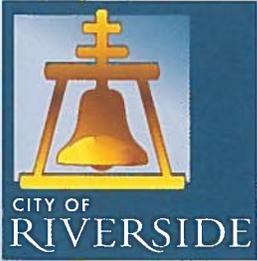
"Memorandum of Understanding Regarding Urban Water Conservation in California" is deemed to be reasonable for the purposes of this section.

10655. If any provision of this part or the application thereof to any person or circumstances is held invalid, that invalidity shall not affect other provisions or applications of this part which can be given effect without the invalid provision or application thereof, and to this end the provisions of this part are severable.

10656. An urban water supplier that does not prepare, adopt, and submit its urban water management plan to the department in accordance with this part, is ineligible to receive funding pursuant to Division 24 (commencing with Section 78500) or Division 26 (commencing with Section 79000), or receive drought assistance from the state until the urban water management plan is submitted pursuant to this article.

Appendix B

Notice of Preparation Letters and Notice of Public Hearing



Public Utilities Department
Administration

March 23, 2011

Larry Ross
Principal Planner, West County
Riverside County Planning Department
PO Box 1409
Riverside, CA 92502-1409

Subject: Notice of Preparation of the City of Riverside Public Utilities' 2010 Urban Water Management Plan

Dear Larry:

Notice is hereby given that the City of Riverside Public Utilities Department (RPU) is in the process of preparing its 2010 Urban Water Management Plan (UWMP), in accordance with the *Urban Water Management Planning Act*, sections 10610 through 10656 of the California Water Code. The RPU expects to have a draft of the 2010 UWMP completed by the second week of June 2011. The draft plan will be available for review at the RPU office located at 3901 Orange Street, Riverside, CA 92501, or as a PDF on the RPU website.

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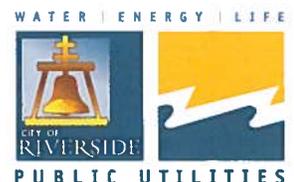
If you have any questions or need additional information regarding the 2010 UWMP, please do not hesitate to contact me. I can be reached at (951) 826-5311 or by e-mail at dwright@riversideca.gov.

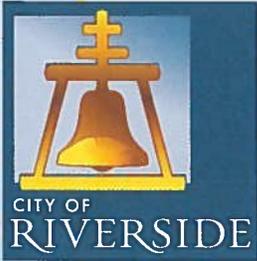
Sincerely,

David H. Wright
General Manager

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Public Utilities Department
Administration

March 23, 2011

Warren D. Williams
General Manager
Riverside County Flood Control and Water Conservation District
1995 Market St.
Riverside, CA 92501

Subject: Notice of Preparation of the City of Riverside Public Utilities' 2010 Urban Water Management Plan

Dear Warren:

Notice is hereby given that the City of Riverside Public Utilities Department (RPU) is in the process of preparing its 2010 Urban Water Management Plan (UWMP), in accordance with the *Urban Water Management Planning Act*, sections 10610 through 10656 of the California Water Code. The RPU expects to have a draft of the 2010 UWMP completed by the second week of June 2011. The draft plan will be available for review at the RPU office located at 3901 Orange Street, Riverside, CA 92501, or as a PDF on the RPU website.

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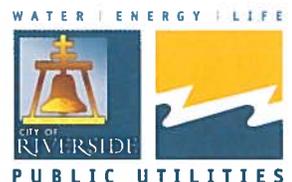
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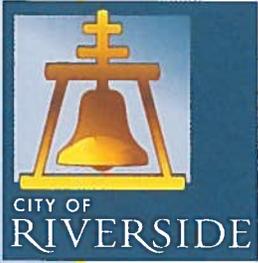
Sincerely,

David H. Wright
General Manager

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Public Utilities Department
Administration

March 23, 2011

Ken Gutierrez
Planning Director
City of Riverside Planning Department
3900 Main St.
Riverside, CA 92522

Subject: Notice of Preparation of the City of Riverside Public Utilities' 2010 Urban Water Management Plan

Dear Ken:

Notice is hereby given that the City of Riverside Public Utilities Department (RPU) is in the process of preparing its 2010 Urban Water Management Plan (UWMP), in accordance with the *Urban Water Management Planning Act*, sections 10610 through 10656 of the California Water Code. The RPU expects to have a draft of the 2010 UWMP completed by the second week of June 2011. The draft plan will be available for review at the RPU office located at 3901 Orange Street, Riverside, CA 92501, or as a PDF on the RPU website.

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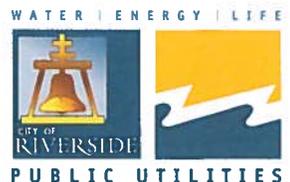
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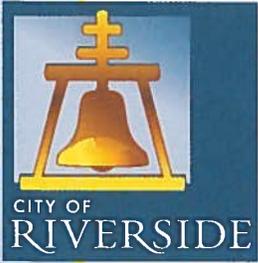
Sincerely,

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General Manager

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Public Utilities Department
Administration

March 23, 2011

Matthew Litchfield
Director, Water Utility
City of San Bernardino Municipal Water Department
300 N. D Street - 5th Floor
San Bernardino, CA 92418

Subject: Notice of Preparation of the City of Riverside Public Utilities' 2010 Urban Water Management Plan

Dear Matthew:

Notice is hereby given that the City of Riverside Public Utilities Department (RPU) is in the process of preparing its 2010 Urban Water Management Plan (UWMP), in accordance with the *Urban Water Management Planning Act*, sections 10610 through 10656 of the California Water Code. The RPU expects to have a draft of the 2010 UWMP completed by the second week of June 2011. The draft plan will be available for review at the RPU office located at 3901 Orange Street, Riverside, CA 92501, or as a PDF on the RPU website.

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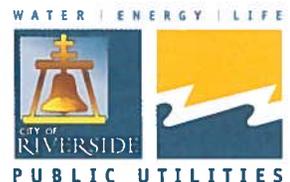
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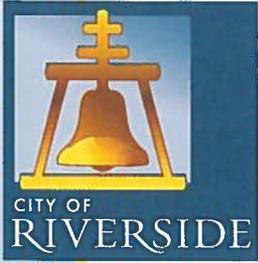
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General Manager

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Public Utilities Department
Administration

March 23, 2011

Peter Fox
Water Superintendent
City of Rialto Water and Wastewater Utilities
150 S. Palm Ave.
Rialto, CA 92376

Subject: Notice of Preparation of the City of Riverside Public Utilities' 2010 Urban Water Management Plan

Dear Peter:

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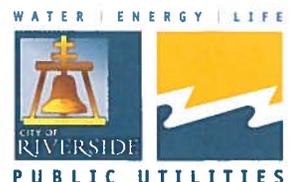
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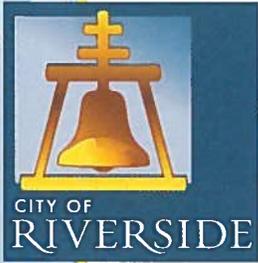
Sincerely,

David H. Wright
General Manager

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Public Utilities Department
Administration

March 23, 2011

Amer Jakher
Director of Public Works and Utility Service
City of Colton
650 N. Cadena Dr.
Colton, CA 92324

Subject: Notice of Preparation of the City of Riverside Public Utilities' 2010 Urban Water Management Plan

Dear Amer:

Notice is hereby given that the City of Riverside Public Utilities Department (RPU) is in the process of preparing its 2010 Urban Water Management Plan (UWMP), in accordance with the *Urban Water Management Planning Act*, sections 10610 through 10656 of the California Water Code. The RPU expects to have a draft of the 2010 UWMP completed by the second week of June 2011. The draft plan will be available for review at the RPU office located at 3901 Orange Street, Riverside, CA 92501, or as a PDF on the RPU website.

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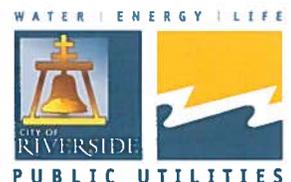
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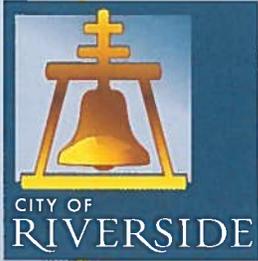
Sincerely,

David H. Wright
General Manager

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Public Utilities Department
Administration

March 23, 2011

T. Jarb Thaipejr
Public Works Director
City of Loma Linda
25541 Barton Rd.
Loma Linda, CA 92354

Subject: Notice of Preparation of the City of Riverside Public Utilities' 2010 Urban Water Management Plan

Dear T. Jarb:

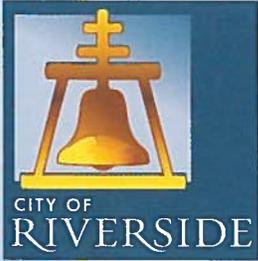
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Sincerely,

David H. Wright
General Manager



Public Utilities Department
Administration

March 23, 2011

Rosemary Hoerning
Municipal Utilities and Engineering Director
City of Redlands
35 Cajon St., Ste. 15A
Redlands, CA 92373

Subject: Notice of Preparation of the City of Riverside Public Utilities' 2010 Urban Water Management Plan

Dear Rosemary:

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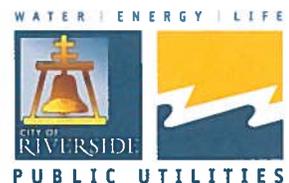
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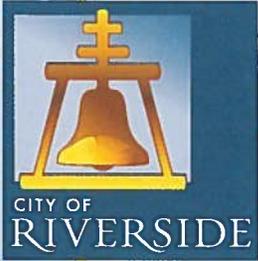
Sincerely,

David H. Wright
General Manager

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Public Utilities Department
Administration

March 23, 2011

Jonathan Daly
General Manager
City of Corona Department of Water and Power
755 Corporation Yard Way
Corona, CA 92880

Subject: Notice of Preparation of the City of Riverside Public Utilities' 2010 Urban Water Management Plan

Dear Jonathan:

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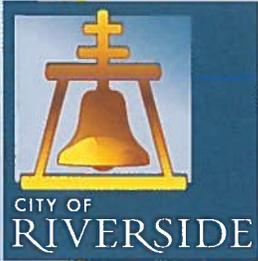
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David H. Wright
General Manager

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Public Utilities Department
Administration

March 23, 2011

Bill Thompson
Public Works Director
City of Norco Public Works
2870 Clark Ave.
Norco, CA 92860

Subject: Notice of Preparation of the City of Riverside Public Utilities' 2010 Urban Water Management Plan

Dear Bill:

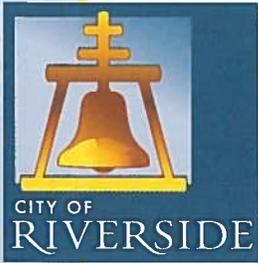
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Sincerely,

David H. Wright
General Manager



Public Utilities Department
Administration

March 23, 2011

Doug Headrick
General Manager
San Bernardino Valley Municipal Water District
380 East Vanderbilt Way
San Bernardino, CA 92408

Subject: Notice of Preparation of the City of Riverside Public Utilities' 2010 Urban Water Management Plan

Dear Doug:

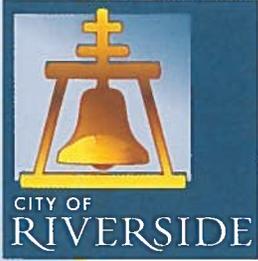
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Sincerely,

David H. Wright
General Manager



Public Utilities Department
Administration

March 23, 2011

Daniel Cozad
General Manager
San Bernardino Valley Water Conservation District
PO Box 1839
Redlands, CA 92373

Subject: Notice of Preparation of the City of Riverside Public Utilities' 2010 Urban Water Management Plan

Dear Daniel:

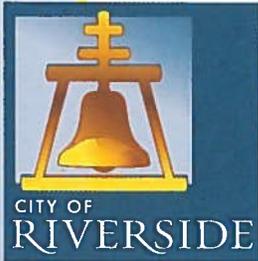
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Sincerely,

David H. Wright
General Manager



Public Utilities Department
Administration

March 23, 2011

Jack Safely
Director of Water Resources
Western Municipal Water District
4205 Meridian Pkwy.
Riverside, CA 92518

Subject: Notice of Preparation of the City of Riverside Public Utilities' 2010 Urban Water Management Plan

Dear Jack:

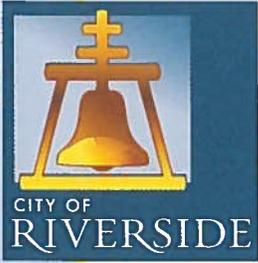
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Sincerely,

David H. Wright
General Manager



Public Utilities Department
Administration

March 23, 2011

Bruce Mortazavi
Assistant General Manager
Eastern Municipal Water District
2270 Trumble Rd.
Perris, CA 92570

Subject: Notice of Preparation of the City of Riverside Public Utilities' 2010 Urban Water Management Plan

Dear Bruce:

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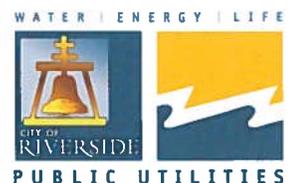
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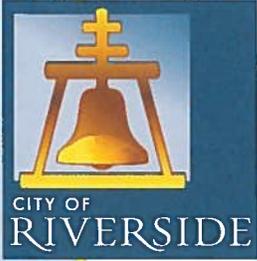
Sincerely,

David H. Wright
General Manager

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Public Utilities Department
Administration

March 23, 2011

Anthony W. Araiza
General Manager
West Valley Water District
PO Box 920
Rialto, CA 92377

Subject: Notice of Preparation of the City of Riverside Public Utilities' 2010 Urban Water Management Plan

Dear Anthony:

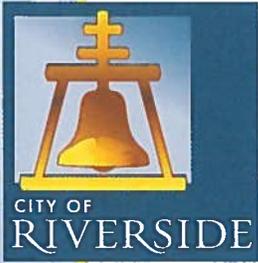
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Sincerely,

David H. Wright
General Manager



Public Utilities Department
Administration

March 23, 2011

Robert E. Martin
General Manager
East Valley Water District
3654 E. Highland Ave., Ste. 18
Highland, CA 92346

Subject: Notice of Preparation of the City of Riverside Public Utilities' 2010 Urban Water Management Plan

Dear Robert:

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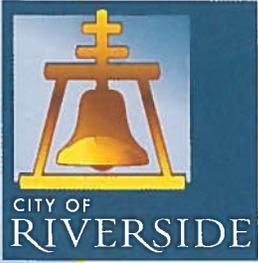
Sincerely,

David H. Wright
General Manager

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Public Utilities Department
Administration

March 23, 2011

David Lopez
General Manager
Rubidoux Community Services District
3590 Rubidoux Blvd.
Rubidoux, CA 92509

Subject: Notice of Preparation of the City of Riverside Public Utilities' 2010 Urban Water Management Plan

Dear David:

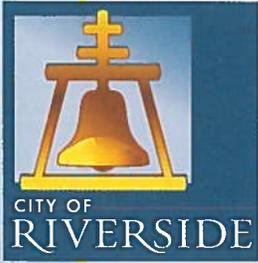
Notice is hereby given that the City of Riverside Public Utilities Department (RPU) is in the process of preparing its 2010 Urban Water Management Plan (UWMP), in accordance with the *Urban Water Management Planning Act*, sections 10610 through 10656 of the California Water Code. The RPU expects to have a draft of the 2010 UWMP completed by the second week of June 2011. The draft plan will be available for review at the RPU office located at 3901 Orange Street, Riverside, CA 92501, or as a PDF on the RPU website.

The Riverside Board of Public Utilities will hold a public hearing at 8:30 am on Friday July 1, 2011, in the Public Utilities Board Room at 3901 Orange Street (Ninth and Orange Streets), for the purpose of receiving comments on the 2010 UWMP. Comments can be submitted prior to or at the public hearing.

If you have any questions or need additional information regarding the 2010 UWMP, please do not hesitate to contact me. I can be reached at (951) 826-5311 or by e-mail at dwright@riversideca.gov.

Sincerely,

David H. Wright
General Manager



Public Utilities Department
Administration

March 23, 2011

Eldon Horst
General Manager
Jurupa Community Services District
11201 Harrel Street
Mira Loma, CA 91752

Subject: Notice of Preparation of the City of Riverside Public Utilities' 2010 Urban Water Management Plan

Dear Eldon:

Notice is hereby given that the City of Riverside Public Utilities Department (RPU) is in the process of preparing its 2010 Urban Water Management Plan (UWMP), in accordance with the *Urban Water Management Planning Act*, sections 10610 through 10656 of the California Water Code. The RPU expects to have a draft of the 2010 UWMP completed by the second week of June 2011. The draft plan will be available for review at the RPU office located at 3901 Orange Street, Riverside, CA 92501, or as a PDF on the RPU website.

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If you have any questions or need additional information regarding the 2010 UWMP, please do not hesitate to contact me. I can be reached at (951) 826-5311 or by e-mail at dwright@riversideca.gov.

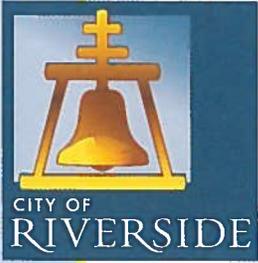
Sincerely,

David H. Wright
General Manager

Riverside Public Utilities is Committed to the Highest Quality Water and Electric Services at the Lowest Possible Rates to Benefit the Community

3901 Orange Street • Riverside, CA 92501 • 951.826.5781 • fax 951.826.2450 • www.riversidepublicutilities.com





Public Utilities Department
Administration

March 23, 2011

Karl Schalow
District Manager
Home Gardens County Water District
3832 North Grant St.
Corona, CA 92879

Subject: Notice of Preparation of the City of Riverside Public Utilities' 2010 Urban Water Management Plan

Dear Karl:

Notice is hereby given that the City of Riverside Public Utilities Department (RPU) is in the process of preparing its 2010 Urban Water Management Plan (UWMP), in accordance with the *Urban Water Management Planning Act*, sections 10610 through 10656 of the California Water Code. The RPU expects to have a draft of the 2010 UWMP completed by the second week of June 2011. The draft plan will be available for review at the RPU office located at 3901 Orange Street, Riverside, CA 92501, or as a PDF on the RPU website.

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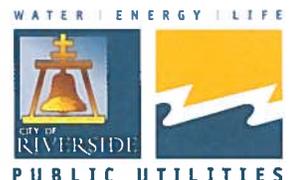
If you have any questions or need additional information regarding the 2010 UWMP, please do not hesitate to contact me. I can be reached at (951) 826-5311 or by e-mail at dwright@riversideca.gov.

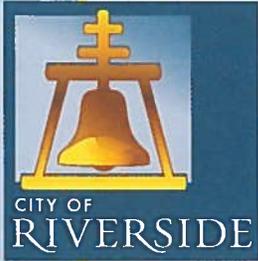
Sincerely,

David H. Wright
General Manager

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Public Utilities Department
Administration

March 23, 2011

Ross Lewis
General Manager
Gage Canal Company
7452 Dufferin Ave.
Riverside, CA 92504

Subject: Notice of Preparation of the City of Riverside Public Utilities' 2010 Urban Water Management Plan

Dear Ross:

Notice is hereby given that the City of Riverside Public Utilities Department (RPU) is in the process of preparing its 2010 Urban Water Management Plan (UWMP), in accordance with the *Urban Water Management Planning Act*, sections 10610 through 10656 of the California Water Code. The RPU expects to have a draft of the 2010 UWMP completed by the second week of June 2011. The draft plan will be available for review at the RPU office located at 3901 Orange Street, Riverside, CA 92501, or as a PDF on the RPU website.

The Riverside Board of Public Utilities will hold a public hearing at 8:30 am on Friday July 1, 2011, in the Public Utilities Board Room at 3901 Orange Street (Ninth and Orange Streets), for the purpose of receiving comments on the 2010 UWMP. Comments can be submitted prior to or at the public hearing.

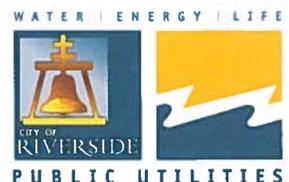
If you have any questions or need additional information regarding the 2010 UWMP, please do not hesitate to contact me. I can be reached at (951) 826-5311 or by e-mail at dwright@riversideca.gov.

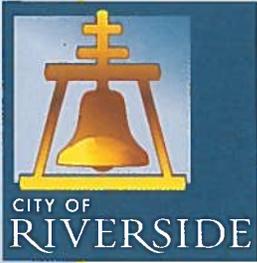
Sincerely,

David H. Wright
General Manager

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3901 Orange Street • Riverside, CA 92501 • 951.826.5781 • fax 951.826.2450 • www.riversidepublicutilities.com





Public Utilities Department
Administration

March 23, 2011

Don Hough
General Manager
Riverside Highland Water Company
12374 Michigan St.
Grand Terrace, CA 92313

Subject: Notice of Preparation of the City of Riverside Public Utilities' 2010 Urban Water Management Plan

Dear Don:

Notice is hereby given that the City of Riverside Public Utilities Department (RPU) is in the process of preparing its 2010 Urban Water Management Plan (UWMP), in accordance with the *Urban Water Management Planning Act*, sections 10610 through 10656 of the California Water Code. The RPU expects to have a draft of the 2010 UWMP completed by the second week of June 2011. The draft plan will be available for review at the RPU office located at 3901 Orange Street, Riverside, CA 92501, or as a PDF on the RPU website.

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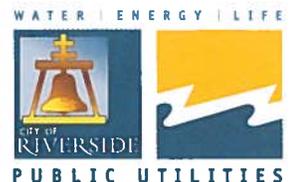
If you have any questions or need additional information regarding the 2010 UWMP, please do not hesitate to contact me. I can be reached at (951) 826-5311 or by e-mail at dwright@riversideca.gov.

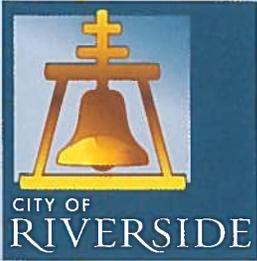
Sincerely,

David H. Wright
General Manager

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3901 Orange Street • Riverside, CA 92501 • 951.826.5781 • fax 951.826.2450 • www.riversidepublicutilities.com





Public Utilities Department
Administration

March 23, 2011

Ronald Young
General Manager
Elsinore Valley Municipal Water District / Meeks & Daley Water Company
31315 Chaney St.
Lake Elsinore, CA 92530

Subject: Notice of Preparation of the City of Riverside Public Utilities' 2010 Urban Water Management Plan

Dear Ronald:

Notice is hereby given that the City of Riverside Public Utilities Department (RPU) is in the process of preparing its 2010 Urban Water Management Plan (UWMP), in accordance with the *Urban Water Management Planning Act*, sections 10610 through 10656 of the California Water Code. The RPU expects to have a draft of the 2010 UWMP completed by the second week of June 2011. The draft plan will be available for review at the RPU office located at 3901 Orange Street, Riverside, CA 92501, or as a PDF on the RPU website.

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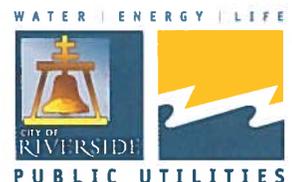
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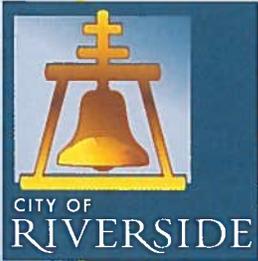
Sincerely,

David H. Wright
General Manager

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3901 Orange Street • Riverside, CA 92501 • 951.826.5781 • fax 951.826.2450 • www.riversidepublicutilities.com





Public Utilities Department
Administration

March 23, 2011

Julius Ma
Water Resources Manager
Elsinore Valley Municipal Water District / Agua Mansa Water
31315 Chaney St.
Lake Elsinore, CA 92530

Subject: Notice of Preparation of the City of Riverside Public Utilities' 2010 Urban Water Management Plan

Dear Julius:

Notice is hereby given that the City of Riverside Public Utilities Department (RPU) is in the process of preparing its 2010 Urban Water Management Plan (UWMP), in accordance with the *Urban Water Management Planning Act*, sections 10610 through 10656 of the California Water Code. The RPU expects to have a draft of the 2010 UWMP completed by the second week of June 2011. The draft plan will be available for review at the RPU office located at 3901 Orange Street, Riverside, CA 92501, or as a PDF on the RPU website.

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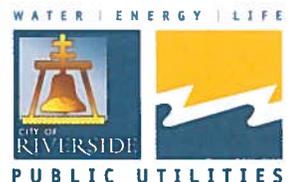
If you have any questions or need additional information regarding the 2010 UWMP, please do not hesitate to contact me. I can be reached at (951) 826-5311 or by e-mail at dwright@riversideca.gov.

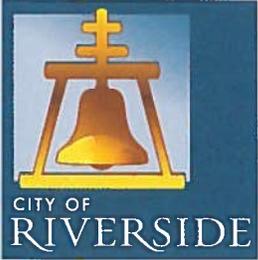
Sincerely,

David H. Wright
General Manager

Riverside Public Utilities is Committed to the Highest Quality Water and Electric Services at the Lowest Possible Rates to Benefit the Community

3901 Orange Street • Riverside, CA 92501 • 951.826.5781 • fax 951.826.2450 • www.riversidepublicutilities.com





Public Utilities Department
Administration

March 23, 2011

Robert Young
General Manager
Fontana Water Company
15966 Arrow Blvd.
Fontana, CA 92335

Subject: Notice of Preparation of the City of Riverside Public Utilities' 2010 Urban Water Management Plan

Dear Robert:

Notice is hereby given that the City of Riverside Public Utilities Department (RPU) is in the process of preparing its 2010 Urban Water Management Plan (UWMP), in accordance with the *Urban Water Management Planning Act*, sections 10610 through 10656 of the California Water Code. The RPU expects to have a draft of the 2010 UWMP completed by the second week of June 2011. The draft plan will be available for review at the RPU office located at 3901 Orange Street, Riverside, CA 92501, or as a PDF on the RPU website.

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If you have any questions or need additional information regarding the 2010 UWMP, please do not hesitate to contact me. I can be reached at (951) 826-5311 or by e-mail at dwright@riversideca.gov.

Sincerely,

David H. Wright
General Manager

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3901 Orange Street • Riverside, CA 92501 • 951.826.5781 • fax 951.826.2450 • www.riversidepublicutilities.com



City of Riverside
NOTICE OF PUBLIC HEARING
2010 Urban Water Management Plan

NOTICE IS HEREBY GIVEN that a public hearing will be held before the City of Riverside Board of Public Utilities on Friday, July 1, 2011, at 8:30 a.m. in the Public Utilities Board Room at 3901 Orange Street (Ninth and Orange Streets), Riverside, California to receive comments on Riverside Public Utilities' 2010 Urban Water Management Plan. The California Urban Water Management Planning Act requires that each urban water supplier providing water for municipal purposes shall prepare and adopt its urban water management plan at least once every five years. The draft of the Urban Water Management Plan is available for review on the Riverside Public Utilities' Web site at www.riversidepublicutilities.com, or by contacting Michael Plinski, Riverside Public Utilities, Water Resources Division, 3025 Madison Street, Riverside, California 92504. Persons unable to attend the hearing may submit their written statements on the matter to Public Utilities General Manager, 3901 Orange Street, Riverside, California 92501, prior to the date and time set for the hearing.

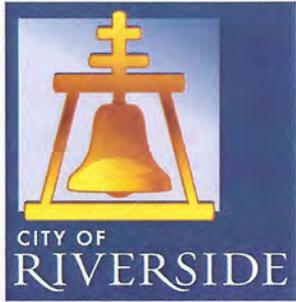
Dated: June 10, 2011

Signed: David H. Wright

Public Utilities General Manager

Appendix C

City of Riverside's Certified Minutes Adopting the 2010 Urban Water Management Plan



**CITY COUNCIL
AND
REDEVELOPMENT AGENCY
MINUTES**

TUESDAY, JULY 12, 2011, 2 P.M.
ART PICK COUNCIL CHAMBER
CITY HALL
3900 MAIN STREET

**COUNCIL/AGENCY
MEMBERS**

| | | | | | | |
|---------------------------------|---|----------------------------|-----------------------|---|------------------|-----------------------|
| G A R D N E R | M E L E N D R E Z | B A I L E Y | D A V I S | M A C A R T H U R | H A R T | A D A M S |
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City of Arts & Innovation

WARDS

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|---|------------------------------|---|---|---|---|---|---|
| Roll Call: | Present | X | X | X | X | X | X |
| <u>CONSENT CALENDAR</u> The following items were approved by one motion affirming the actions appropriate to each item. | Motion Second All Ayes | | | | | X | X |
| 2010 URBAN WATER MANAGEMENT PLAN The City Council adopted the 2010 Urban Water Management Plan to identify and quantify existing and planned water sources and reliability through 2035. | | | | | | | |
| Certified under penalty of perjury to be a full, true, and correct excerpt from the Minutes of the City Council appearing on Pages 97-5 and 97-11 on file in my Office. | | | | | | | |
|  COLLEEN J. NICOL City Clerk | | | | | | | |
| Dated this 15th day of July, 2011, at Riverside, CA. | | | | | | | |

Appendix D

Western-San Bernardino Judgment (Case No. 78426)

APR 17 1969

DONALD O. SULLIVAN, Clerk
By *[Signature]* Deputy

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CLAYSON, STARK, ROTHROCK & MANN
ATTORNEYS AT LAW
LAW BUILDING
601 SOUTH MAIN STREET
P. O. BOX 670
CORONA, CALIFORNIA 91720
737-1910
689-7241

SUPERIOR COURT OF THE STATE OF CALIFORNIA
FOR THE COUNTY OF RIVERSIDE

WESTERN MUNICIPAL WATER)
DISTRICT OF RIVERSIDE)
COUNTY, et al.,)
Plaintiff,)
v.)
EAST SAN BERNARDINO COUNTY)
WATER DISTRICT, et al.,)
Defendants.)

78426
No. 784726
[Signature] 4/17/69

STIPULATION FOR JUDGMENT

The undersigned, as counsel for the indicated parties in the above-entitled action, hereby stipulate and agree as follows:

(1) That judgment, substantially in the form attached hereto as Exhibit "A", may be entered by the Court herein.

(2) That the limitation periods specified in Sections 581 and 583 of the Code of Civil Procedure are by this stipulation extended to and including the date hereof.

(3) Each party to this stipulation expressly

APR-21-69 10 10 7 9 479126 750

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waives findings of fact and conclusions of law in support of the Judgment, and specifically waives any right to appeal therefrom; provided that nothing herein contained shall be deemed to restrict or impair the rights of any parties in relation to any proceeding which may hereafter be undertaken in connection with the exercise of the Court's reserved jurisdiction or determinations of the Watermaster.

Dated: April 17, 1969.

SAN BERNARDINO VALLEY
MUNICIPAL WATER DISTRICT

BEST, BEST & KRIEGER

By Joseph E. Benadum
President

By Arthur d. Littleworth
for Western Municipal Water
District of Riverside County

and Le Roy Williams
Secretary

JOHN WOODHEAD, City Attorney
LELAND J. THOMPSON JR.

Approved Martin McDonough
Attorney

By Leland J. Thompson Jr.
for City of Riverside,
for itself and as successor
in interest to Gage Canal
Company

CLAYSON, STARK, ROTHROCK & MANN

By Donald D. Stark
for Agua Mansa Water Company
and Meeks & Daley Water
Company

REDWINE & SHERRILL

By Francis Sherrill
for Riverside Highland Water
Company

THOMAS J. CUNNINGHAM
JOHN P. SPARROW
ROBERT C. FIELD

By John P. Sparrow
for The Regents of the University
of California

JUDGMENT

F I L E D
RIV. RFD. COUNTY

APR 17 1969

DONALD H. McLELLAN, Clerk
By *[Signature]* Deputy

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IN THE SUPERIOR COURT OF THE STATE OF CALIFORNIA
IN AND FOR THE COUNTY OF RIVERSIDE

WESTERN MUNICIPAL WATER DISTRICT OF
RIVERSIDE COUNTY, a municipal water
district; CITY OF RIVERSIDE, a
municipal corporation; THE GAGE
CANAL COMPANY, a corporation; AGUA
MANSA WATER COMPANY, a corporation,
MEEKS & DALEY WATER COMPANY, a
corporation; RIVERSIDE HIGHLAND
WATER COMPANY, a corporation, and
THE REGENTS OF THE UNIVERSITY OF
CALIFORNIA,

Plaintiffs,

-vs-

(A) EAST SAN BERNARDINO COUNTY
WATER DISTRICT, et al.,

Defendants

78426
No. *784726* *JHR*
4/17/69

JUDGMENT

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TABLE OF CONTENTS

RECITALS

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| III | Prior Judgments | 6 |
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| VI | San Bernardino Basin Area Rights and Replenishment | 10 |
| VII | Water Discharged Across the Bunker Hill Dike | 16 |
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APPENDIX A -- Map showing San Bernardino Basin Area, Colton Basin Area, and Riverside Basin Area situated within San Bernardino County; Riverside Basin Area within Riverside County; Bunker Hill Dike; Riverside Narrows; and

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Boundaries of San Bernardino
Valley Municipal Water
District & Western Municipal
Water District of Riverside
County

APPENDIX B -- Extractions by Plaintiffs from San Bernardino Basin Area.
APPENDIX C -- Exports for Use on Lands not Tributary to Riverside Narrows
APPENDIX D -- Miscellaneous Data

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IT IS HEREBY ORDERED, ADJUDGED AND DECREED as follows:

I
ACTIVE PARTIES

(a) The parties to this Judgment are as follows:

(1) Plaintiff Western Municipal Water District of Riverside County, a California municipal water district, herein often called "Western", appearing and acting pursuant to Section 71751 of the Water Code;

(2) Plaintiff City of Riverside, a municipal corporation;

(3) Plaintiffs Riverside Highland Water Company, Agua Mansa Water Company and Meeks & Daley Water Company, each of which is a mutual water company and a California corporation;

(4) Plaintiff The Regents of the University of California, a California public corporation;

(5) Defendant San Bernardino Valley Municipal Water District, a California municipal water district, herein often called "San Bernardino Valley", appearing and acting pursuant to Section 71751 of the Water Code;

(b) This Judgment shall inure to the benefit of, and be binding upon, the successors and assigns of the parties.

II
DISMISSED PARTIES

All parties other than those named in the preceding Paragraph I are dismissed without prejudice.

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III
PRIOR JUDGMENTS

(a) The Judgment dated and entered on May 13, 1959, in that certain action filed in the Superior Court of the State of California in and for the County of San Bernardino, entitled and numbered "San Bernardino Valley Water Conservation District, a State Agency, Plaintiff v. Riverside Water Company, a corporation, et al., Defendants", No. 97031, is superseded effective January 1, 1971, and for so long as this Judgment remains in effect as to any party hereto that was a party to that action, and as to any party hereto that is a successor in interest to the rights determined in that action.

(b) The Judgment dated June 23, 1965, and entered on April 21, 1966, in that certain action filed in the Superior Court of the State of California in and for the County of San Bernardino entitled and numbered "San Bernardino Valley Water Conservation District, a State Agency, Plaintiff, v. Riverside Water Company, a corporation, et al., Defendants," No. 111614, is superseded effective January 1, 1971, and for so long as this Judgment remains in effect as to any party hereto that was a party to that action, and as to any party hereto that is a successor in interest to any rights determined in that action.

(c) As used in this Paragraph III only, "party" includes any person or entity which stipulates with the parties hereto to accept this Judgment.

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IV
DEFINITIONS

The following ground water basins and tributary areas are situated within the Santa Ana River watershed upstream from Riverside Narrows and are tributary thereto, and their approximate locations and boundaries for purposes of this Judgment are shown upon the map attached hereto as Appendix "A"; San Bernardino Basin Area (the area above Bunker Hill Dike, but excluding certain mountainous regions and the Yucaipa, San Timoteo, Oak Glen and Beaumont Basins); Colton Basin Area, Riverside Basin Area within San Bernardino County, and Riverside Basin Area within Riverside County.

As used herein the following terms shall have the meanings herein set forth:

(a) Bunker Hill Dike - The San Jacinto Fault, located approximately as shown on Appendix "A", and forming the principal downstream boundary of the San Bernardino Basin Area.

(b) Riverside Narrows - That bedrock narrows in the Santa Ana River indicated on Appendix "A".

(c) Extractions - Any form of the verb or noun shall include pumping, diverting, taking or withdrawing water, either surface or subsurface, by any means whatsoever, except extractions for hydroelectric generation to the extent that such flows are returned to the stream, and except for diversions for replenishment.

(d) Natural Precipitation - Precipitation which falls naturally in the Santa Ana River watershed.

(e) Imported Water - Water brought into the Santa Ana River watershed from sources of origin outside such watershed.

1 (f) Replenishment - Artificial recharge of the
2 ground water body achieved through the spreading or retention of
3 water for the purpose of causing it to percolate and join the
4 underlying ground water body, or injection of water into the
5 ground water resources by means of wells; provided that as used
6 with reference to any obligation of Western to replenish the
7 Riverside Basin Area in Riverside County, the term replenishment
8 shall include any water caused to be delivered by Western for
9 which credit is received by San Bernardino Valley against its
10 obligation under the Orange County Judgment to provide base
11 flow at Riverside Narrows.

12 (g) Safe Yield - Safe yield is that maximum
13 average annual amount of water that could be extracted from the
14 surface and subsurface water resources of an area over a period
15 of time sufficiently long to represent or approximate long-time
16 mean climatological conditions, with a given areal pattern of
17 extractions, under a particular set of physical conditions or
18 structures as such affect the net recharge to the ground water
19 body, and with a given amount of usable underground storage
20 capacity, without resulting in long-term, progressive lowering
21 of ground water levels or other undesirable result. In
22 determining the operational criteria to avoid such adverse
23 results, consideration shall be given to maintenance of adequate
24 ground water quality, subsurface outflow, costs of pumping,
25 and other relevant factors.

26 The amount of safe yield is dependent in part upon
27 the amount of water which can be stored in and used from the
28 ground water reservoir over a period of normal water supply
29 under a given set of conditions. Safe yield is thus related to
30 factors which influence or control ground water recharge, and
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1 to the amount of storage space available to carry over recharge
2 occurring in years of above average supply to years of
3 deficient supply. Recharge, in turn, depends on the available
4 surface water supply and the factors influencing the
5 percolation of that supply to the water table.

6 Safe yield shall be determined in part through the
7 evaluation of the average net groundwater recharge which would
8 occur if the culture of the safe yield year had existed over
9 a period of normal native supply.

10 (h) Natural Safe Yield - That portion of the safe
11 yield of the San Bernardino Basin Area which could be derived
12 solely from natural precipitation in the absence of imported
13 water and the return flows therefrom, and without
14 contributions from new conservation. If in the future any
15 natural runoff tributary to the San Bernardino Basin Area is
16 diverted away from that Basin Area so that it is not included
17 in the calculation of natural safe yield, any replacement made
18 thereof by San Bernardino Valley or entities within it from
19 imported water shall be included in such calculation.

20 (i) New Conservation - Any increase in
21 replenishment from natural precipitation which results from
22 operation of works and facilities not now in existence, other
23 than those works installed and operations which may be
24 initiated to offset losses caused by increased flood control
25 channelization.

26 (j) Year - A calendar year from January 1 through
27 December 31. The term "annual" shall refer to the same period
28 of time.

29 (k) Orange County Judgment - The final judgment
30 in Orange County Water District v. City of Chino, et al.,
31 Orange County Superior Court No. 117628, as it may from time to
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1 time be modified.

2 (l) Return Flow - That portion of the water
3 applied for use in any particular ground water basin which
4 subsequently reaches the ground water body in that basin.

5 (m) Five Year Period - a period of five consecutive
6 years.

7 V

8 EXTRactions FROM THE SAN BERNARDINO BASIN AREA

9
10 (a) For Use by Plaintiffs. The average annual
11 extractions from the San Bernardino Basin Area delivered for
12 use in each service area by each Plaintiff for the five year
13 period ending with 1963 are hereby determined to be as set forth
14 in Table B-1 of Appendix "B". The amount for each such
15 Plaintiff delivered for use in each service area as set forth
16 in Table B-1 shall be designated, for purposes of this Judgment,
17 as its "base right" for such service area.

18 (b) For Use by Others. The total actual average
19 annual extractions from the San Bernardino Basin Area by
20 entities other than Plaintiffs for use within San Bernardino
21 County for the five year period ending with 1963 are assumed
22 to be 165,407 acre feet; the correct figure shall be
23 determined by the Watermaster as herein provided.

24

25 VI

26 SAN BERNARDINO BASIN AREA RIGHTS AND REPLENISHMENT

27

28 (a) Determination of Natural Safe Yield. The
29 natural safe yield of the San Bernardino Basin Area shall be
30 computed by the Watermaster, reported to and determined
31 initially by supplemental order of this Court, and thereafter

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1 shall be subject to the continuing jurisdiction thereof.

2 (b) Annual Adjusted Rights of Plaintiffs.

3 1. The annual "adjusted right" of each
4 Plaintiff to extract water from the San Bernardino
5 Basin Area for use in each service area designated
6 in Table B-1 shall be equal to the sum of the
7 following:

8 (a) its base right for such service area, until
9 the natural safe yield of the San Bernardino Basin
10 Area is determined, and thereafter its percentage
11 of such natural safe yield determined by the
12 methods used in Table B-2; and (b) an equal
13 percentage for each service area of any new
14 conservation, provided the conditions of the
15 subparagraph 2 below have been met.

16 2. In order that the annual adjusted
17 right of each such Plaintiff shall include its
18 same respective percentage of any new conservation,
19 such Plaintiff shall pay its proportionate share
20 of the costs thereof. Each Plaintiff shall have
21 the right to participate in new conservation projects,
22 under procedures to be determined by the Watermaster
23 for notice to Plaintiffs of the planned construction
24 of such projects. With respect to any new
25 conservation brought about by Federal installations,
26 the term "costs" as used herein shall refer to any
27 local share required to be paid in connection with
28 such project. Each Plaintiff shall make its
29 payment at times satisfactory to the constructing
30 agency, and new conservation shall be credited to
31 any participating Plaintiff as such conservation is
32 effected.

1 3. In any five year period, each
2 Plaintiff shall have the right to extract from the
3 San Bernardino Basin Area for use in each service
4 area designated in Table B-1 an amount of water
5 equal to five times its adjusted right for such
6 service area; provided, however, that extractions by
7 each Plaintiff in any year in any service area shall
8 not exceed such Plaintiff's adjusted right for that
9 service area by more than 30 percent.

10 4. If the natural safe yield of the
11 San Bernardino Basin Area has not been determined by
12 January 1, 1972, the initial determination thereof
13 shall be retroactive to that date and the rights
14 of the Plaintiffs, and the replenishment
15 obligation of San Bernardino Valley as hereinafter
16 set forth, shall be adjusted as of such date. Any
17 excess extractions by Plaintiffs shall be charged
18 against their respective adjusted rights over the
19 next five year period, or in the alternative,
20 Plaintiffs may pay to San Bernardino Valley the
21 full cost of any replenishment which it has pro-
22 vided as replenishment for such excess extractions.
23 Any obligation upon San Bernardino Valley to pro-
24 vide additional replenishment, by virtue of such
25 retroactive determination of natural safe yield,
26 may also be discharged over such next five year
27 period.

28 5. Plaintiffs and each of them and
29 their agents and assigns are enjoined from extracting
30 any more water from the San Bernardino Basin Area than
31 is permitted under this Judgment. Changes in place
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1 of use of any such water from one service area to
2 another shall not be made without the prior
3 approval of Court upon a finding of compliance
4 with Paragraph XV(b) of this Judgment. So long
5 as San Bernardino Valley is in compliance with all
6 its obligations hereunder, and Plaintiffs are
7 allowed to extract the water provided for in this
8 Judgment, Plaintiffs are further enjoined from
9 bringing any action to limit the water extracted
10 from the San Bernardino Basin Area for use within
11 San Bernardino Valley.

12 6. Nothing in this Judgment shall
13 prevent future agreements between San Bernardino
14 Valley and Western under which additional
15 extractions may be made from the San Bernardino Basin
16 Area, subject to the availability of imported water
17 not required by San Bernardino Valley, and subject
18 to payment satisfactory to San Bernardino Valley
19 for replenishment required to compensate for such
20 additional extractions.

21
22 (c) San Bernardino Valley Replenishment. San
23 Bernardino Valley shall provide imported water for
24 replenishment of the San Bernardino Basin Area at least equal
25 to the amount by which extractions therefrom for use within
26 San Bernardino County exceed during any five year period the
27 sum of: (a) five times the total average annual extractions
28 determined under Paragraph V(b) hereof, adjusted as may be
29 required by the natural safe yield of the San Bernardino Basin
30 Area; and (b) any new conservation to which users within San
31 Bernardino Valley are entitled. Such replenishment shall be

1 supplied in the year following any five year period; provided
2 that during the first five year period, San Bernardino Valley
3 shall supply annual amounts on account of its obligations
4 hereunder, and such amounts shall be not less than fifty
5 percent of the gross amount of excess extractions in the
6 previous year.

7 1. Against its replenishment obligation
8 over any five year period San Bernardino Valley shall
9 receive credit for that portion of such excess
10 extractions that returns to the ground water of the
11 San Bernardino Basin Area.

12 2. San Bernardino Valley shall also
13 receive credit against any future replenishment
14 obligations for all replenishment which it provides
15 in excess of that required herein, and for any
16 amounts which may be extracted without replenishment
17 obligation, which in fact are not extracted.

18 (d) In this subparagraph (d), "person" and "entity"
19 mean only those persons and entities, and their successors
20 in interest, which have stipulated with the parties to this
21 Judgment within six months after its entry to accept this
22 Judgment.

23 San Bernardino Valley agrees that the base rights of
24 persons or entities other than Plaintiffs to extract water
25 from the San Bernardino Basin Area for use within San
26 Bernardino Valley will be determined by the average annual
27 quantity extracted by such person or entity during the five
28 year period ending with 1963. After the natural safe yield
29 of the San Bernardino Basin Area is determined hereunder, such
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1 base rights will be adjusted to such natural safe yield; the
2 adjusted right of each such person or entity shall be that
3 percentage of natural safe yield as determined hereunder from
4 time to time which the unadjusted right of such person or
5 entity is of the amount determined under Paragraph V(b).

6 San Bernardino Valley further agrees that in the
7 event the right to extract water of any of such persons or
8 entities in the San Bernardino Basin Area is adjudicated and
9 legal restrictions placed on such extractions which prevent
10 extracting of water by said persons or entities in an amount
11 equal to their base rights, or after natural safe yield is
12 determined, their adjusted rights, San Bernardino Valley will
13 furnish to such persons or entities or recharge the ground
14 water resources in the area of extraction for their benefit
15 with imported water, without direct charge to such persons or
16 entities therefor, so that the base rights, or adjusted
17 rights, as the case may be, may be taken by the person or
18 entity.

19 Under the provisions hereof relating to furnishing
20 of such water by San Bernardino Valley, such persons or
21 entities shall be entitled to extract in addition to their
22 base rights or adjusted rights any quantities of water spread
23 for repumping in their area of extractions, which has been
24 delivered to them by a mutual water company under base rights
25 or adjusted base rights included by the Watermaster under the
26 provisions of Paragraph V (b) hereof. Extractions must be
27 made within three years of spreading to so qualify.
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VII

WATER DISCHARGED ACROSS THE BUNKER HILL DIKE

San Bernardino Valley shall keep in force an agreement with the City of San Bernardino that the present annual quantity of municipal sewage effluent discharged across Bunker Hill Dike, assumed for all purposes herein to be 16,000 acre feet annually, shall be committed to the discharge of the downstream obligations imposed on San Bernardino Valley under this Judgment or under the Orange County Judgment, and that such effluent shall comply with the requirements of the Santa Ana River Basin Regional Water Quality Control Board in effect December 31, 1968.

VIII

EXTRACTIONS FROM COLTON BASIN AREA AND RIVERSIDE BASIN AREA IN SAN BERNARDINO COUNTY.

(a) The average annual extractions from the Colton Basin Area and that portion of the Riverside Basin Area within San Bernardino County, for use outside San Bernardino Valley, for the five year period ending with 1963 are assumed to be 3,349 acre feet and 20,191 acre feet, respectively; the correct figures shall be determined by the Watermaster as herein provided.

(b) Over any five year period, there may be extracted from each such Basin Area for use outside San Bernardino Valley, without replenishment obligation, an amount equal to five times such annual average for the Basin Area; provided, however, that if extractions in any year exceed such average by more than 20 percent, Western shall provide replenishment in the following year equal to the excess

1 extractions over such 20 percent peaking allowance.

2 (c). To the extent that extractions from each such
3 Basin Area for use outside San Bernardino Valley exceed the
4 amounts specified in the next preceding Paragraph (b), Western
5 shall provide replenishment. Except for any extractions in
6 excess of the 20 percent peaking allowance, such replenishment
7 shall be supplied in the year following any five year period,
8 and shall not be from reclaimed water produced within San
9 Bernardino Valley. Such replenishment shall also be of a
10 quality at least equal to the water extracted from the Basin
11 Area being recharged; provided, that water from the State Water
12 Project shall be deemed to be of acceptable quality.

13 Replenishment shall be supplied to the Basin Area from which
14 any excess extractions have occurred and in the vicinity of
15 the place of the excess extractions to the extent required to
16 preclude influence on the water level in the three wells below
17 designated; provided that discharge of imported water into the
18 Santa Ana River or Warm Creek from a connection on the State
19 Aqueduct near the confluence thereof, if released in accordance
20 with a schedule approved by the Watermaster to achieve
21 compliance with the objectives of this Judgment, shall satisfy
22 any obligation of Western to provide replenishment in the Colton
23 Basin Area, or that portion of the Riverside Basin Area in San
24 Bernardino County, or the Riverside Basin Area in Riverside
25 County.

26 (d) Extractions from the Colton Basin Area and that
27 portion of the Riverside Basin Area within San Bernardino County,
28 for use within San Bernardino Valley, shall not be limited.
29 However, except for any required replenishment by Western,
30 San Bernardino Valley shall provide the water to maintain the
31 static water levels in the area, as determined by wells numbered
32

1 1S 4W 21 Q3, 1S 4W 29 H1, and 1S 4W 29 Q1 at an average level
2 no lower than that which existed in the Fall season of 1963.
3 Such 1963 average water level is hereby determined to be 822.04
4 feet above sea level. In future years, the level shall be
5 computed by averaging the lowest static water levels in each
6 of the three wells occurring at or about the same time of the
7 year, provided that no measurements will be used which reflect
8 the undue influence of pumping in nearby wells, or in the
9 three wells, or pumping from the Riverside Basin in Riverside
10 County in excess of that determined pursuant to Paragraph IX(a)
11 hereof.

12 (e) Extractions by Plaintiffs from the Colton Basin
13 Area and the portion of the Riverside Basin Area in San
14 Bernardino County may be transferred to the San Bernardino
15 Basin Area if the level specified in Paragraph (d) above is
16 not maintained, but only to the extent necessary to restore
17 such 1963 average water level, provided that Western is not
18 in default in any of its replenishment obligations. San
19 Bernardino Valley shall be required to replenish the San
20 Bernardino Basin Area in an amount equal to any extractions so
21 transferred. San Bernardino Valley shall be relieved of
22 responsibility toward the maintenance of such 1963 average water
23 level to the extent that Plaintiffs have physical facilities
24 available to accommodate such transfers of extractions, and
25 insofar as such transfers can be legally accomplished.

26 (f) The Colton Basin Area and the portion of the
27 Riverside Basin Area in San Bernardino County constitute a major
28 source of water supply for lands and inhabitants in both San
29 Bernardino Valley and Western, and the parties hereto have a
30 mutual interest in the maintenance of water quality in these
31 Basin Areas and in the preservation of such supply. If
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1 the water quality in such Areas, as monitored by the City of
2 Riverside wells along the river, falls below the Objectives set
3 therefor by the Santa Ana River Basin Regional Water Quality
4 Control Board, the Court shall have jurisdiction to modify the
5 obligations of San Bernardino Valley to include, in addition
6 to its obligation to maintain the average 1963 water level,
7 reasonable provisions for the maintenance of such water quality.

8 (g) The primary objectives of Paragraph VIII and
9 related provisions are to allow maximum flexibility to San
10 Bernardino Valley in the operation of a coordinated
11 replenishment and management program, both above and below
12 Bunker Hill Dike; to protect San Bernardino Valley against
13 increased extractions in the area between Bunker Hill Dike and
14 Riverside Narrows, which without adequate provision for
15 replenishment might adversely affect base flow at Riverside
16 Narrows, for which it is responsible under the Orange County
17 Judgment; and to protect the area as a major source of ground
18 water supply available to satisfy the historic extractions
19 therefrom for use within Western, without regard to the method
20 of operation which may be adopted by San Bernardino Valley for
21 the San Bernardino Basin Area, and without regard to the effect
22 of such operation upon the historic supply to the area below
23 Bunker Hill Dike.

24 If these provisions should prove either inequitable or
25 unworkable, the Court upon the application of any party hereto
26 shall retain jurisdiction to modify this Judgment so as to
27 regulate the area between Bunker Hill Dike and Riverside Narrows
28 on a safe yield basis; provided that under such method of
29 operation, (1) base rights shall be determined on the basis of
30 total average annual extractions for use within San Bernardino
31 Valley and Western, respectively, for the five year period ending

1 with 1963; (2) such base rights for use in both Districts shall
2 be subject to whatever adjustment may be required by the safe
3 yield of the area, and in the aggregate shall not be exceeded
4 unless replenishment therefor is provided; (3) in calculating
5 safe yield, the outflow from the area at Riverside Narrows shall
6 be determined insofar as practical by the base flow obligations
7 imposed on San Bernardino Valley under the Orange County
8 Judgment; and (4) San Bernardino Valley shall be required to
9 provide replenishment for any deficiency between the actual
10 outflow and the outflow obligation across Bunker Hill Dike as
11 established by safe yield analysis using the base period of
12 1934 through 1960.

13
14 IX

15 EXTRactions FROM THE PORTION OF RIVERSIDE BASIN AREA
16 IN RIVERSIDE COUNTY WHICH IS TRIBUTARY TO RIVERSIDE NARROWS.

17 (a) The average annual extractions from the portion
18 of the Riverside Basin Area in Riverside County which is
19 tributary to Riverside Narrows, for use in Riverside County,
20 for the five year period ending with 1963 are assumed to be
21 30,044 acre feet; the correct figures shall be determined by
22 the Watermaster as herein provided.

23 (b) Over any five year period, there may be
24 extracted from such Basin Area, without replenishment
25 obligation, an amount equal to five times such annual average
26 for the Basin Area; provided, however, that if extractions in
27 any year exceed such average by more than 20 percent, Western
28 shall provide replenishment in the following year equal to the
29 excess extractions over such 20 percent peaking allowance.

30 (c) To the extent that extractions from such Basin
31 Area exceed the amounts specified in the next preceding
32

1 Paragraph (b), Western shall provide replenishment. Except
2 for any extractions in excess of the 20 percent peaking
3 allowance, such replenishment shall be supplied in the year
4 following any five year period, and shall be provided at or
5 above Riverside Narrows.

6 (d) Western shall also provide such replenishment
7 to offset any reduction in return flow now contributing to the
8 base flow at Riverside Narrows, which reduction in return
9 flow results from the conversion of agricultural uses of water
10 within Western to domestic or other uses connected to sewage
11 or waste disposal systems, the effluent from which is not
12 tributary to the rising water at Riverside Narrows.

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14 X

15 REPLENISHMENT TO OFFSET NEW EXPORTS OF WATER TO AREAS
16 NOT TRIBUTARY TO RIVERSIDE NARROWS.

17 Certain average annual amounts of water extracted
18 from the San Bernardino Basin Area and the area downstream
19 therefrom to Riverside Narrows during the five year period
20 ending in 1963 have been exported for use outside of the area
21 tributary to Riverside Narrows and are assumed to be 50,667
22 acre feet annually as set forth in Table C-1 of Appendix "C";
23 the correct amount shall be determined by the Watermaster as
24 herein provided. Western shall be obligated to provide
25 replenishment at or above Riverside Narrows for any increase
26 over such exports by Western or entities within it from such
27 areas for use within areas not tributary to Riverside Narrows.
28 San Bernardino Valley shall be obligated to provide
29 replenishment for any increase over the exports from San
30 Bernardino Valley for use in any area not within Western nor
31 tributary to Riverside Narrows as set forth in Table C-2 of
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1 Appendix. "C", such amounts being subject to correction by the
2 Watermaster, or for any exports from the San Bernardino Basin
3 Area for use in the Yucaipa, San Timoteo, Oak Glen and
4 Beaumont Basins.

5 XI

6 REPLENISHMENT CREDITS AND ADJUSTMENT FOR QUALITY

7
8 (a) All replenishment provided by Western under
9 Paragraph IX and all credits received against such
10 replenishment obligation shall be subject to the same adjustments
11 for water quality applicable to base flow at Riverside Narrows,
12 as set forth in the Orange County Judgment.

13 (b) Western shall receive credit against its
14 replenishment obligations incurred under this Judgment for the
15 following:

16 1. As against its replenishment obligation
17 under Paragraph VIII, any return flow to the Colton
18 Basin Area or the portion of the Riverside Basin Area
19 within San Bernardino County, respectively, resulting
20 from any excess extractions therefrom; and as
21 against its replenishment obligation under Paragraph
22 IX, any return flow to the portion of the Riverside
23 Basin Area in Riverside County, which contributes
24 to the base flow at Riverside Narrows, resulting
25 from any excess extractions therefrom, or from the
26 Riverside Basin Area in San Bernardino County, or
27 from the Colton Basin Area.

28 2. Subject to adjustment under
29 Paragraph (a) hereof, any increase over the present
30 amounts of sewage effluent discharged from
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treatment plants within Riverside County which are tributary to Riverside Narrows, and which results from the use of imported water.

3. Any replenishment which may be provided in excess of that required; any amounts which hereunder are allowed to be extracted from the Colton and Riverside Basin Areas without replenishment obligation by Western, and which in fact are not extracted; any storm flows conserved between Bunker Hill Dike and Riverside Narrows by works financed solely by Western, or entities within it, which would not otherwise contribute to base flow at Riverside Narrows; and any return flow from imported water used in Riverside County which contributes to base flow at Riverside Narrows; provided, however, that such use of the underground storage capacity in each of the above situations does not adversely affect San Bernardino Valley in the discharge of its obligations at Riverside Narrows under the Orange County Judgment, nor interfere with the accomplishment by San Bernardino Valley of the primary objectives of Paragraph VIII, as stated in Subdivision (g).

(c) The replenishment obligations of Western under this Judgment shall not apply during such times as amounts of base flow at Riverside Narrows and the amounts of water stored in the ground water resources below Bunker Hill Dike and tributary to the maintenance of such flow are found by Order of the Court to be sufficient to satisfy any obligation which San Bernardino Valley may have under this Judgment, or under the

1 Orange County Judgment, and if the Court further finds by Order
2 that during such times any such increase in pumping, changes
3 in use or exports would not adversely affect San Bernardino
4 Valley in the future.

5 (d) The replenishment obligations of San Bernardino
6 Valley under Paragraph X of this Judgment for increase in
7 exports from the Colton and Riverside Basin Areas within San
8 Bernardino Valley below the Bunker Hill Dike shall not apply
9 during such times as the amounts of water in the ground water
10 resources of such area are found by Order of the Court to be
11 sufficient to satisfy the obligations which San Bernardino
12 Valley may have to Plaintiffs under this Judgment, and if the
13 Court further finds by Order that during such times any such
14 increases in exports would not adversely affect Plaintiffs in
15 the future.

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17 XII

18 CONVEYANCE OF WATER BY SAN BERNARDINO VALLEY
19 TO RIVERSIDE NARROWS.

20 If San Bernardino Valley determines that it will
21 convey reclaimed sewage effluent, or other water, to or near
22 Riverside Narrows, to meet its obligations under this or the
23 Orange County Judgment, the City of Riverside shall make
24 available to San Bernardino Valley for that purpose any unused
25 capacity in the former Riverside Water Company canal, and the
26 Washington and Monroe Street storm drains, without cost except
27 for any alterations or capital improvements which may be
28 required, or any additional maintenance and operation costs which
29 may result. The use of those facilities shall be subject to the
30 requirements of the Santa Ana River Basin Regional Water Quality
31 Control Board and of the State Health Department, and compliance
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1 therewith shall be San Bernardino Valley's responsibility.
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3 XIII

4 WATERMASTER

5 (a) This Judgment and the instructions and
6 subsequent orders of this Court shall be administered and
7 enforced by a Watermaster. The parties hereto shall make such
8 measurements and furnish such information as the Watermaster
9 may reasonably require, and the Watermaster may verify such
10 measurements and information and obtain additional measurements
11 and information as the Watermaster may deem appropriate.

12 (b) The Watermaster shall consist of a committee
13 of two persons. San Bernardino Valley and Western shall each
14 have the right to nominate one of such persons. Each such
15 nomination shall be made in writing, served upon the other
16 parties to this Judgment, and filed in Court. Such person shall
17 be appointed by and serve at the pleasure of and until further
18 order of this Court. If either Western or San Bernardino Valley
19 shall at any time nominate a substitute appointee in place of
20 the last appointee to represent it, such appointee shall be
21 appointed by the Court in place of such last appointee.

22 (c) Appendix "D" to this Judgment contains some of
23 the data which have been used in preparation of this Judgment,
24 and shall be utilized by the Watermaster in connection with
25 any questions of interpretation.

26 (d) Each and every finding and determination of the
27 Watermaster shall be made in writing certified to be by
28 unanimous action of both members of the Watermaster committee.
29 In the event of failure or inability of such Watermaster
30 Committee to reach agreement, the Watermaster committee may
31 determine to submit the dispute to a third person to be selected
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1 by them, or if they are unable to agree on a selection, to be
2 selected by the Court, in which case the decision of the third
3 person shall be binding on the parties; otherwise the fact,
4 issue, or determination in question shall forthwith be
5 certified to this Court by the Watermaster, and after due notice
6 to the parties and opportunity for hearing, said matter shall
7 be determined by order of this Court, which may refer the
8 matter for prior recommendation to the State Water Resources
9 Control Board. Such order of the Court shall be a determination
10 by the Watermaster within the meaning of this Judgment.

11 (e) The Watermaster shall report to the Court and
12 to each party hereto in writing not more than seven (7) months
13 after the end of each year, or within such other time as the
14 Court may fix, on each determination made by it pursuant to this
15 Judgment, and such other items as the parties may mutually
16 request or the Watermaster may deem to be appropriate. All of
17 the books and records of the Watermaster which are used in the
18 preparation of, or are relevant to, such reported data,
19 determinations and reports shall be open to inspection by the
20 parties hereto. At the request of any party this Court will
21 establish a procedure for the filing and hearing of objections
22 to the Watermaster's report.

23 (f) The fees, compensation and expenses of each
24 person on the Watermaster shall be borne by the District which
25 nominated such person. All other Watermaster service costs and
26 expenses shall be borne by San Bernardino Valley and Western
27 equally.

28 (g) The Watermaster shall initially compute and
29 report to the Court the natural safe yield of the San Bernardino
30 Basin Area, said computation to be based upon the cultural
31

1 conditions equivalent to those existing during the five
2 calendar year period ending with 1963.

3 (h) The Watermaster shall as soon as practical
4 determine the correct figures for Paragraphs V(b), VI(b)1,
5 VIII(a), IX(a) and X, as the basis for an appropriate
6 supplemental order of this Court.

7
8 XIV

9 CONTINUING JURISDICTION OF THE COURT

10 (a) The Court hereby reserves continuing
11 jurisdiction of the subject matter and parties to this Judgment,
12 and upon application of any party, or upon its own motion, may
13 review and redetermine, among other things, the following
14 matters and any matters incident thereto:

15 1. The hydrologic condition of any one or
16 all of the separate basins described in this Judgment in order
17 to determine from time to time the safe yield of the San
18 Bernardino Basin Area.

19 2. The desirability of appointing a
20 different Watermaster or a permanent neutral member of the
21 Watermaster, or of changing or more clearly defining the duties
22 of the Watermaster.

23 3. The desirability of providing for increases
24 or decreases in the extraction of any particular party because
25 of emergency requirements or in order that such party may
26 secure its proportionate share of its rights as determined
27 herein.

28 4. The adjusted rights of the Plaintiffs as
29 required to comply with the provisions hereof with respect to
30 changes in the natural safe yield of the San Bernardino Basin
31

1 Area. If such changes occur, the Court shall adjudge that the
2 adjusted rights and replenishment obligations of each party
3 shall be changed proportionately to the respective base rights.

4 5. Conforming the obligations of San
5 Bernardino Valley under this Judgment to the terms of any new
6 judgment hereafter entered adjudicating the water rights within
7 San Bernardino Valley, if inconsistencies of the two judgments
8 impose hardship on San Bernardino Valley.

9 6. Adjusting the figures in Paragraphs V(b),
10 VI(b) 1, VIII(a) IX(a), and X, to conform to determination
11 by the Watermaster.

12 7. Credit allowed for return flow in the San
13 Bernardino Basin Area if water levels therein drop to the point
14 of causing undue hardship upon any party.

15 8. Other matters not herein specifically set
16 forth which might occur in the future and which would be
17 of benefit to the parties in the utilization of the surface and
18 ground water supply described in this Judgment, and not
19 inconsistent with the respective rights of the parties as herein
20 established and determined.

21 (b) Any party may apply to the Court under its
22 continuing jurisdiction for any appropriate modification of
23 this Judgment if its presently available sources of imported
24 water are exhausted and it is unable to obtain additional
25 supplies of imported water at a reasonable cost, or if there is
26 any substantial delay in the delivery of imported water through
27 the State Water Project.

SAVING CLAUSES

1
2
3
4 (a) Nothing in this Judgment precludes San
5 Bernardino Valley, Western, or any other party from exercising
6 such rights as it may have or obtain under law to spread, store
7 underground and recapture imported water, provided that any
8 such use of the underground storage capacity of the San
9 Bernardino Basin Area by Western or any entity within it shall
10 not interfere with any replenishment program of the Basin Area.

11 (b) Changes in the place and kind of water use,
12 and in the transfer of rights to the use of water, may be made
13 in the absence of injury to others or prejudice to the
14 obligations of either San Bernardino Valley or Western under
15 Judgment or the Orange County Judgment.

16 (c) If any Plaintiff shall desire to transfer all or
17 any of its water rights to extract water within San Bernardino
18 Valley to a person, firm, or corporation, public or private,
19 who or which is not then bound by this Judgment, such Plaintiff
20 shall as a condition to being discharged as hereinafter pro-
21 vided cause such transferee to appear in this action and file
22 a valid and effective express assumption of the obligations
23 imposed upon such Plaintiff under this Judgment as to such
24 transferred water rights. Such appearance and assumption of
25 obligation shall include the filing of a designation of the
26 address to which shall be mailed all notices, requests,
27 objections, reports and other papers permitted or required by
28 the terms of this Judgment.

29 If any Plaintiff shall have transferred all of its
30 said water rights and each transferee not theretofore bound by
31 this Judgment as a Plaintiff shall have appeared in this action
32

1 and filed a valid and effective express assumption of the
2 obligations imposed upon such Plaintiff under this Judgment as
3 to such transferred water rights, such transferring Plaintiff
4 shall thereupon be discharged from all obligations hereunder.
5 If any Plaintiff shall cease to own any rights in and to the water
6 supply declared herein and shall have caused the appearance and
7 assumption provided for in the third preceding sentence with
8 respect to each voluntary transfer, then upon application to
9 this Court and after notice and hearing such Plaintiff shall
10 thereupon be relieved and discharged from all further
11 obligations hereunder. Any such discharge of any Plaintiff
12 hereunder shall not impair the aggregate rights of defendant
13 San Bernardino Valley or the responsibility hereunder of the
14 remaining Plaintiffs or any of the successors.

15 (d) Non-use of any right to take water as provided
16 herein shall not result in any loss of the right. San
17 Bernardino Valley does not guarantee any of the rights set out
18 herein for Western and the other Plaintiffs as against the
19 claims of third parties not bound hereby. If Western or the
20 other Plaintiffs herein should be prevented by acts of third
21 parties within San Bernardino County from extracting the
22 amounts of water allowed them by this Judgment, they shall have
23 the right to apply to this Court for any appropriate relief,
24 including vacation of this Judgment, in which latter case all
25 parties shall be restored to their status prior to this
26 Judgment insofar as possible.

27 (e) Any replenishment obligation imposed hereunder
28 on San Bernardino Valley may be deferred until imported water
29 first is available to San Bernardino Valley under its contract
30 with the California Department of Water Resources and the
31

1 obligation so accumulated may be discharged in five
2 approximately equal annual installments thereafter.

3 (f) No agreement has been reached concerning the
4 method by which the cost of providing replenishment will be
5 financed, and no provision of this Judgment, nor its failure
6 to contain any provision, shall be construed to reflect any
7 agreement relating to the taxation or assessment of extractions.

8

9

XVI

10

EFFECTIVE DATE

11

12

13

14

The provisions of Paragraphs III and V to XII of this
Judgment shall be in effect from and after January 1, 1971;
the remaining provisions are in effect immediately.

15

16

XVII

17

COSTS

18

19

No party shall recover its costs herein as against
any other party.

20

21

THE CLERK WILL ENTER THIS JUDGMENT FORTHWITH.

22

DATED: *April 17, 1969*

23

24

25

ENTERED

John P. McManis
JUDGE OF THE SUPERIOR COURT

26

APR 17 1969

27

28

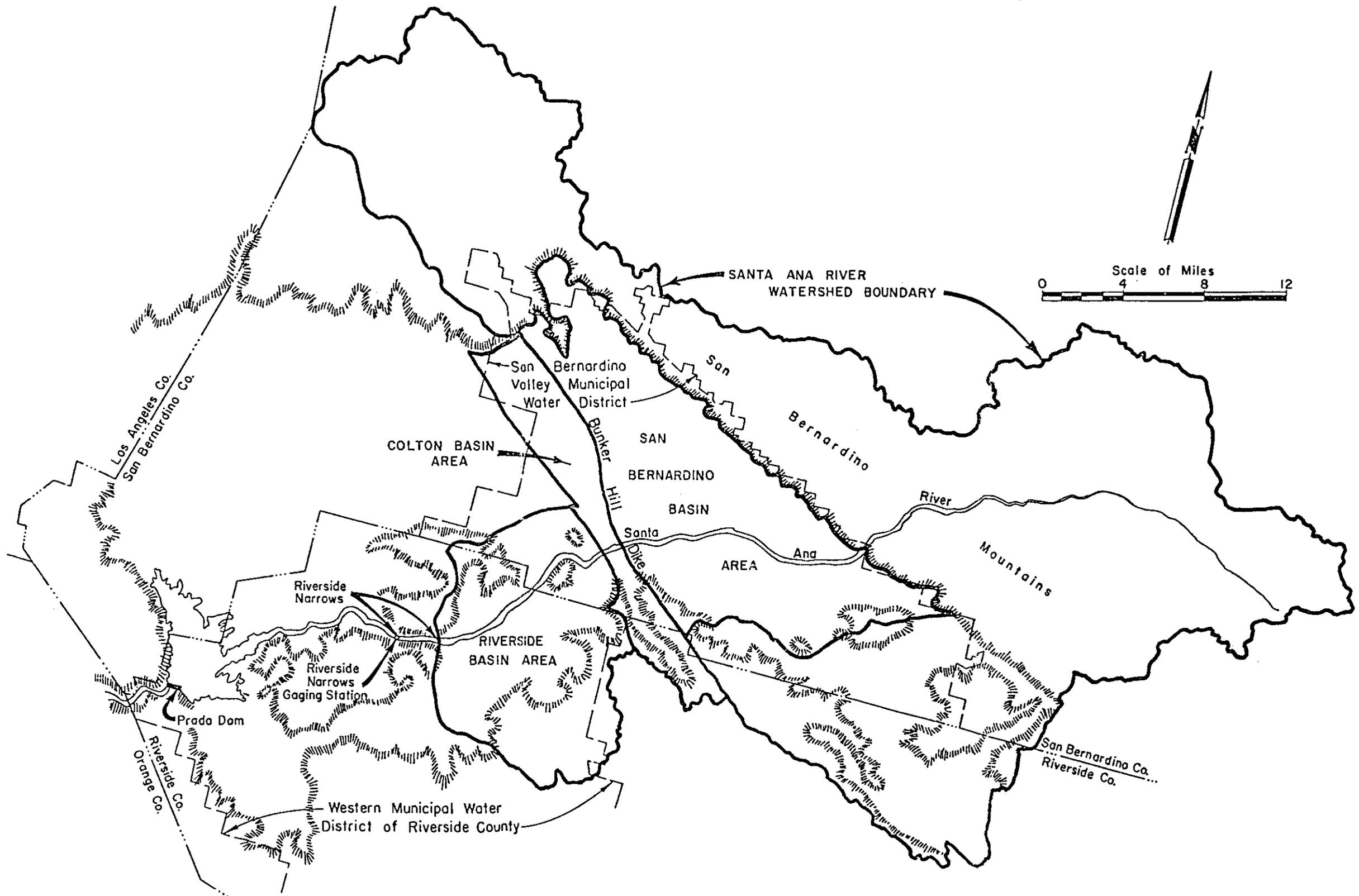
JUDGMENT BOOK *124* PG *42*

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MAP SHOWING
 SAN BERNARDINO BASIN AREA, COLTON BASIN AREA, AND
 RIVERSIDE BASIN AREA SITUATED WITHIN SAN BERNARDINO
 COUNTY; RIVERSIDE BASIN AREA WITHIN RIVERSIDE COUNTY;
 BUNKER HILL DIKE; RIVERSIDE NARROWS; AND BOUNDARIES OF
 SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT & WESTERN
 MUNICIPAL WATER DISTRICT OF RIVERSIDE COUNTY. 09/16/2005

APPENDIX B
TABLE B-1

EXTRACTIONS BY PLAINTIFFS FROM THE SAN BERNARDINO BASIN AREA FOR AVERAGE OF 5-YEAR PERIOD ENDING WITH 1963

(All Values in Acre Feet)
Classified According to Service Area

| <u>Plaintiff</u> | <u>Total Extractions in San Bernardino Basin Area</u> | <u>Delivery to San Bernardino Basin Area</u> | <u>Delivery to Colton Basin Area & Riverside Basin Area in San Bernardino County</u> | <u>Delivery to Areas Outside San Bernardino Valley</u> |
|---|---|--|--|--|
| City of Riverside (including those rights acquired as successor to the Riverside Water Company and The Gage Canal Company) | 53,448 | 1462 | 1260 | 50,726 |
| Riverside High-Land Water Company | 4,399 | 0 | 2509 | 1,890 |
| Agua Mansa Water Company, and Meeks & Daley Water Company | 8,026 | 0 | 326 | 7,700 |
| The Regents of the University of California | 581 | 0 | 0 | 581 |
| Total | 66,454 | 1,462 | 4,095 | 60,897 |

APPENDIX B
TABLE B-2

PLAINTIFFS' PERCENTAGES OF BASE RIGHT
TO TOTAL PRODUCTION FROM SAN BERNARDINO
VALLEY BASIN AREA,

231,861 Acre Feet Annually,
For 5-Year Average Ending With 1963
Classified According to Service Area

| <u>Plaintiff</u> | <u>Delivery to San Bernardino Basin Area</u> | <u>Delivery to Colton Basin Area & Riverside Basin Area in San Bernardino County</u> | <u>Delivery to Areas Outside San Bernardino Valley</u> |
|--|--|--|--|
| City of Riverside (including those rights acquired as successor to the Riverside Water Company and The Gage Canal Company) | .630 | .543 | 21,878 |
| Riverside Highland Water Company | | 1.082 | 0.815 |
| Aqua Mansa Water Company, and Meeks & Daley Water Company | | .141 | 3.321 |
| The Regents of the University of California | | | 0.250 |
| <u>Total</u> | <u>1.630</u> | <u>1.766</u> | <u>26.264</u> |

APPENDIX C
TABLE C-1

EXTRACTIONS FOR USE WITHIN WESTERN
FROM
THE SAN BERNARDINO BASIN AREA, COLTON BASIN AREA,
AND THE RIVERSIDE BASIN AREA
FOR USE ON LANDS THAT ARE NOT TRIBUTARY
TO THE RIVERSIDE NARROWS FOR
AVERAGE OF FIVE-YEAR PERIOD ENDING IN 1963

| <u>Extractor</u> | <u>Five-Year</u> <u>Average</u> <u>Ac. Ft.</u> |
|---|--|
| City of Riverside, including Irrigation Division water extracted by Gage Canal Co. and former Riverside Water Co. | 30,657 |
| Meeks & Daley Water Co., Agua Mansa Water Co., and Temescal Water Co., including water received from City of Riverside | 13,731 |
| Extractions delivered by West Riverside Canal received from Twin Buttes Water Co., La Sierra Water Co., Agua Mansa Water Co., Salazar Water Co., West Riverside 350" Water Co., and Jurupa Water Co. | 5,712 |
| Rubidoux Community Services District | 531 |
| Jurupa Hills Water Co. | <u>36</u> |
| <u>TOTAL</u> | 50,667 |

APPENDIX C
TABLE C-2

EXTRactions FOR USE WITHIN SAN BERNARDINO COUNTY
FROM
SAN BERNARDINO BASIN AREA AND COLTON BASIN AREA
FOR USE ON LANDS NOT TRIBUTARY TO
RIVERSIDE WATERS FOR AVERAGE OF
FIVE-YEAR PERIOD ENDING WITH 1983

(ALL VALUES IN ACRE FEET)

| <u>Entity</u> | <u>San Bernardino Basin Area</u> | <u>Colton Basin Area</u> | <u>Total</u> |
|--|--------------------------------------|----------------------------------|--------------|
| Fontana Union Water Co. | 14,272 | 365 | 14,637 |
| West San Bernardino County Water District | 2,961 | 947 | 3,908 |
| City of Rialto | | | 700 |
| <u>TOTAL</u> | | | 19,245 |

APPENDIX D
TABLE D-1

EXTRACTIONS FROM SAN BERNARDINO BASIN AREA
FOR THE AVERAGE OF FIVE-YEAR PERIOD ENDING WITH 1963
FOR USE WITHIN SAN BERNARDINO COUNTY

(ALL VALUES IN ACRE FEET)

| <u>Basin</u> | <u>Five Year Avg.</u> <u>1959-63</u> |
|--|---|
| Beaumont | 10,064 |
| Big Bear | 1,171 |
| Borea Canyon | 91 |
| Bunker Hill | 181,600 |
| City Creek | 337 |
| Cook Canyon | 197 |
| Devil Canyon | 3,326 |
| Devil Creek | 42 |
| Lower Cajon | 2,090 |
| Little San Creek | 15 |
| Lytle | 29,364 |
| Mill Creek | 11,084 |
| Oak Glen | 935 |
| Plunge Creek | 1,265 |
| Santa Ana | 1,790 |
| Strawberry Creek | 291 |
| San Timoteo | 2,272 |
| Waterman Canyon | 367 |
| Yucaipa | <u>13,837</u> |
| Upper Basin Total | 260,139 |
| Less: Beaumont | |
| Oak Glen | |
| San Timoteo | 27,107 |
| Yucaipa | |
| Subtotal | <u>233,032</u> |
| Less Big Bear | <u>1,171</u> |
| Subtotal | 231,861 |
| Less extractions for use outside San Bernardino County | <u>60,897</u> |
| Extractions from San Bernardino for use in San Bernardino County | 170,964 |

APPENDIX D
TABLE D-2

EXTRACTIONS FROM
COLTON BASIN AREA FOR AVERAGE OF
FIVE-YEAR PERIOD ENDING WITH 1963
BY SAN BERNARDINO AND RIVERSIDE COUNTY ENTITIES
FOR USE WITHIN EACH COUNTY

(VALUES IN ACRE FEET)

| <u>Extractor</u> | <u>Place of Use</u> | | <u>Total</u> |
|-----------------------------------|---------------------------|----------------------|--------------|
| | <u>San Bernardino Co.</u> | <u>Riverside Co.</u> | |
| San Bernardino County Entities | 8,480 | 0 | 8,480 |
| Riverside County Entities | <u>147</u> | <u>3,349</u> | <u>3,496</u> |
| <u>TOTAL EXTRACTIONS</u> | 8,627 | 3,349 | 11,976 |

APPENDIX D
TABLE D-3

EXTRACTIONS FROM
RIVERSIDE BASIN AREA IN SAN BERNARDINO COUNTY
FOR AVERAGE FIVE-YEAR PERIOD ENDING WITH 1963
BY SAN BERNARDINO AND RIVERSIDE COUNTY ENTITIES
FOR USE WITHIN EACH COUNTY

(VALUES IN ACRE FEET)

| <u>Extractor</u> | <u>Place of Use</u> | | <u>Total</u> |
|-----------------------------------|---------------------------|----------------------|---------------|
| | <u>San Bernardino Co.</u> | <u>Riverside Co.</u> | |
| San Bernardino County Entities | 9,582 | 0 | 9,582 |
| Riverside County Entities | <u>3,929</u> | <u>20,191</u> | <u>24,120</u> |
| <u>TOTAL EXTRACTIONS</u> | 13,511 | 20,191 | 33,702 |

APPENDIX D
TABLE D-4

EXTRACTIONS FROM
SAN BERNARDINO BASIN AREA, COLTON BASIN AREA
AND RIVERSIDE BASIN AREA USED WITHIN
RIVERSIDE COUNTY FOR THE AVERAGE
FIVE-YEAR PERIOD ENDING WITH 1963

(ALL VALUES IN ACRE FEET)

| <u>Basin</u> | <u>Five-Year</u> <u>Average</u> |
|---|------------------------------------|
| San Bernardino Basin Area | 60,897 |
| Colton Basin Area | 3,349 |
| Riverside Basin Area in San Bernardino County | 20,191 |
| Riverside Basin Area in Riverside County | <u>30,044</u> |
| <u>TOTAL</u> | 114,481 |

APPENDIX D
TABLE D-5

IRRIGATED ACREAGE IN RIVERSIDE BASIN AREA
IN RIVERSIDE COUNTY PRESENTLY TRIBUTARY
TO RIVERSIDE NARROWS WHICH
UPON CONVERSION TO URBAN USES
REQUIRING SEWAGE DISPOSAL THROUGH
THE RIVERSIDE TREATMENT PLANT WILL
BE DISCHARGED TO THE RIVER BELOW
RIVERSIDE NARROWS

| <u>Entity Serving Acreage</u> | <u>Acres</u> |
|----------------------------------|--------------|
| Gage Canal | 1,752 |
| Alta Mesa Water Co. | 65 |
| East Riverside Water Co. | 926 |
| Riverside Highland Water Company | <u>1,173</u> |
| <u>TOTAL</u> | <u>3,916</u> |

Appendix H.1

Water Conservation Incentive Program History

All Programs in Western's General Service Area

| Year | Residential Programs | | | | High Efficiency Clothes Washers unit quantity | water savings(AF) | High Efficiency Clothes Washers water savings(AF) | Year |
|------|---|-------------------|--|-------------------|--|-------------------|--|------|
| | Ultra-Low-Flow Toilets unit quantity | water savings(AF) | High Efficiency Clothes Washers unit quantity | water savings(AF) | | | | |
| 1995 | - | - | - | - | - | - | - | 1995 |
| 1996 | 2359 | 82 | - | - | - | - | 82.4 | 1996 |
| 1997 | 2450 | 85.6 | - | - | - | - | 85.6 | 1997 |
| 1998 | 1780 | 62 | - | - | - | - | 62.2 | 1998 |
| 1999 | 1708 | 59.7 | - | - | - | - | 59.7 | 1999 |
| 2000 | 1384 | 48 | - | - | - | - | 48.4 | 2000 |
| 2001 | 1468 | 51.3 | - | - | - | - | 51.3 | 2001 |
| 2002 | 1914 | 66.9 | 204 | 3.3 | 3.3 | 3.3 | 70.1 | 2002 |
| 2003 | 2182 | 76.2 | 1346 | 21.5 | 21.5 | 21.5 | 97.8 | 2003 |
| 2004 | 1892 | 66.1 | 2317 | 37.1 | 37.1 | 37.1 | 103.2 | 2004 |

| Year | Total Incentive Dollars | | | | | | Average AF Cost of Water Saved (over the estimated life of device) ULFT (10years) | HECW (14 years) | Year |
|------|-------------------------|----------|--------------------|-----------|-----------------|----------|---|-----------------|------|
| | by Metropolitan | | Third Party Grants | | by Local Agency | | | | |
| | ULFT | HECW | ULFT | HECW | ULFT | HECW | ULFT | HECW | |
| 1995 | - | - | - | - | - | - | - | - | 1995 |
| 1996 | \$141,540 | - | - | - | \$141,540 | - | \$283,080 | - | 1996 |
| 1997 | \$147,000 | - | \$48,000 | - | \$70,650 | - | \$265,650 | - | 1997 |
| 1998 | \$106,800 | - | - | - | \$74,760 | - | \$181,560 | - | 1998 |
| 1999 | \$102,480 | - | - | - | \$69,738 | - | \$172,218 | - | 1999 |
| 2000 | \$83,040 | - | - | - | \$58,128 | - | \$141,168 | - | 2000 |
| 2001 | \$88,080 | - | - | - | \$42,252 | - | \$130,332 | - | 2001 |
| 2002 | \$114,840 | \$7,140 | - | \$15,300 | \$45,378 | \$10,545 | \$160,218 | \$32,985 | 2002 |
| 2003 | \$130,920 | \$47,110 | - | \$100,950 | \$44,466 | \$28,035 | \$175,386 | \$176,095 | 2003 |
| 2004 | \$113,520 | \$81,095 | - | \$173,775 | \$41,271 | \$38,490 | \$154,791 | \$293,360 | 2004 |

Appendix E

Imported Water Agreement Between RPU and WMWD



"People Serving
People"

CITY OF RIVERSIDE
INTEROFFICE MEMO

RECEIVED
AUG 04 2003
OFFICE OF THE CITY CLERK

TO: Colleen J. Nicol
City Clerk

DATE: August 4, 2003

FROM: Eileen M. Teichert
Supervising Deputy City Attorney

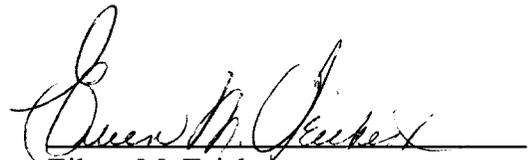
SUBJECT: OLD WATER AGREEMENTS; OUR FILE NO. CA 02-1923

Attached are "copies" of two agreements between the City of Riverside and Western Municipal Water District: 1) Agreement for Service Right in the Western Municipal Water District State Project Water Pipeline, dated 9/23/86; and 2) Single Project Administration Agreement dated 4/24/90. I understand that your office does not have either copies or originals of these agreements. Please create files for these and maintain them as these Agreements will be in effect for some time.

3-5-03
MP

Also, this is to request a search of City Council minutes around the dates of the Agreements. I would like to confirm that these have been duly authorized and executed by the City.

If you should have any questions or comments, please do not hesitate to contact me.


Eileen M. Teichert
Supervising Deputy City Attorney

Enclosure: As indicated

AGREEMENT FOR SERVICE RIGHT IN THE WESTERN
MUNICIPAL WATER DISTRICT STATE PROJECT WATER PIPELINE

THIS AGREEMENT made this 23rd day of September, 1986, is entered into by and between the WESTERN MUNICIPAL WATER DISTRICT OF RIVERSIDE COUNTY ("WMWD"), a municipal water district organized under the laws of the State of California and a member agency of the Metropolitan Water District of Southern California ("MWD") and of the Santa Ana Watershed Project Authority ("SAWPA"), and the CITY OF RIVERSIDE, a charter city ("CITY").

RECITALS

1. The Santa Ana Watershed Project Authority, a joint powers agency organized and existing pursuant to the laws of California and to a certain Joint Powers Agreement of January, 1975, exercising the powers common to its member agencies ("SAWPA"), has agreed to engineer, design, and construct an imported water conveyance system within the service area of WMWD, consisting of a gravity pipeline, a pressure pipeline, a reservoir and a pumping station ("PROJECT"), for the purpose of supplying treated water to WMWD's service area for irrigation, domestic and industrial uses. PROJECT Construction is presently estimated to be complete by 1990.

SAWPA has entered into a contract with the United States pursuant to the Small Reclamation Projects Act for a loan to construct the PROJECT entitled Contract Between the U.S. and Santa Ana Watershed Project Authority, dated February 11, 1985 and on file with SAWPA which is incorporated herein by reference. SAWPA has estimated the total project cost to be \$23,316,500. The loan, in an amount not to exceed \$14,917,000, has been approved and authorized for funding. The loan contract required the execution of a Lease-Purchase agreement between SAWPA and WMWD, which was executed on January 2, 1985 and is on file with the WMWD at its offices, which Agreement is incorporated herein by reference.

2. By the terms of the Lease-Purchase Agreement, WMWD will lease and operate the PROJECT from SAWPA during the period of time SAWPA is obligated under the loan contract with the United States, and will be solely responsible for all the financial obligations, costs and expenses of the PROJECT and the loan contract. At the time the loan obligation is repaid, SAWPA will convey its ownership interest in the PROJECT to WMWD.

3. WMWD, in turn, will make service rights in the PROJECT available to applicants within its service area, subject to certain payment requirements and terms and conditions.

4. CITY has applied for a service right of 30 cubic feet per second ("cfs"), and has agreed to pay the cost and to comply with the terms and conditions.

5. It is the purpose of this Agreement to provide the terms, conditions and payment schedule under which CITY will acquire a 30 cfs service right in the PROJECT.

COVENANTS

Based upon the foregoing facts, and in consideration of the mutual covenants of the parties, it is hereby agreed as follows:

6. Definitions. As used in this Agreement, these terms shall have the following meaning:

A. Service Right. A right to receive treated State Water Project water service at a specific maximum rate of flow of water at specific connections, to the extent water is available to WMWD from the Metropolitan Water District of Southern California ("MWD"), and to the extent the PROJECT facilities are capable of delivering design capacity flows. The amount of the service right shall be expressed in cubic feet per second as constant flow during a 24-hour period, and shall be equal to the maximum flow which may be required by CITY as measured at its connections on Reach A. Use of the pipeline by any project participant or participants shall not diminish CITY's service right.

B. PROJECT. The PROJECT is an imported water conveyance system intended to carry treated State Water Project water from the Henry J. Mills Filtration Plant ("Mills") on Alessandro Boulevard in western Riverside County to certain locations within the service area of WMWD. The conveyance system consists of two separate pipelines.

The first is a gravity pipeline, which begins at the Mills Filtration Plant and runs westerly approximately 65,000 feet, generally following the alignment of the Box Springs and Upper Feeder right of way belonging to MWD, to a final turnout at Eagle Valley. It includes a 10 million gallon storage facility located near the westerly end of the pipeline.

The second is a pressure pipeline, which will begin at the Mills Filtration Plant and run southerly approximately 18,300 feet, and includes a pumping station located near the Mills Filtration Plant.

C. PROJECT Participants. PROJECT Participants shall be those entities which obtain a service right in the PROJECT from WMWD and agree to abide by the terms and conditions set by WMWD for acquisition and utilization of such right.

D. Gravity Pipeline Reaches. The gravity pipeline shall consist of five reaches and a reservoir which are further defined as follows:

(1) Reach A. Reach A shall be the first reach of the gravity pipeline from the Mills Filtration Plant, running westerly approximately 31,200 feet, and consisting of a 60-inch pipeline.

(2) Reach B. Reach B shall be the second reach of the gravity pipeline from the Mills Plant, commencing at the westerly end of Reach A, running westerly approximately 14,600 feet, and consisting of a 54-inch pipeline.

(3) Reach C. Reach C shall be the third reach of the gravity pipeline, commencing at the westerly end of Reach B, running westerly approximately 3,200 feet, and consisting of a 48-inch pipeline.

(4) Reach D. Reach D shall be the fourth reach of the gravity pipeline, commencing at the end of Reach C, running westerly approximately 12,300 feet, consisting of a 48-inch pipeline.

(5) Reach E. Reach E shall be the fifth reach of the gravity pipeline, commencing at the western end of Reach D, running westerly 3,700 feet, consisting of a 36-inch pipeline, and terminating in Eagle Valley.

(6) Reservoir. Reservoir shall mean a 10 million gallon storage facility located along the gravity pipeline toward the westerly end. CITY shall have no storage rights in this facility.

A map generally showing the location and terminus of each Reach and the Reservoir of the PROJECT is attached hereto as Exhibit "A."

E. PROJECT Costs. PROJECT Costs are defined as all ordinary and usual costs relevant to creating the PROJECT for its stated purposes, including construction costs of the gravity pipeline, reservoir, pressure pipeline, pump station, design, engineering, legal and administrative costs, rights of way, Bureau of Reclamation participation, loan application reports, CEQA-EIR costs, field inspection, interest costs, escalation factors and contingencies.

7. CITY Service Right. CITY shall have the right to require and WMWD shall have the obligation to deliver at connections to be determined along or at the end of Reach A, 30 cfs of treated State Water Project water, dependent upon full payment of the purchase price therefor by CITY, and compliance with the terms and conditions set forth herein, and further dependent upon the availability of MWD water to WMWD, and the capability of the PROJECT to deliver water at its design capacity.

8. Price of Service Right. The total price of the 30 cfs service right is fixed at \$2,400,000 and is not subject to changed project requirements, cost overruns, or other increases or decreases in actual costs.

9. Payment Terms. CITY shall pay WMWD the total price of \$2,400,000 in one payment submitted no later than September 26, 1986.

10. Reach A Estimated Completion Date. SAWPA estimates completion of construction of Reach A by February 1, 1988, provided Bureau of Reclamation loan funds continue to be made available as presently expected and authorized. WMWD agrees to exercise its best efforts to cause SAWPA to use due diligence in completing construction of Reach A by February 1, 1988.

WMWD also agrees to use its best efforts to provide water service to CITY immediately after acceptance of Reach A, regardless of completion of subsequent reaches of the gravity pipeline.

11. Operation, Maintenance, Repair and Replacement Costs (Gravity Pipeline). Operation and maintenance costs which shall be those associated with the gravity section of the PROJECT shall be divided between fixed and variable costs.

A. Fixed Costs, which shall include an amount for replacement, shall be charged to PROJECT participants as an annual charge on a fiscal year basis, and divided among participants based on each participant's percent of allocated service rights, whether or not the participants take delivery of the flow. The fixed costs may also be divided among participants on a reach by reach basis.

Replacement shall mean replacement after destruction by acts of God, malicious mischief, vandalism, extraordinary major maintenance costs or similar events. If such

replacement becomes necessary when there are insufficient funds to cover the costs, WMWD shall meet with the PROJECT participants to determine how such costs shall be met.

B. Variable Costs shall be included in the rate for water, which shall be paid on a monthly basis. The water rate shall be the sum of the MWD rate for treated water, WMWD'S administrative charge, and variable costs of operation and maintenance of the gravity pipeline portion of the PROJECT. Payments shall be based on the net amount of water delivered to CITY'S connections on Reach A. The water rate shall apply to the quantity of water delivered at each connection and shall be billed monthly.

WMWD shall establish an independent cost center and an annual budget for the operation and maintenance of the gravity pipeline portion of the Project. CITY shall be provided the opportunity to review and comment upon the proposed budget prior to its adoption by WMWD'S board. Operation and maintenance cost amounts for this portion of the Project shall be based on the annual budget.

12. Point of Delivery. CITY shall be entitled to take delivery of its 30 cfs of water at a connection or connections, not to exceed 3, at such location or locations on Reach A as shall be determined by the parties. The primary water source shall be California State Water Project water, treated and delivered to WMWD at the Mills Plant. CITY shall be responsible for the costs of whatever additional

facilities required to make a connection to the PROJECT, including a structure, valves, meter, and telemetry, although the actual design and construction of such connection facility shall be completed by WMWD. Such costs shall be paid to WMWD in advance of letting any contract for the work or the purchase of any necessary equipment or facilities. Once a connection has been made, the connection facilities and meter shall belong to WMWD, and WMWD shall be responsible for their operation, maintenance, repair and replacement.

The CITY will have the right to install, maintain and inspect its own telemetry equipment and connections within the metering facilities. WMWD shall provide electrical contacts and meter characteristics as approved by the CITY for CITY's telemetry equipment and a flanged connection for the CITY's pipeline. All CITY's telemetry equipment shall belong to the CITY and CITY shall be responsible for its operation, maintenance, repair and replacement. The CITY will demonstrate the capability of flow control for its service connections.

13. Operation and Administration.

A. Scheduled outages - WMWD will provide advance notice of any scheduled pipeline outage.

B. Connection Right of Way - WMWD will assist CITY in obtaining permanent and temporary construction easements from MWD for right of way needed to connect to the metering facilities.

C. Corrosion control - The pipeline will be bonded and test leads will be brought to the surface and WMWD will monitor potential for corrosion and provide corrosion control if necessary as part of the operation and maintenance.

D. Changes in flow - WMWD will permit instantaneous changes in flow at the CITY's connection provided WMWD is permitted by MWD to make instantaneous changes in flow from the Mills treated water reservoir.

14. Title to PROJECT. After all payments on the loan obligations are made, SAWPA will convey title of the PROJECT to WMWD which shall thenceforth be the sole owner and operator of the PROJECT and of capacity in the PROJECT. Notwithstanding any provisions of this Agreement, PROJECT participants shall have no ownership rights to PROJECT facilities or capacity. Further, no right created by this Agreement may be assigned, sold, leased, or transferred.

15. Reversion of Service Right. If CITY should determine it does not need its full 30 cfs service right, it may notify WMWD and request a reversion of the surplus to WMWD. If WMWD thereafter sells that right to another participant or new party, it shall reimburse CITY the amount of CITY'S purchase price for that portion, plus 8.64% interest annually from date of purchase. WMWD, however, is under no obligation to offer such reverted rights to a purchaser in advance of offering any other then-existing capacity.

16. Agreement Subject To Terms Of Prior Agreements.

This Agreement is subject to all the terms and conditions of the Lease Payment Agreement between SAWPA and WMWD dated January 2, 1985 and between SAWPA and the United States through the Loan Contract.

17. Default. Should CITY fail to perform its obligations under this Agreement with respect to payment for the service right, or with respect to the fixed and variable costs of operation, maintenance, repair or replacement, the following shall apply:

A. Default on Service Right. If CITY shall fail to make any payment due herein of the service right within ten (10) days from the date such payment is due, or if CITY shall fail to keep any of the terms and conditions of this Agreement concerning payment for the service right, then CITY shall be deemed to be in default hereunder. If CITY should, after notice, fail to remedy any such default with all reasonable dispatch, not to exceed thirty (30) days, then WMWD shall have the right, at its option, without any further demand or notice, to terminate this Agreement and to take possession of CITY's service right in the PROJECT and to declare CITY's right forfeited, and to thereafter hold or resell such right to other applicants without reimbursement to CITY.

With respect to the payment for the service right, this shall be the exclusive and only remedy for CITY's default should WMWD elect to pursue a remedy.

B. Default on Operation, Maintenance, Repair or Replacement Costs. If CITY shall fail to make any payment due herein within thirty (30) days from the invoice date, or if CITY shall fail to keep any of the terms and conditions of this contract concerning payment of operation, maintenance, repair or replacement costs, then CITY shall be deemed to be in default hereunder and WMWD shall have the right, at its option, without any further demand or notice, to terminate water service.

These rights are not intended to constitute WMWD's exclusive remedies, and they shall be in addition to any other right or remedy that WMWD may have for damages, termination of the Agreement, injunction, or other relief allowed by law.

18. Notices. Any notices or filings required to be given or made under this Agreement shall be served or made in the following manner:

A. Upon WMWD, by serving the Secretary or General Manager of WMWD personally or by registered mail addressed to the General Manager, Western Municipal Water District, 450 Alessandro Boulevard, Riverside, California 92508, P. O. Box 5286, Riverside, California 92517-5286.

B. Upon CITY, by serving the Public Utilities Director personally or by registered mail, Public Utilities Department, 3900 Main Street, Riverside, California 92522.

19. Severability. If any section or portion of this Agreement or the application thereof to any party is for any reason held invalid, it shall be deemed severable, and the validity of the remainder of the Agreement shall not be affected thereby.

20. Attorneys' Fees. Should either party hereto commence an action to enforce the provisions of this Agreement, then such party that prevails in that action shall be entitled to reasonable attorneys' fees, costs, expert witness fees, consulting fees and testing fees.

21. Amendments. This Agreement may be amended with the mutual consent of the parties, provided that such amendment shall be in writing, signed and dated by both parties hereto.

22. Hold Harmless. WMWD agrees to hold CITY harmless from any liability for damages or claims for personal injury and property damage which do not result from the negligent acts of CITY, its officials, officers, agents or employees, and CITY agrees to hold WMWD harmless from any liability for damages or claims for personal injury or property damage resulting from the negligence of CITY.

IN WITNESS WHEREOF, WMWD has caused this Agreement to be executed by the President of its Board of Directors and attested by the Secretary thereof, and CITY has executed this by its Mayor and attested by its CITY Clerk.

APPROVED AS TO FORM:

WESTERN MUNICIPAL WATER
FOR RIVERSIDE COUNTY

Anne J. Thomas
Attorney for Western
Municipal Water District
for Riverside County

By: [Signature]

ATTESTED BY:
[Signature]

CITY OF RIVERSIDE
a municipal corporation

By: [Signature] Mayor Pro Tempore

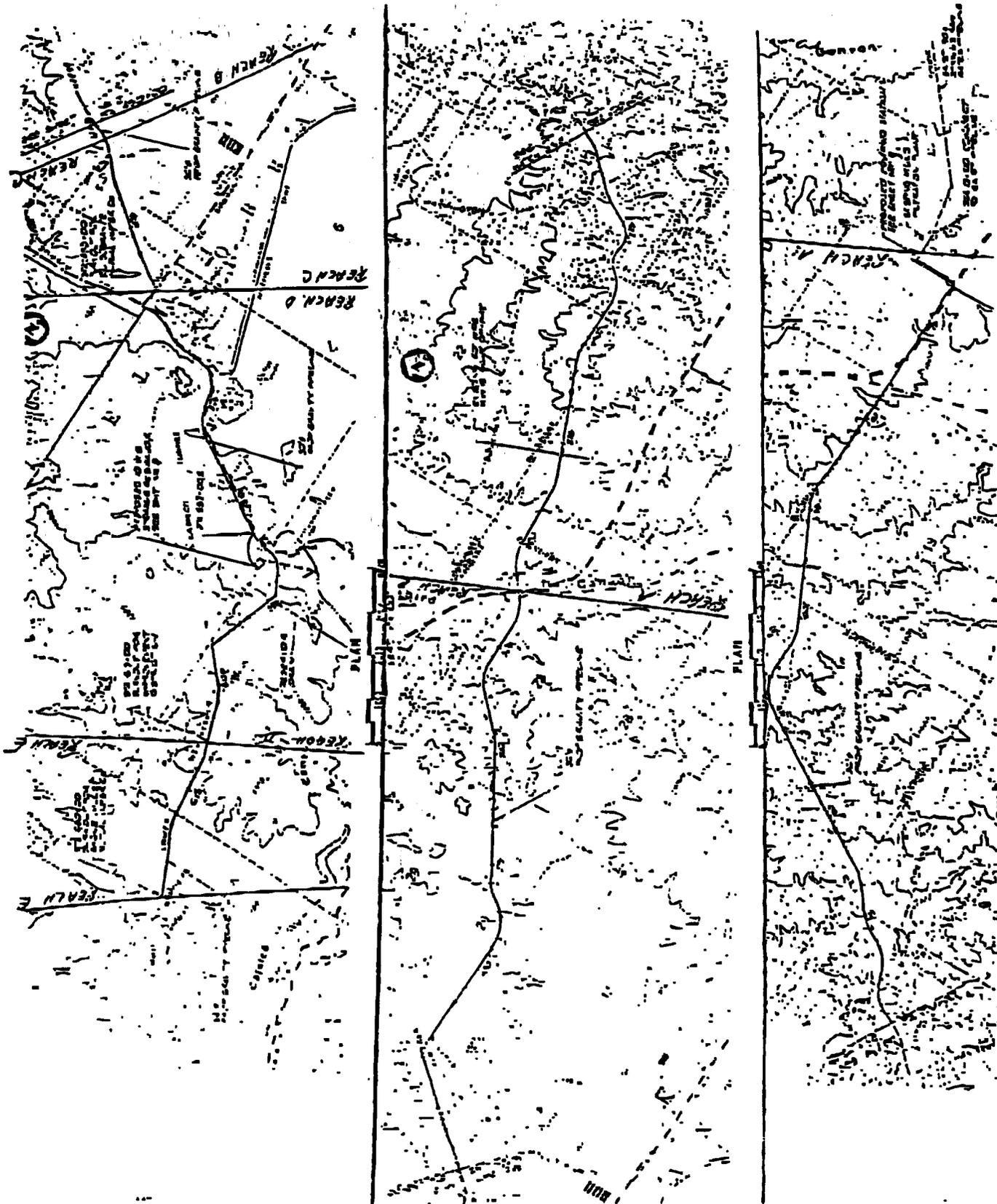
APPROVED AS TO FORM:

ATTESTED BY:

[Signature]
City Attorney
City of Riverside

[Signature]
City Clerk

EXHIBIT "A"



**SINGLE PROJECT ADMINISTRATION AGREEMENT
BETWEEN WESTERN MUNICIPAL WATER DISTRICT
AND CITY OF RIVERSIDE**

RECEIVED
FEB 06 1990
CITY OF RIVERSIDE
WATER ENGINEERING

This Single Project Administration Agreement ("Agreement") is made and entered into this 24th day of April, 1990, by and between the City of Riverside, a municipal corporation ("City") and Western Municipal Water District of Riverside County ("WMWD"), a municipal water district organized under the laws of the State of California and a member agency of the Metropolitan Water District of Southern California ("MWD") and of the Santa Ana Watershed Project Authority ("SAWPA").

Recitals

A. WHEREAS, the City and WMWD have previously entered into an agreement entitled "Agreement for Service Right in the Western Municipal Water District State Project Water Pipeline" ("Service Right Agreement") dated September 23, 1986, a copy of which is attached hereto as Exhibit "A" and herein incorporated by reference; and

B. WHEREAS, WMWD hired A. A. Webb Associates ("Webb") as an independent contractor to design the turnout metering and flow-regulating facilities associated with City's turnout for those facilities described in the Service Right Agreement; and

C. WHEREAS, WMWD gave notice to City in a letter dated December 23, 1987, of its intentions to hire Webb and thereafter WMWD did engage Webb and Webb proceeded to design turnout metering and flow-regulating facilities, which design is now acceptable to both WMWD and MWD; and

D. WHEREAS, it is City's intention to build its own pressure-regulating facilities for the project at the same time that WMWD intends to construct its metering and flow-regulating facilities; and

E. WHEREAS, the construction to be carried out by WMWD and the construction to be carried out by City are to occur on the same site; and

F. WHEREAS, City and WMWD desire to avoid, as much as possible, confusion, interference and delays, and desire to integrate their respective contracts and allow the City to administer the City's project and WMWD's project as a single project ("Combined Project").

NOW, THEREFORE, in consideration of the mutual covenants and conditions contained herein, City and WMWD agree as follows:

Agreement

1. City's Rights and Obligations.

(a) City shall construct the Combined Project at City's expense.

(b) City shall administer and inspect all contract work associated with the Combined Project; provided, however, that all aspects of the contract work for WMWD metering and flow regulating facilities are subject to review and approval by WMWD, which approval shall not be unreasonably withheld and shall be given timely so as to avoid project delays.

(c) City shall pay to WMWD the cost of City's share of the telemetry facilities being provided by WMWD for the operation of the metering/flow regulating facilities. Said telemetry facilities shall include, but not be limited to, cable, remote control terminals and a central control unit.

(d) City shall pay for the cost of design of the facility for the rate of flow control and metering.

(e) City shall pay for all water delivered through the turnout at a rate to be established by WMWD, such rates to include both water sold and a proportionate share of fixed costs.

2. WMWD's Rights and Obligations.

(a) WMWD shall own and operate turnout through meter and regulation of flow facility.

(b) WMWD shall have final approval of all contract work, pertaining to WMWD metering/flow regulating facilities, which approval shall not be unreasonably withheld and shall be given timely so as to avoid project delays.

3. Term. The term of this Agreement shall be until the completion of the Combined Project, namely the construction of facilities and acceptance of the construction of the facilities by the City and WMWD.

4. Notices. All notices, requests, demands, certificates and other communication hereunder shall be in writing and shall be deemed to have been duly given if personally delivered or if mailed by United States Certified or Registered mail, postage prepaid, to the appropriate parties at the following addresses. Notice shall be deemed given at the time personally delivered or, if mailed, seventy-two (72) hours after deposit in the U.S. Postal Service.

Any notices or filings required to be given or made under this Agreement shall be served or made in the following manner:

(a) Upon WMWD by serving the Secretary or General Manager of WMWD personally or by registered mail, addressed to the General Manager, Western Municipal Water District, P.O. Box 5286, Riverside, CA 92517-5286, with a copy to Anne T. Thomas, Best, Best & Krieger, 800 North Haven, Suite 120, Ontario, CA 91764.

(b) Upon City by serving the Public Utilities Director personally or by registered mail, addressed to Public Utilities Director, City of Riverside, Public Utilities Department, 3900 Main Street, Riverside, CA 92522.

5. Assignment. Neither this Agreement nor any rights of any party hereunder shall be assignable or transferable by any party, in whole or in part, directly or indirectly, by operation of law or otherwise without the prior written consent of the other party. Subject to the preceding sentence, this Agreement shall be binding upon and inure to the benefit of the successors and assigns of the parties hereto.

6. Waiver. No waiver of any provision of this Agreement shall be deemed or shall constitute a waiver of any other provision, whether or not similar, nor shall any waiver constitute a continuing waiver. No waiver shall be binding unless executed in writing by the party making the waiver.

7. Governing Law: Venue. This Agreement shall be construed in accordance with and governed by the laws of the State of California. Any lawsuit brought to enforce this Agreement shall be brought in the appropriate court in Riverside County, State of California.

8. Time is of the Essence. Time is of the essence in this Agreement and its provisions.

9. Severability. If any provision of this Agreement is held to be invalid, void or unenforceable by a court of competent jurisdiction, the remaining provisions shall nevertheless continue in full force and effect without being impaired or invalidated in any way.

10. Attorney's Fees and Costs. If any legal action or other proceeding is brought for the enforcement of this Agreement, because of any alleged dispute, breach, default or misrepresentation in connection with any provisions of this Agreement, the successful or prevailing party shall be entitled to recover reasonable attorney's fees and other costs incurred in that action or proceeding in addition to any other relief to which it may be entitled.

11. Counterparts. This Agreement may be executed in counterparts, each of which will constitute an original and which collectively will constitute one instrument.

12. Captions. The caption of the articles and sections of this Agreement are included for purposes of convenience only and the words contained in the caption shall not affect the construction or interpretation of any of the provisions.

13. Hold Harmless. WMWD agrees to hold City harmless from any liability for damages or claims for personal injury and property damage which do not result from the negligent acts of City, its officials, officers, agents or employees, and City agrees to hold WMWD harmless from liability for damages or claims for personal injury or property damage resulting from the negligence of City.

14. Effective Date. The effective date of this Agreement is the date first set forth above.

Exhibit "A"

**Agreement for Service Right in the Western
Municipal Water District State Project
Water Pipeline
dated September 23, 1986**

AGREEMENT FOR SERVICE RIGHT IN THE WESTERN
MUNICIPAL WATER DISTRICT STATE PROJECT WATER PIPELINE

THIS AGREEMENT made this 23rd day of September, 1986, is entered into by and between the WESTERN MUNICIPAL WATER DISTRICT OF RIVERSIDE COUNTY ("WMWD"), a municipal water district organized under the laws of the State of California and a member agency of the Metropolitan Water District of Southern California ("MWD") and of the Santa Ana Watershed Project Authority ("SAWPA"), and the CITY OF RIVERSIDE, a charter city ("CITY").

RECITALS

1. The Santa Ana Watershed Project Authority, a joint powers agency organized and existing pursuant to the laws of California and to a certain Joint Powers Agreement of January, 1975, exercising the powers common to its member agencies ("SAWPA"), has agreed to engineer, design, and construct an imported water conveyance system within the service area of WMWD, consisting of a gravity pipeline, a pressure pipeline, a reservoir and a pumping station ("PROJECT"), for the purpose of supplying treated water to WMWD's service area for irrigation, domestic and industrial uses. PROJECT Construction is presently estimated to be complete by 1990.

SAWPA has entered into a contract with the United States pursuant to the Small Reclamation Projects Act for a loan to construct the PROJECT entitled Contract Between the U.S. and Santa Ana Watershed Project Authority, dated February 11, 1985 and on file with SAWPA which is incorporated herein by reference. SAWPA has estimated the total project cost to be \$23,316,500. The loan, in an amount not to exceed \$14,917,000, has been approved and authorized for funding. The loan contract required the execution of a Lease-Purchase agreement between SAWPA and WMWD, which was executed on January 2, 1985 and is on file with the WMWD at its offices, which Agreement is incorporated herein by reference.

2. By the terms of the Lease-Purchase Agreement, WMWD will lease and operate the PROJECT from SAWPA during the period of time SAWPA is obligated under the loan contract with the United States, and will be solely responsible for all the financial obligations, costs and expenses of the PROJECT and the loan contract. At the time the loan obligation is repaid, SAWPA will convey its ownership interest in the PROJECT to WMWD.

3. WMWD, in turn, will make service rights in the PROJECT available to applicants within its service area, subject to certain payment requirements and terms and conditions.

4. CITY has applied for a service right of 30 cubic feet per second ("cfs"), and has agreed to pay the cost and to comply with the terms and conditions.

5. It is the purpose of this Agreement to provide the terms, conditions and payment schedule under which CITY will acquire a 30 cfs service right in the PROJECT.

COVENANTS

Based upon the foregoing facts, and in consideration of the mutual covenants of the parties, it is hereby agreed as follows:

6. Definitions. As used in this Agreement, these terms shall have the following meaning:

A. Service Right. A right to receive treated State Water Project water service at a specific maximum rate of flow of water at specific connections, to the extent water is available to WMWD from the Metropolitan Water District of Southern California ("MWD"), and to the extent the PROJECT facilities are capable of delivering design capacity flows. The amount of the service right shall be expressed in cubic feet per second as constant flow during a 24-hour period, and shall be equal to the maximum flow which may be required by CITY as measured at its connections on Reach A. Use of the pipeline by any project participant or participants shall not diminish CITY's service right.

B. PROJECT. The PROJECT is an imported water conveyance system intended to carry treated State Water Project water from the Henry J. Mills Filtration Plant ("Mills") on Alessandro Boulevard in western Riverside County to certain locations within the service area of WMWD. The conveyance system consists of two separate pipelines.

The first is a gravity pipeline, which begins at the Mills Filtration Plant and runs westerly approximately 65,000 feet, generally following the alignment of the Box Springs and Upper Feeder right of way belonging to MWD, to a final turnout at Eagle Valley. It includes a 10 million gallon storage facility located near the westerly end of the pipeline.

The second is a pressure pipeline, which will begin at the Mills Filtration Plant and run southerly approximately 18,300 feet, and includes a pumping station located near the Mills Filtration Plant.

C. PROJECT Participants. PROJECT Participants shall be those entities which obtain a service right in the PROJECT from WMWD and agree to abide by the terms and conditions set by WMWD for acquisition and utilization of such right.

D. Gravity Pipeline Reaches. The gravity pipeline shall consist of five reaches and a reservoir which are further defined as follows:

(1) Reach A. Reach A shall be the first reach of the gravity pipeline from the Mills Filtration Plant, running westerly approximately 31,200 feet, and consisting of a 60-inch pipeline.

(2) Reach B. Reach B shall be the second reach of the gravity pipeline from the Mills Plant, commencing at the westerly end of Reach A, running westerly approximately 14,600 feet, and consisting of a 54-inch pipeline.

(3) Reach C. Reach C shall be the third reach of the gravity pipeline, commencing at the westerly end of Reach B, running westerly approximately 3,200 feet, and consisting of a 48-inch pipeline.

(4) Reach D. Reach D shall be the fourth reach of the gravity pipeline, commencing at the end of Reach C, running westerly approximately 12,300 feet, consisting of a 48-inch pipeline.

(5) Reach E. Reach E shall be the fifth reach of the gravity pipeline, commencing at the western end of Reach D, running westerly 3,700 feet, consisting of a 36-inch pipeline, and terminating in Eagle Valley.

(6) Reservoir. Reservoir shall mean a 10 million gallon storage facility located along the gravity pipeline toward the westerly end. CITY shall have no storage rights in this facility.

A map generally showing the location and terminus of each Reach and the Reservoir of the PROJECT is attached hereto as Exhibit "A."

E. PROJECT Costs. PROJECT Costs are defined as all ordinary and usual costs relevant to creating the PROJECT for its stated purposes, including construction costs of the gravity pipeline, reservoir, pressure pipeline, pump station, design, engineering, legal and administrative costs, rights of way, Bureau of Reclamation participation, loan application reports, CEQA-EIR costs, field inspection, interest costs, escalation factors and contingencies.

7. CITY Service Right. CITY shall have the right to require and WMWD shall have the obligation to deliver at connections to be determined along or at the end of Reach A, 30 cfs of treated State Water Project water, dependent upon full payment of the purchase price therefor by CITY, and compliance with the terms and conditions set forth herein, and further dependent upon the availability of MWD water to WMWD, and the capability of the PROJECT to deliver water at its design capacity.

8. Price of Service Right. The total price of the 30 cfs service right is fixed at \$2,400,000 and is not subject to changed project requirements, cost overruns, or other increases or decreases in actual costs.

9. Payment Terms. CITY shall pay WMWD the total price of \$2,400,000 in one payment submitted no later than September 26, 1986.

10. Reach A Estimated Completion Date. SAWPA estimates completion of construction of Reach A by February 1, 1988, provided Bureau of Reclamation loan funds continue to be made available as presently expected and authorized. WMWD agrees to exercise its best efforts to cause SAWPA to use due diligence in completing construction of Reach A by February 1, 1988.

WMWD also agrees to use its best efforts to provide water service to CITY immediately after acceptance of Reach A, regardless of completion of subsequent reaches of the gravity pipeline.

11. Operation, Maintenance, Repair and Replacement Costs (Gravity Pipeline). Operation and maintenance costs which shall be those associated with the gravity section of the PROJECT shall be divided between fixed and variable costs.

A. Fixed Costs, which shall include an amount for replacement, shall be charged to PROJECT participants as an annual charge on a fiscal year basis, and divided among participants based on each participant's percent of allocated service rights, whether or not the participants take delivery of the flow. The fixed costs may also be divided among participants on a reach by reach basis.

Replacement shall mean replacement after destruction by acts of God, malicious mischief, vandalism, extraordinary major maintenance costs or similar events. If such

replacement becomes necessary when there are insufficient funds to cover the costs, WMWD shall meet with the PROJECT participants to determine how such costs shall be met.

B. Variable Costs shall be included in the rate for water, which shall be paid on a monthly basis. The water rate shall be the sum of the MWD rate for treated water, WMWD'S administrative charge, and variable costs of operation and maintenance of the gravity pipeline portion of the PROJECT. Payments shall be based on the net amount of water delivered to CITY'S connections on Reach A. The water rate shall apply to the quantity of water delivered at each connection and shall be billed monthly.

WMWD shall establish an independent cost center and an annual budget for the operation and maintenance of the gravity pipeline portion of the Project. CITY shall be provided the opportunity to review and comment upon the proposed budget prior to its adoption by WMWD'S board. Operation and maintenance cost amounts for this portion of the Project shall be based on the annual budget.

12. Point of Delivery. CITY shall be entitled to take delivery of its 30 cfs of water at a connection or connections, not to exceed 3, at such location or locations on Reach A as shall be determined by the parties. The primary water source shall be California State Water Project water, treated and delivered to WMWD at the Mills Plant. CITY shall be responsible for the costs of whatever additional

facilities required to make a connection to the PROJECT, including a structure, valves, meter, and telemetry, although the actual design and construction of such connection facility shall be completed by WMWD. Such costs shall be paid to WMWD in advance of letting any contract for the work or the purchase of any necessary equipment or facilities. Once a connection has been made, the connection facilities and meter shall belong to WMWD, and WMWD shall be responsible for their operation, maintenance, repair and replacement.

The CITY will have the right to install, maintain and inspect its own telemetry equipment and connections within the metering facilities. WMWD shall provide electrical contacts and meter characteristics as approved by the CITY for CITY's telemetry equipment and a flanged connection for the CITY's pipeline. All CITY's telemetry equipment shall belong to the CITY and CITY shall be responsible for its operation, maintenance, repair and replacement. The CITY will demonstrate the capability of flow control for its service connections.

13. Operation and Administration.

A. Scheduled outages - WMWD will provide advance notice of any scheduled pipeline outage.

B. Connection Right of Way - WMWD will assist CITY in obtaining permanent and temporary construction easements from MWD for right of way needed to connect to the metering facilities.

C. Corrosion control - The pipeline will be bonded and test leads will be brought to the surface and WMWD will monitor potential for corrosion and provide corrosion control if necessary as part of the operation and maintenance.

D. Changes in flow - WMWD will permit instantaneous changes in flow at the CITY's connection provided WMWD is permitted by MWD to make instantaneous changes in flow from the Mills treated water reservoir.

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With respect to the payment for the service right, this shall be the exclusive and only remedy for CITY's default should WMWD elect to pursue a remedy.

B. Default on Operation, Maintenance, Repair or Replacement Costs. If CITY shall fail to make any payment due herein within thirty (30) days from the invoice date, or if CITY shall fail to keep any of the terms and conditions of this contract concerning payment of operation, maintenance, repair or replacement costs, then CITY shall be deemed to be in default hereunder and WMWD shall have the right, at its option, without any further demand or notice, to terminate water service.

These rights are not intended to constitute WMWD's exclusive remedies, and they shall be in addition to any other right or remedy that WMWD may have for damages, termination of the Agreement, injunction, or other relief allowed by law.

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19. Severability. If any section or portion of this Agreement or the application thereof to any party is for any reason held invalid, it shall be deemed severable, and the validity of the remainder of the Agreement shall not be affected thereby.

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21. Amendments. This Agreement may be amended with the mutual consent of the parties, provided that such amendment shall be in writing, signed and dated by both parties hereto.

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IN WITNESS WHEREOF, WMWD has caused this Agreement to be executed by the President of its Board of Directors and attested by the Secretary thereof, and CITY has executed this by its Mayor and attested by its CITY Clerk.

APPROVED AS TO FORM:

WESTERN MUNICIPAL WATER
FOR RIVERSIDE COUNTY

Anne T. Thomas
Attorney for Western
Municipal Water District
for Riverside County

By: [Signature]

ATTESTED BY:

[Signature]

CITY OF RIVERSIDE
a municipal corporation

By: [Signature] Mayor Pro Tempore

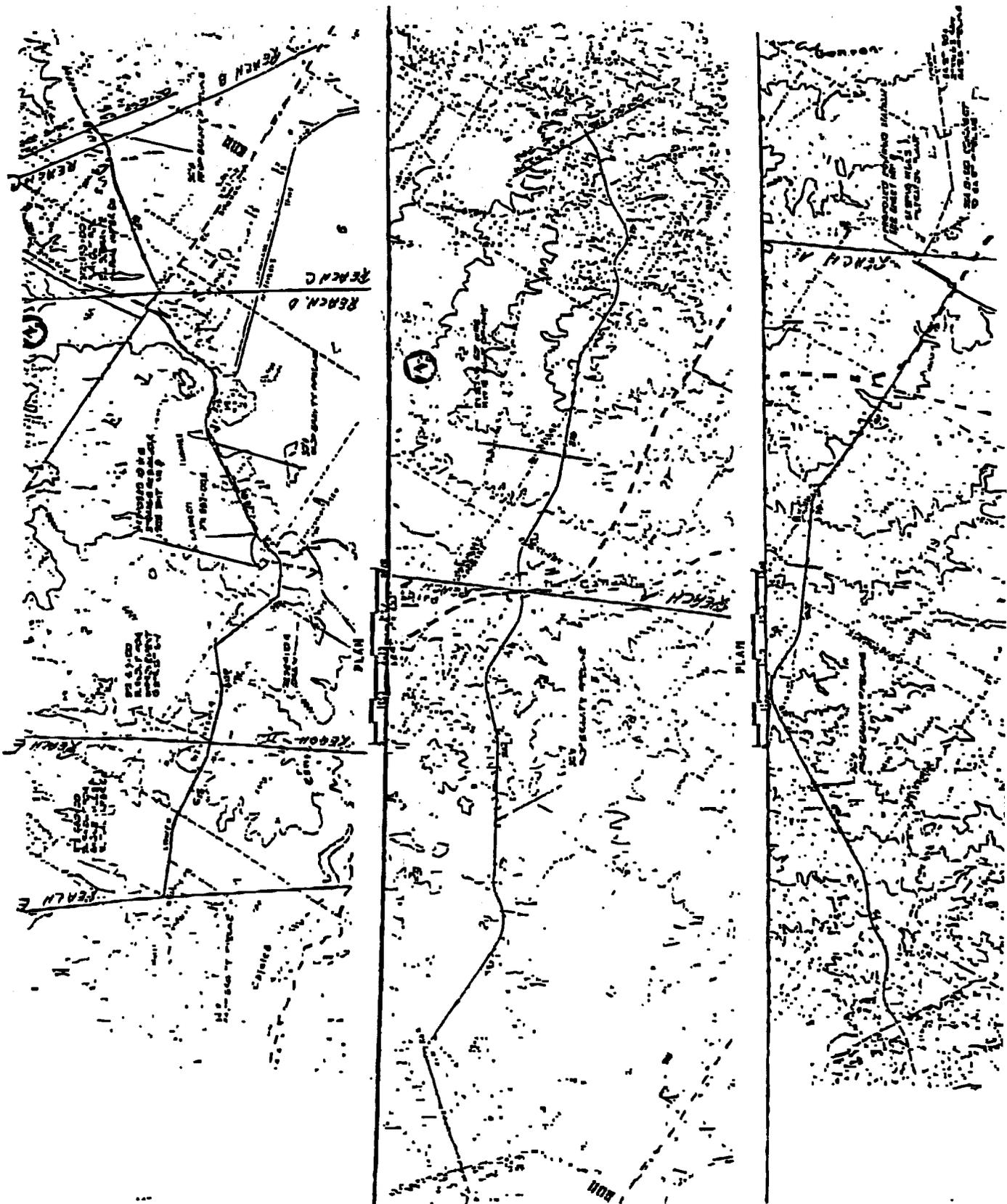
APPROVED AS TO FORM:

ATTESTED BY:

[Signature]
City Attorney
City of Riverside

[Signature]
City Clerk

EXHIBIT "A"



Appendix F

Upper Santa Ana River Watershed – Integrated Regional Water Management Plan

Upper Santa Ana River Watershed **Integrated Regional Water Management Plan**



November 2007

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1 Introduction

1.1 Background

In 2005, the Upper Santa Ana Water Resources Association (Association) members met and agreed to develop an Integrated Regional Water Management Plan (IRWM Plan) to address water management issues for the communities of the Upper Santa Ana River (SAR) watershed. The Association is composed of agencies in the Upper SAR watershed that share a common concern for the region's water resources. The list of Association member agencies is presented in Appendix D. San Bernardino Valley Municipal Water District (Valley District), a major regional water agency, agreed to lead the planning effort and applied for and received a grant from the California Department of Water Resources (DWR) to prepare this plan. An objective of developing the proposed IRWM Plan is to identify, define, and establish strategies to capitalize on all water management opportunities that are present today or may become available in the region in the future. With careful and thoughtful integrated planning, the participation of water managers and stakeholders, and the development of robust water management strategies and implementation tools, the region's water entities can improve their water supply reliability and self-reliance for future water supplies. Implementation of the IRWM Plan will help the fast-growing region, which is dependent upon the San Bernardino Basin and imported water from the State Water Project (SWP) to reduce its dependence on imported water, while providing reliable, good quality water for economic growth and enhancing the wellbeing of the residents of the Upper SAR region.

1.1.1 Overview of Plan Area

1.1.1.1 Santa Ana River Watershed

The SAR is the largest stream system in Southern California. It begins high in the San Bernardino Mountains where snowmelt and rainfall flow more than 100 miles southwesterly to



The Santa Ana River System originates high in the San Bernardino Mountains. (Photo by Ryan Gilmore).



discharge into the Pacific Ocean between Newport Beach and Huntington Beach. The SAR watershed covers over 2,650 square miles of urban, rural, agricultural, and forested terrain and the more populated urban areas of San Bernardino, Riverside, and Orange Counties, as well as a small portion of Los Angeles County. Figure 1-1 depicts the SAR watershed and its relationship to the IRWM Plan Area.

The IRWM Plan Area is the Upper SAR watershed and encompasses Big Bear Lake and the headwaters of the SAR until it reaches the Riverside Narrows and includes the cities and communities of San Bernardino, Yucaipa, Redlands, Beaumont, Cherry Valley, Calimesa, Highland, Rialto, Colton, Fontana, Grand Terrace, and Loma Linda. Figure 1-2 shows the region. The region covers 824 square miles, approximately 32 percent of the total SAR watershed, and is located in San Bernardino and Riverside Counties. The climate in the region is characterized by relatively hot, dry summers and cool winters with intermittent precipitation.

There are numerous tributaries that contribute flow to the main stem of the SAR in the Plan Area including Bear Creek, Keller Creek, Plunge Creek, Mill Creek, San Timoteo Creek, Yucaipa Creek and Mission Zanja Creek (tributaries to San Timoteo Creek), City Creek, East Twin Creek (a tributary to City Creek), Lytle Creek, Cajon Wash (a tributary to Lytle Creek), and Warm Creek (a tributary to Lytle Creek) (see Figure 1-2).

Figure 1-1
Santa Ana River Watershed

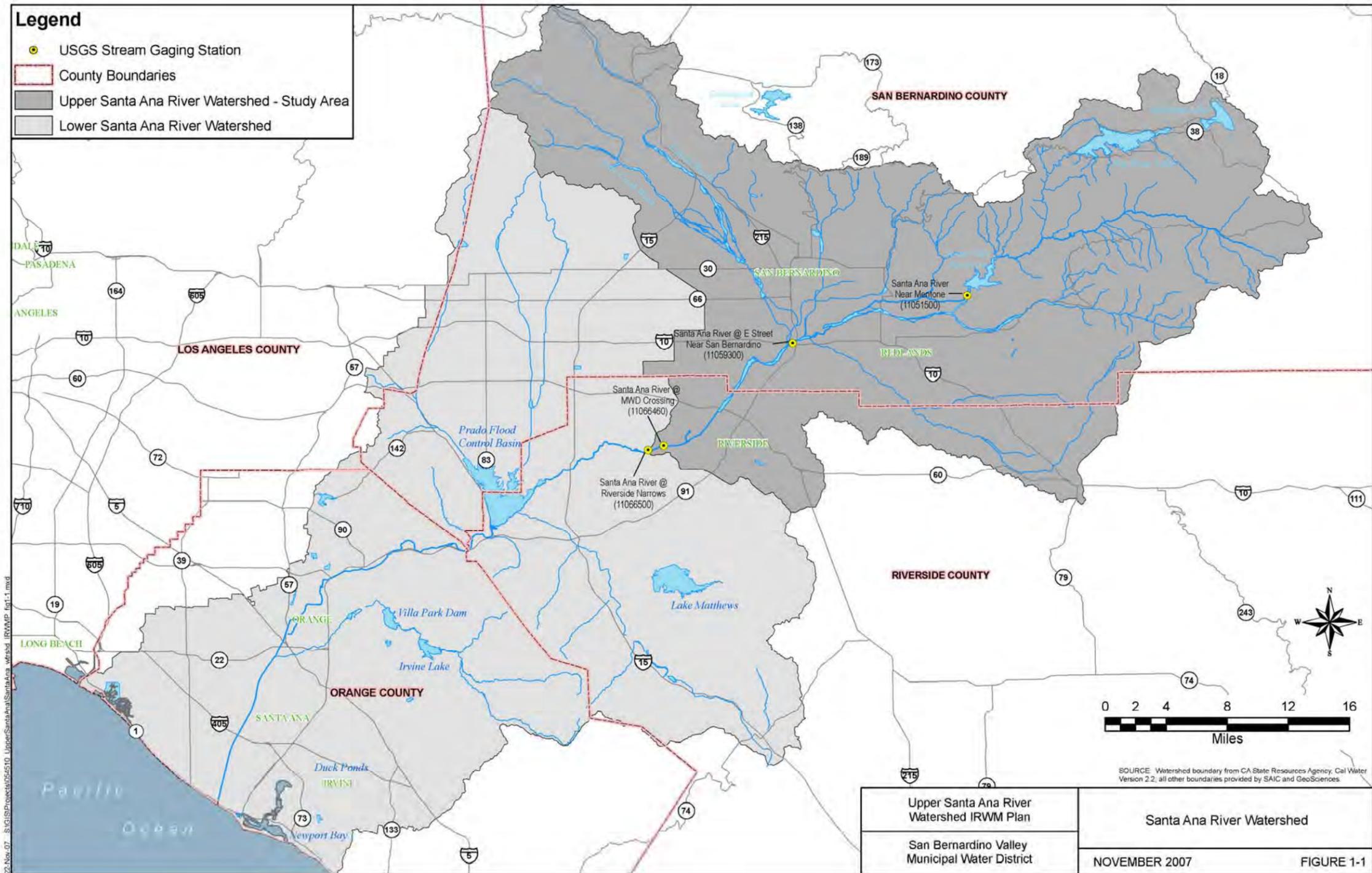
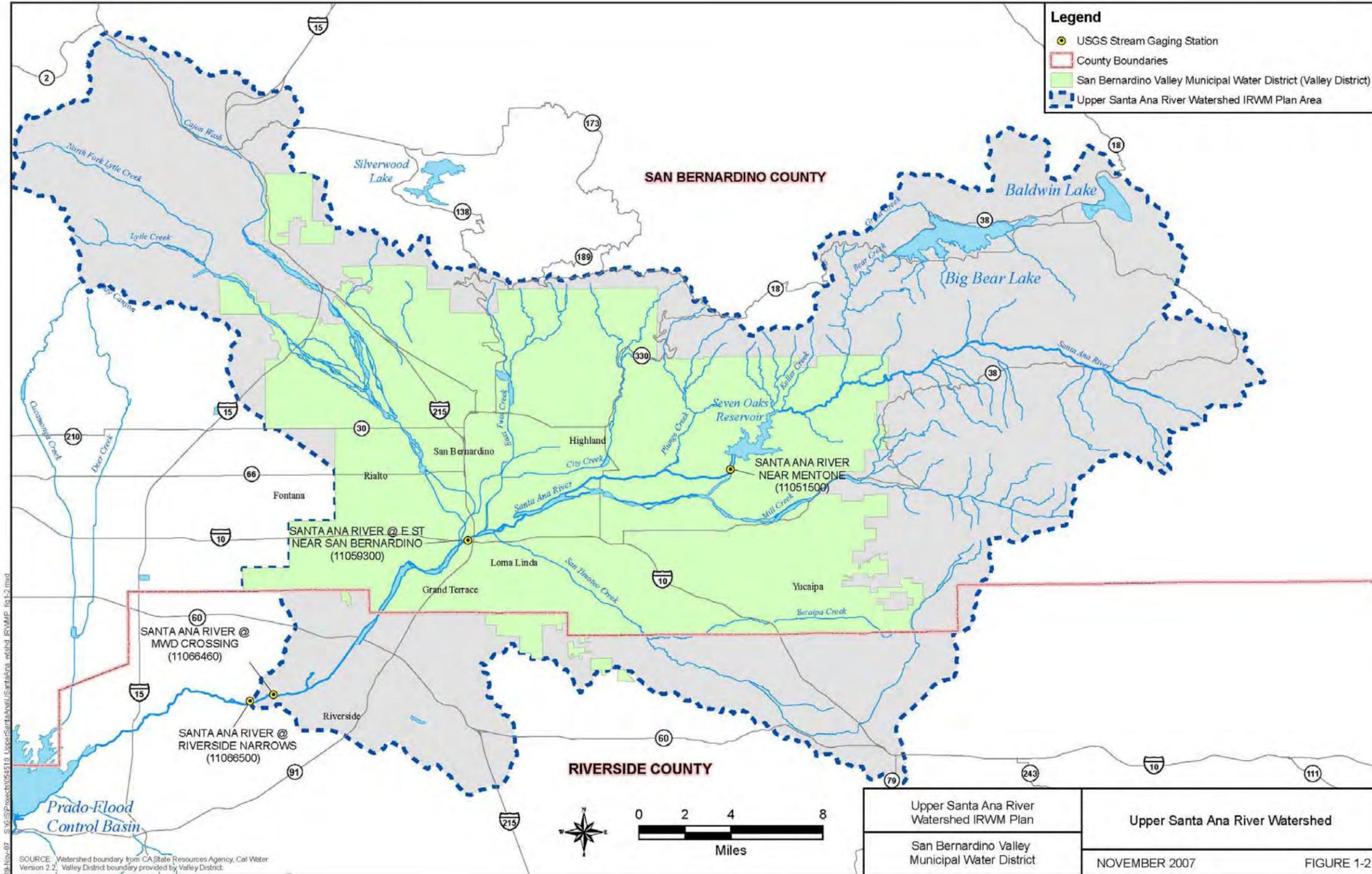




Figure 1-2
Upper Santa Ana River Watershed



1.2 Integrated Regional Water Management Plan

Management of water resources in the region takes place within a complex legal and institutional framework. Development of the IRWM Plan, a comprehensive and coordinated regional water management plan for the Upper SAR, involves the cooperation of many parties interested in water management, including water purveyors in the region. The development of an IRWM Plan is initiated by encouraging all stakeholders to participate in the planning process. The planning process includes stakeholder participation; consideration of historic plans; and compliance with institutional constraints, orders, accords, and government laws and judgments.

In 2005, nine members of the Association met and formed a Regional Water Management Group for the purpose of developing an IRWM Plan. The Regional Water Management Group is now called the Technical Advisory Group (TAG), with the regional lead agency, Valley District, coordinating development of the IRWM Plan. The TAG members actively participated in development of the IRWM Plan. Members of the TAG include:

- Valley District – Lead Agency
- City of Big Bear Lake Department of Water and Power
- City of Redlands Municipal Utilities Department
- City of Riverside Public Utilities Department
- East Valley Water District
- San Bernardino Municipal Water Department
- San Bernardino Valley Water Conservation District (SBVWCD)
- San Bernardino County Flood Control District
- San Gorgonio Pass Water Agency
- West Valley Water District
- Yucaipa Valley Water District
- Water Resource Institute, California State University, San Bernardino
- San Timoteo Watershed Management Authority (STWMA)
- Fontana Union Water Company

In the initial stages of the planning process for the IRWM Plan, the TAG identified a list of stakeholders. In general, the stakeholders for this planning process are described by four categories: (1) members of the TAG as listed above, (2) other regional stakeholders and water agencies located in the Upper SAR watershed region, (3) watershed-based stakeholders located in the SAR



watershed that are part of the larger integrated planning for the region discussed in the Santa Ana Watershed Project Authority (SAWPA) Plan, and (4) federal and State of California (State) agencies that were encouraged to participate throughout development of the IRWM Plan.

The TAG has encouraged local agencies to be active in the development of the IRWM Plan and to participate in the planning process. Specific steps taken by the TAG to inform and encourage stakeholders' participation are discussed below.

Early in the planning process, the TAG assembled a list of stakeholders and a letter was sent to each one informing them of the planning process and encouraging them to participate. Stakeholders were invited to participate in the TAG's bi-monthly face-to-face meetings and by conference calls. The TAG meetings focused on discussion of regional water management issues of the basin. TAG members and other participating agencies reviewed the work in progress and provided comments on the development of the plan. The agendas for the TAG meetings were posted on Valley District's website in advance so all agencies, other stakeholders, and interested parties could participate throughout the planning process in discussion of the issues in which they were interested. A copy of the draft IRWM Plan was sent to all stakeholders for review and comment.

This IRWM Plan was developed in coordination with Western, San Jacinto River Watershed Council, and SAWPA

Other Regional Water Agencies and Stakeholders

- San Bernardino County Board of Supervisors
- Riverside County Board of Supervisors
- Beaumont-Cherry Valley Water District
- Bear Valley Mutual Water Company
- Big Bear Municipal Water District
- City of Beaumont
- City of Calimesa
- City of Colton
- City of Fontana
- City of Loma Linda
- City of Rialto
- Marygold Mutual Water Company
- Muscoy Mutual Water Company
- Regents of the University of California (Regents)
- Riverside Highland Water Company
- Riverside Flood Control and Water Conservation District
- South Mesa Water Company
- Orange County Flood Control District
- Terrace Water Company
- Western Heights Mutual Water Company
- Fontana Water Company

Watershed-Based Stakeholders

- SAWPA and its member agencies (Eastern Municipal Water District, Inland Empire Utilities Agency, Orange County Water District (OCWD), Valley District, and Western Municipal Water District (Western))
- Beaumont Basin Watermaster
- Western-San Bernardino Watermaster
- California Resource Connections, Inc.

State and Federal Stakeholders

- California Department of Fish and Game
- California Department of Public Health
- California Department of Toxic Substances Control
- California Department of Water Resources
- Regional Water Quality Control Board (RWQCB)
- Southern California Edison
- State Water Resources Control Board (SWRCB)
- U.S. Army Corps of Engineers (USACE)
- U.S. Forest Service

and will become part of the SAWPA regional plan for the SAR watershed. A representative from SAWPA participated in the TAG meetings and actively engaged in the discussions. A representative from Western was also invited and attended the regular meetings of the TAG. The San Jacinto Watershed Council, although not an active participant in the TAG, has been briefed on the development of the plan and received a copy of the draft IRWM Plan for their review and comment.

1.2.1 Santa Ana Watershed Project Authority

SAWPA is a regional agency that has a major role in water resources planning in the SAR watershed. SAWPA was formed in 1968 as a planning agency and was transformed in 1972 through a change in its mission to plan and build facilities that would protect the water quality of the SAR watershed. SAWPA is a Joint Powers Authority, classified as a Special District (government agency) in which it carries out functions useful to its member agencies. SAWPA's vision is to have a sustainable SAR watershed that supports economic and environmental vitality as well as an enhanced quality of life. Its regional leadership is a model of collaboration and cooperation utilizing integrated solutions. To that extent, SAWPA has developed an IRWM Plan for the entire SAR watershed as well as a regional groundwater management plan and an urban water management plan (UWMP).

SAWPA's planning activities generally address water management and water supply reliability issues for the ever-growing population of the watershed. SAWPA works with planners, water experts, and other government agencies to identify issues and challenges of the region. To resolve the many water-related problems, SAWPA works with water planners to ensure there is enough water in the future; with regulators to ensure that the water is safe and clean; and with all other stakeholders (including the concerned public) to develop collaborative, regional solutions to the area's water needs.

SAWPA is working with its member agencies to update its IRWM Plan for the entire SAR watershed and is an active participant in the planning process for the Upper SAR Watershed IRWM Plan. The information from the Upper SAR Watershed IRWM Plan will be incorporated into SAWPA's integrated regional plan for the watershed.



1.3 Other Integrated Regional Water Management Activities in the Watershed

Integrated regional water management activities occurred in the SAR watershed as early as the 1960s. In 2002, SAWPA developed an Integrated Watershed Plan (IWP) for the Santa Ana watershed that was updated in 2005 as an IRWM Plan (IWRMP June 2005). In 2006, Western also prepared an IRWM Plan for its service area. SAWPA's IRWM Plan, Western's IRWM Plan, and the San Jacinto Watershed Component of the Santa Ana IWP are particularly related to the development of this IRWM Plan. In 2002, STWMA developed the San Timoteo Watershed Management Program (STWMA 2002). It was updated in 2005 as an IRWM Plan for the San Timoteo watershed (STWMA 2005). These plans are described below.

1.3.1 Santa Ana Watershed Project Authority IRWM Plan

Water users in the SAR watershed have worked together for decades to develop an integrated regional approach to water management for the entire watershed. In 2002, SAWPA developed a phased planning process called the *Santa Ana Integrated Watershed Plan (IWP)*. In 2005, the IWP was updated as an IRWM Plan (SAWPA Plan) to cover the entire SAR watershed. This broad planning document is the framework for water management in the watershed and is largely based upon the planning efforts of its member agencies. The SAWPA Plan is a "macro-level" plan that is consistent with DWR's California Water Plan Update (Bulletin 160) and State Water Resources Control Board's (SWRCB) Strategic Plan, Watershed Management Initiative, and the basin planning process. The SAWPA Plan builds upon local agencies' initiatives and programs and emphasizes integrated regional water management.

The IRWM Plan for the Upper SAR watershed is a complementary planning process that will be incorporated into the SAWPA Plan. "Zooming" in on a "micro-level" reveals that the Upper SAR watershed has several unique water management challenges and issues. The purpose of this planning process is to focus on these local issues and to assess water management opportunities in greater detail. This collaborative "grassroots" process will address some of the long-term water management strategies of the Upper SAR watershed and will greatly contribute to protecting and enhancing reasonable and beneficial uses of the watershed's water resources. This planning process is a part of the overall SAR water management planning process and is in agreement with past and current SAWPA regional planning initiatives.

1.3.2 Western Municipal Water District IRWM Plan, November 2006

Western's area consists of a 510-square-mile area primarily in western Riverside County with a population of over 500,000 people. Western relies on SWP and Colorado River water to augment its local water supplies. During drought years, these imported water sources will suffer from increased demands and increasingly poor water quality. Colorado River water may have salinity in excess of 800 milligrams per liter (mg/L) in dry years. Such water quality will not meet the water quality objectives of the Regional Water Quality Control Board (RWQCB) and will thus make Colorado River water unsuitable for use without desalination treatment. Western's IRWM Plan is focusing on putting water from all sources to maximum beneficial use. This includes storage of imported water, when it is available, to augment its dry year supplies.

It is the mission of Western to provide water supply, wastewater disposal, and water resource management to the public in a safe, reliable, environmentally sensitive, and financially responsible manner. Given the significant loss of water wells in the region due to water quality issues and the uncertainty of supplemental supplies flowing from the Colorado River, implementing an IRWM Plan is imperative to Western. The objectives of the plan are built on the identification of the water management issues and solutions and refinement of the plan through a consensus of appropriate stakeholders. A number of water management strategies have been considered to meet the objectives defined for Western's IRWM Plan.

Western has already started identifying and implementing regional projects that will create cleaner, more reliable water supplies and optimize the use of imported water to reduce reliance on imported water during drought periods. The projects include the recently completed Arlington desalter enhancement to provide 6,000 acre-feet of drinking water to the city of Norco; March Air Reserve Base Wastewater Treatment Plant improvement to enhance treatment capacity and improve conveyance lines to deliver reclaimed water for irrigation purposes; and the non-potable water conveyance system, which will bring 6,000 acre-feet of surplus water from the Riverside groundwater basin annually, redirecting it to beneficial uses. Western and Valley District share a long history of working cooperatively to address the imbalance between available water supplies and the demands of a growing population in the Inland Empire area of Southern California (the urbanized portions of San Bernardino and Riverside Counties). Valley District and Western sit on the Watermaster Committee for the Orange County Judgment (Orange County Water District v. City of Chino, et al., Case No. 117 628), and together make up the two-member Watermaster Committee for the Western Judgment (Western Municipal Water District of Riverside County v. East San Bernardino County Water District, Case No. 78426).



Western is a stakeholder in the Upper SAR region because of its share in managing the water resources of the Bunker Hill Basin.

1.3.3 The San Jacinto Watershed Component of the Santa Ana Integrated Watershed Plan

The San Jacinto IRWM Plan focuses on specific water management issues that address the unique and complex needs of the 732-square-mile San Jacinto watershed. The plan is a component of the Santa Ana IWP. The proposed San Jacinto Component Plan is a complementary planning effort that will build upon the work already completed by stakeholders participating in the SAWPA planning process. SAWPA's Santa Ana IWP adequately addresses management issues within the Santa Ana watershed as a whole. The San Jacinto Creek watershed component would carefully consider unique water quality, habitat, National Pollutant Discharge Elimination System (NPDES) projects, need for additional reclaimed water management, and potential impacts of total maximum daily load (TMDL) requirements that specifically affect the residents (human, avian, animal, fish, plant, or insect) of the San Jacinto Creek sub-watershed. This planning effort will address issues that are specific to the San Jacinto Creek watershed and integrate the solution strategies with the Santa Ana IWP. The sheer size of the SAR watershed and the array of water resources naturally lend themselves to a large regional solution that integrates a number of watershed issues.

Riverside County has been identified as one of the fastest growing counties in the United States. This growth caused Riverside County to revise its General Plan in 2002. Further integration of water management strategies and coordination between competing interests would benefit the watershed as a whole and would allow for more orderly development in Riverside County and overall protection of the San Jacinto watershed consistent with the proposed IRWM Plan for the San Jacinto Creek watershed.

1.3.4 The San Timoteo Watershed Management Authority IRWM Program

The STWMA was formed in January 2001 by the Beaumont-Cherry Valley Water District (BCVWD), the City of Beaumont (Beaumont), the South Mesa Water Company, and the Yucaipa Valley Water District (YVWD). The purpose of the STWMA is to prepare and implement a water resources management program for the San Timoteo watershed and the waters tributary thereto in order to conserve local water supplies, improve surface and groundwater quality and quantity, protect and enhance groundwater storage and recreational resources, preserve open space, protect wildlife habitat and wetlands, protect and enhance agriculture, and develop and enhance the region's water resources for the benefit of the public. The water resources management program is to include watershed

and basin monitoring; groundwater storage, banking, and conjunctive use; stormwater capture and management; recycled water programs and projects; wetlands, wildlife, and open space protection; water quality protection and enhancement; and water conservation and efficiency.

The STWMA formed a stakeholder group to develop a watershed-scale integrated water resources management program that will provide a safe and reliable water supply for all water users in the watershed. The San Timoteo Watershed Management Program (STWMP) was completed in March 2002 and was documented in the San Timoteo Watershed Management Program, Phase 1 Report (March 2002). The Phase 1 investigation inventoried the water resources in the STWMA service area and described the occurrence and quality of these waters. The current and future water demands of the member agencies were described based on planning information provided by the STWMA member agencies and the City of Banning (Banning). The water and recycled water master plans and the UWMPs of the agencies were reviewed to assess how STWMA member agencies and Banning were planning to meet their water demands and dispose of or reuse their recycled water. This research revealed daunting water resource management challenges and opportunities.

Currently, the proven local water supplies for the area are about 32,000 acre-feet per year and ultimate demand will be about 99,000 acre-feet per year; that is, the STWMA service area will need to develop 67,000 acre-feet per year of new supplies. The STWMP was designed to ensure that the additional 67,000 acre-feet per year of water will be there when it is needed.

The STWMP accomplishes consideration and integration of multiple management strategies through eight management initiatives or program elements that are as follows:

- Program Element 1 – Develop and Implement a Comprehensive Monitoring Program for Groundwater Level, Groundwater Quality, Production and Diversion, Subsidence, Surface Water Discharge, and Surface Water Quality. Status – developed and implemented.
- Program Element 2 – Develop and Implement a Comprehensive Surface Water Management and Recharge Program. Status – program developed with some facilities implemented.
- Program Element 3 – Develop and Implement a Regional Supplemental Water Master Plan for the STWMA Area. Status – Plan is in early development.
- Program Element 4 – Develop and Implement a Salt Management Program. Status – developed and implemented.



- Program Element 5 – Establish a Groundwater Management Entity. Status – developed and implemented.
- Program Element 6 – Develop Conjunctive-Use Programs. Status – no progress.
- Program Element 7 – Develop and Implement a Habitat and Recreation Program for the San Timoteo Creek Watershed. Status – no progress.
- Program Element 8 – Develop and Implement a Financial Plan to Enable the STWMP. Status – no progress.

The water resources management program and projects within the STWMP include improved water supply reliability, water quality protection and improvement, groundwater management, flood management, stormwater capture and management, water recycling, recreation and public access, environmental and habitat protection and improvement, wetlands enhancement and creation, and ecosystem restoration, as part of implementing the above program elements. These program elements and projects will enhance recharge of native and recycled water, maximize the direct use of recycled water, and optimize the use of imported water for direct use, recharge, and conjunctive use. The estimated cost of STWMP implementation ranges from \$200 to \$300 million.

STWMA updated the STWMP in 2005 to conform to the then IRWM Plan requirements. STWMA and its member agencies continue to work together and with adjacent water management entities to implement its IRWM Plan. The STWMA IRWM Plan is available for review at www.stwma.org.

1.4 Previous Related Work

1.4.1 State Water Resources Control Board Orders

In 1989 (WR 89-25) and again in 1998 (WR 98-08), the SWRCB included the SAR in its Declaration of Fully Appropriated Streams (Declaration). Per this Declaration, the river was considered fully appropriated year-round. In 1989, the California Water Code prevented the SWRCB from accepting any new applications to appropriate water from watercourses listed in the Declaration.

In 1991, Valley District submitted an application on behalf of itself and Western to appropriate up to 100,000 acre-feet annually from the SAR (First Application). At that time, the river was categorized as fully appropriated. However, in May 1995, the SWRCB adopted procedures for reviewing the fully appropriated stream status and Valley District subsequently submitted a petition to revise the Declaration (First Petition) together with the 1991 First Application.

The First Petition was followed in 1999 by a similar petition by Orange County Water District (OCWD). The SWRCB held hearings on the petitions in December 1999. Valley District provided evidence that demonstrated that urbanization, the resultant increased runoff, and increased releases of treated wastewater had increased flows in the SAR. Additionally, the operation of Seven Oaks Dam would increase the availability of water for diversion during wet years. Based on evidence in the hearing record, the SWRCB amended the Declaration in Order WR 2000–12 and allowed the water right applications submitted by Valley District and OCWD to be processed (SWRCB 2000). Order WR 2000-12 did not determine the specific amount of water available for appropriation by petitioners.

In May 2001, Valley District and Western jointly submitted a second application to appropriate another 100,000 acre-feet of water annually (Second Application) in addition to the 100,000 acre-feet per year previously requested under the First Application, along with a second petition to revise the Declaration (Second Petition). The Second Petition and Second Application were based on updated hydrologic analyses submitted during the 1999 hearings. These analyses indicated that in certain years more than 200,000 acre-feet of water is available for appropriation in the SAR. Based on the hydrologic evidence, the SWRCB issued Order WR 2002-06, which revised the Declaration pursuant to the Second Petition (and similar petitions by other parties) and accepted the following applications for processing:

- The Valley District and Western application (the Second Application) requesting a right to use a maximum of 100,000 acre-feet annually for direct delivery, recharge, or exchange;



- The Chino Basin Watermaster application requesting a right to divert 97,000 acre-feet per year to groundwater storage;
- The City of Riverside application proposing direct diversion of 75 cubic feet per second (cfs) throughout the year for a total maximum direct diversion of 41,400 acre-feet per year; and
- Four minor applications for diversions of up to 102 acre-feet annually throughout the year from the west and east forks of Cable Creek within the SAR watershed.

Order WR 2002-06 did not determine the specific amount of water available for appropriation or whether the amount of water available for appropriation is sufficient to approve the applications. As in Order WR 2000-12, prior to any potential approval of the applications, the SWRCB requires that applications meet all necessary obligations under the California Environmental Quality Act (CEQA).

1.5 Overview of Governing Laws, Judgments, and Agreements

This section briefly describes some of the governing laws, judgments, and agreements that are in place and have significant influence on water management in the region. The intent of these brief descriptions is to provide the readers a general overview of these documents. For a complete understanding of the agreements and judgments, please see the actual documents, which have been reproduced in Appendix A.

1.5.1 *Integrated Regional Water Management Planning Act*

In 2002, the California Legislature passed Senate Bill 1672, the Integrated Regional Water Management Planning Act, and the Governor signed it into law. The Bill added Part 2.2 (commencing with Section 10530) to Division 6 of the Water Code: Conservation, Development and Utilization of State Water Resources.

The Integrated Regional Water Management Planning Act authorized a “regional water management group” to prepare and adopt a regional plan in accordance with certain procedures that addresses programs, projects, reports, or studies relating to water supply, water quality, flood protection, or related matters, over which any local public agency that is a participant in that group has authority to undertake.

The law requires DWR, the SWRCB, and the State Department of Health Services to include in any set of criteria used to select the projects and programs for grant funding “...a criterion that provides a benefit for qualified projects or programs.”

To comply with the requirements of the law, DWR and SWRCB prepared standards (also referred to as IRWM Guidelines) for preparation of IRWM Plans. In addition, they established set criteria for selection of the projects and programs to be funded under Chapter 8 of Proposition 50, the Integrated Regional Water Management Implementation Grant Program. The guidelines state that, “The intent of the IRWM Grant Program is to encourage integrated regional strategies for management of water resources and to provide funding, through competitive grants, for projects that protect communities from drought, protect and improve water quality, and improve local water security by reducing dependence on imported water.”

This IRWM Plan is prepared in compliance with the Integrated Regional Water Management Planning Act and DWR and SWRCB Guidelines and the intent of the grant program.



1.5.2 Groundwater Management Planning Act

In 2002, Senate Bill 1938, Groundwater Management Planning Act of 2002, was enacted into law. This law amended AB3030, which authorizes a local agency to prepare and implement a groundwater management plan. This law requires a local agency that elects to develop a groundwater management plan to follow specific requirements, including public notification and public involvement process as summarized below.

- Make available to the public a written statement describing the manner in which interested parties would be allowed to participate in the development of the plan.
- For the purposes of qualifying as a groundwater management plan and for receiving State funds administered by DWR for the construction of groundwater projects or groundwater quality projects, prepare and implement a plan that includes certain basin management objectives (BMOs) and components and adopt certain monitoring protocols.
- The law requires the local agency to submit a copy of the plan to DWR, in an electronic format, if practicable, approved by the DWR, and DWR would be required to make copies available to the public.
- Prior to adopting a resolution of intention to draft a groundwater management plan, a local agency shall hold a hearing after publication of notice on whether to adopt a resolution of intention to draft a groundwater management plan pursuant to this part for the purposes of implementing the plan and establishing a groundwater management program. At the conclusion of the hearing, the local agency may draft a resolution of intention to adopt a groundwater management plan pursuant to this part for the purposes of implementing the plan and establishing a groundwater management program. Upon written request, the local agency shall provide any interested person with a copy of the resolution of intention.
- The local agency shall prepare a groundwater management plan within two years of the date of the adoption of the resolution of intention. If the plan is not adopted within two years, the resolution of intention expires, and no plan may be adopted except pursuant to a new resolution of intention adopted in accordance with this chapter.
- After a groundwater management plan is prepared, the local agency shall hold a second hearing to determine whether to adopt the plan. Notice of the hearing shall be given pursuant to Section 6066 of the Government Code. The notice should include a summary of the plan and shall state

that copies of the plan may be obtained for the cost of reproduction at the office of the local agency. At the second hearing, the local agency shall consider protests to the adoption of the plan. At any time prior to the conclusion of the hearing, any landowner within the local agency may file a written protest or withdraw a protest previously filed.

Senate Bill 1938 does not require local agencies to prepare a groundwater management plan for the basins that are managed through adjudications. These long-standing adjudications govern the water rights and management of the basins. Any groundwater management planning would need to conform with the provisions of those adjudications and would require agreement and approval of the parties in those adjudications. The basins in the Upper Santa Ana watershed are adjudicated “in gross.” The agencies in the region, however, decided to prepare the plan because they strongly support the intent of the law that states, “It is the intent of the Legislature to encourage local agencies to work cooperatively to manage groundwater resources within their jurisdictions. The preparation of certain basin management objectives will assist local agencies in optimizing local resources while protecting groundwater and surface water resources. The preparation of basin management objectives also will facilitate an understanding of the basin or subbasin, thereby allowing local agencies, individually and cooperatively, to meet local, regional, and state water needs through conjunctive management, while ensuring that no particular water supply is jeopardized.”

A purpose of this IRWM Plan is to meet the intent and requirements of Senate Bill 1938.

1.5.3 Orange County Judgment

In 1963, the OCWD filed suit against substantially all water users in the area tributary to Prado Dam seeking adjudication of water rights on the SAR. The litigation ultimately involved over 4,000 served water users and water agencies, the four largest of which were OCWD, Valley District, Western, and the Chino Basin Municipal Water District (now the Inland Empire Utilities Agency). Given the magnitude of the potential litigation, these four districts and other parties developed a settlement that was approved by the Orange County Superior Court in a stipulated judgment entered on April 17, 1969 (Orange County Judgment). The Orange County Judgment imposes a physical solution that requires parties in the Upper SAR watershed to deliver a minimum quantity and quality of water to points downstream, including Riverside Narrows and Prado Dam. A provision of the Orange County Judgment related to conservation establishes that once the flow requirements are met, the upper area parties “...may engage in unlimited water conservation activities, including spreading, impounding, and other methods, in the area above Prado reservoir.” The Orange County Judgment is administered by the five-member SAR Watermaster that reports annually to the



court and the four representative agencies. Valley District, Inland Empire Utilities Agency, and Western nominate one member each to the Watermaster; OCWD nominates two members; and members are then appointed by the court.

1.5.4 Western Judgment

The Western Judgment, entered simultaneously with the Orange County Judgment, settled rights within the Upper SAR watershed in part to ensure that those resources upstream of Riverside Narrows would be sufficient to meet the flow obligations of the Orange County Judgment at Riverside Narrows. Toward this end, the Western Judgment generally provides for the following:

- A determination of safe yield of the San Bernardino Basin Area (SBBA),
- Establishment 64,872 acre-feet rights that can be extracted from the SBBA by plaintiff parties. This is equal to 27.95 percent of safe yield,
- An obligation of Valley District to replenish any extractions from SBBA by non-plaintiffs in aggregate in excess of 167,228 acre-feet(equal to 72.05 percent of safe yield),
- An obligation of Western to replenish the Colton and Riverside Basins if extractions for use in Riverside County in aggregate exceed certain specific amounts, and
- An obligation of Valley District to replenish the Colton and Riverside basins if water levels are lower than certain specific water level elevations in specified wells.

Like the Orange County Judgment, the Western Judgment identifies regional representative agencies to be responsible, on behalf of the numerous parties bound thereby, for implementing the replenishment obligations and other requirements of the judgment. The representative entities for the Western Judgment are Valley District and Western. Valley District and Western are principally responsible for providing replenishment of the groundwater basins if extractions exceed amounts specified in the judgment or as determined by the Watermaster. For the purposes of this replenishment obligation, Valley District acts on behalf of all defendants (Non-Plaintiffs) dismissed from the Western Judgment and, similarly, Western acts on behalf of the Plaintiffs and other dismissed parties within Western. Plaintiff parties with specific rights to produce 27.95 percent of the safe yield from the SBBA are the City of Riverside, Riverside Highland Water Company, Meeks & Daley Water Company, and the Regents of the University of California (Regents). The Western Judgment is administered by the two-person Western-San Bernardino Watermaster—one

person nominated each by Valley District and Western, and both appointed by the court.

Like the Orange County Judgment, the Western Judgment contemplates that the parties will undertake “new conservation,” which is defined as any increase in replenishment from natural precipitation resulting from operation of works and facilities that did not exist in 1969. The Western Judgment specifies that the parties to the judgment have the right to participate in any new conservation projects and, provided their appropriate shares of costs are paid, rights under the judgment are increased by the respective shares in new conservation (72.05 percent by Valley District and 27.95 by Western).

1.5.5 The Beaumont Basin Judgment

In February 2003, the STWMA filed suit in Riverside County Superior Court to adjudicate pumping and storage rights in the Beaumont Basin. The STWMA and the major pumpers developed a Stipulated Agreement to resolve the lawsuit. In February 2004, the Stipulated Agreement was approved by the Court.

This Stipulated Agreement established pumping rights among the two major classes of pumpers—overlying and appropriative pumpers. The overlying pumpers were assigned fixed rights with some flexibility to vary their maximum use during any five-year period. The safe yield established in the Stipulated Agreement is 8,650 acre-feet per year. The total of the overlying producers’ rights is equal to the safe yield. Collectively, the overlying pumpers produce substantially less than their aggregate rights. Appropriators’ rights are stated as a percentage or fraction of water in the safe yield that is not used by the overlying pumpers. The Stipulated Agreement provides for the orderly transition of land use and associated water uses through detailed provisions that require the assignment of rights from an overlying pumper to an appropriator when the appropriator provides service to the lands of the overlying pumper.

The Stipulated Agreement declares that there is a temporary surplus of water in the basin of 160,000 acre-feet. The temporary surplus can be used by the appropriators during the first ten years of the Stipulated Agreement. The appropriators will store the unused portion of the temporary surplus for use in subsequent years. The intent of removing the temporary surplus is to create additional evacuated storage space in the basin for use in storing supplemental water. The Stipulated Agreement gives control of the evacuated storage space in the basin and the overall management of storage to the Watermaster.

1.5.6 1961 Rialto Basin Judgment

The Rialto-Colton Basin was adjudicated in the Lytle Creek Water & Improvement Company vs. Fontana Ranchos Water Company, et. al., San



Bernardino County Superior Court Action 81264, entered on December 22, 1961. Limits on groundwater extractions are based on the average of the spring-high water level elevations of three wells within the basin. The pro rata water productions by each party (City of Colton, City of Rialto, Fontana Union Water Company, Citizen Land and Water Company, and Lytle Creek Water Improvement Company) are based on the “spring-high water level” in the three index wells as described below:

| | |
|-------------------------------|---|
| Above 1002.3 feet | Unlimited |
| Between 1002.3 and 969.7 feet | As imposed by the judgment |
| Below 969.7 feet | Reduced by 1% for every foot the average is below 969.7 |

At the request of the stipulating parties, Valley District monitors compliance with the decree and has since the early 1990s.

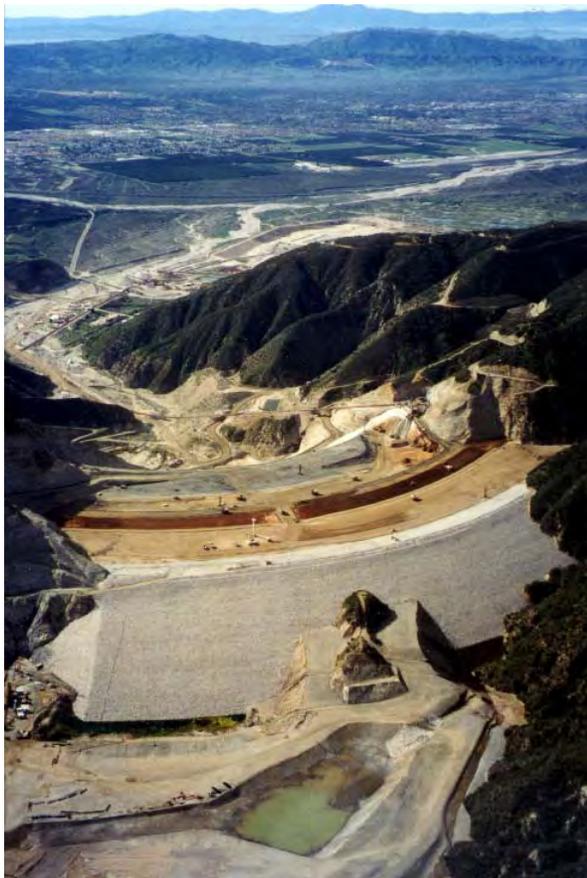
1.5.7 Cooperative Agreement to Protect Water Quality and Encourage the Conjunctive Uses of Imported Water in the Santa Ana River Basin

Water agencies within the Santa Ana River watershed recognize the importance of protecting the quality of its groundwater resources. In July 2007, many of these agencies (Parties) entered into an agreement with the RWQCB for purposes of monitoring and improving water quality within the SAR Region. The agreement is limited in scope and specifically addresses Salinity Objectives.

Generally, the agreement requires that the Parties analyze the effects on water quality of recharging imported water into groundwater basins. This analysis will be compiled into a report and submitted to the RWQCB every three years (Triennial Water Quality Report). In addition, any new project that will include the recharge of imported water must analyze its effects prior to implementation. A copy of this agreement is provided in Appendix A.

1.5.8 Seven Oaks Accord

On July 21, 2004, Valley District, Western, the City of Redlands, East Valley Water District, Bear Valley Mutual Water Company (Bear Valley Mutual), Lugonia Water Company, North Fork Water Company, and Redlands Water Company signed a settlement agreement known as the Seven Oaks Accord (Accord). The Accord calls for Valley District and Western to recognize the prior rights of the water users for a portion of the natural flow of the SAR. In exchange, the water users agree to withdraw their protests to the water right application submitted by Valley District on behalf of itself and Western. All the parties to the Accord have agreed to support the granting of other necessary permits to allow Valley District and Western to divert water from the SAR. By



View from upstream of Seven Oaks Dam under construction

means of the Accord, Valley District agreed to modify its water right applications to incorporate implementation of the Accord. Additionally, the Accord calls for Valley District to develop and manage a groundwater spreading program that will maintain groundwater levels at a number of specified wells owned and operated by the other parties. This integrated management of the basin will be adopted within five years of SWRCB approval of the water right applications. A copy of the Accord is shown in Appendix A.

Management of water resources in the Valley District/Western service area takes place within a complex legal and institutional framework as will be discussed in the next section. Development of a comprehensive, coordinated regional water management plan will involve the cooperation of many parties interested in water management in addition to the signatories of the Accord. The Accord provides the framework and a cooperative environment for major water entities in the Upper SAR watershed to prepare a plan for the integrated management of the region's surface water and groundwater resources. This IRWM Plan enhances and refines the current management and planning activities within the region and develops regional water management strategies and the framework for their implementation.

1.5.9 Agreement Relating to the Diversion of Water from the Santa Ana River System Among Western Municipal Water District of Riverside County, Valley District and City of Riverside

In July 2004 a Settlement Agreement Relating to the Diversion of Water from the Santa Ana River System (the Seven Oaks Accord) was signed. The agreement requires Valley District and Western to develop a groundwater spreading program in cooperation with other parties, "That is intended to maintain groundwater levels at the specified wells at relatively constant levels, in spite of the inevitable fluctuations due to hydrologic variation." Other requirements of the Seven Oaks Accord are as follows:

- i) The groundwater management plan shall identify target water-level ranges in the specified "index wells" subject to the requirement that



- such spreading will not worsen high groundwater levels in the Pressure Zone.
- ii) Thresholds of significance in terms of SAR water diverted by Valley District and Western and spreading by all parties should be observed. See Appendix I of the Accord (sidebar).
 - iii) The determination as to whether a certain groundwater management action will “worsen” high groundwater levels in the Pressure Zone is made through the use of the integrated surface and groundwater models.
 - iv) An “integrated management program” must be “adopted” within five years of the date the SWRCB grants a permit to Valley District/Western to divert water from the SAR. Valley District and Western have presented their data to the SWRCB and were told that any permit “terms” would be available in late 2007.
 - v) Water users agree to limit spreading to conform to an annual management plan.

1.5.10 Local Institutional Considerations

1.5.10.1 Santa Ana River-Mill Creek Cooperative Water Project Agreement

The SAR-Mill Creek Cooperative Water Project Agreement (informally known as the Exchange Plan) is an agreement among 9 agencies and water companies in eastern San Bernardino Valley executed in May 1976. The 9 parties to the Exchange Plan are as follows:

- Redlands Water Company, Bear Valley Mutual, Crafton Water Company, North Fork Water Company [East Valley Water District], Lugonia Water Company, City of Redlands, San Bernardino Water Conservation District (SBVWCD), YVWD, and the Valley District;

In an effort to avoid pumping costs and to lower the overall cost of water, the parties have agreed to the exchange of water from the SAR, Mill Creek, and the SWP. The agreement is described as a “bucket-for-bucket exchange,” whereby a party to the agreement provides a “bucket” of their water to a second, higher elevation party, and the second party provides a “bucket” of water from an alternate, lower elevation source back to the original party. To facilitate exchanges, parties to the agreement share their existing facilities. However, specific facilities (called Cooperative Water Project facilities) were built and are operated by Valley District in part to accommodate Exchange Plan deliveries. Given the three water sources and the available facilities, there are multiple delivery possibilities. Examples of exchanges that occur under the Exchange Plan include two-level exchanges, three-level exchanges, and water banking with

DWR. In a two-level exchange, two water sources are used; for example, SAR water is delivered to Mill Creek water users, and, in return, an equal amount of SWP water is delivered to SAR water users. In a three-level exchange, three sources are used. For example, Mill Creek water is delivered to the Yucaipa area, an equal amount of SAR water is then delivered to Mill Creek water users, and finally SWP water is delivered to SAR water users. To bank water within the SWP, a party entitled to local water exchanges their water when the local water is available and then takes SWP water at a later date.

1.5.10.2 Big Bear Lake Operations

Bear Valley Dam, which forms Big Bear Lake, is the only major dam that affects runoff into Seven Oaks Dam. Big Bear Lake is a water conservation reservoir presently owned by the Big Bear Municipal Water District (Big Bear Municipal). Big Bear Lake is located on Bear Creek, a tributary to the SAR. The lake has a drainage area of about 38 square miles.

Bear Valley Mutual and its predecessors constructed, owned, and operated Big Bear Lake as a supplemental water supply reservoir to meet the irrigation water supply demand within the Bear Valley Mutual service area in the easterly end of the San Bernardino Valley. Historical irrigation releases during dry periods sometimes caused low water levels in Big Bear Lake.

As recreation uses of Big Bear Lake became more important, Big Bear Municipal sought to control the water levels in the lake. On February 4, 1977, a stipulated judgment was entered in San Bernardino County Superior Court for Case No. 165493 *Big Bear Municipal Water District vs. North Fork Water Co. et al.* Big Bear Municipal obtained the opportunity to furnish “in-lieu” water from several other named sources other than Big Bear Lake to meet the water supply demands of Bear Valley Mutual. Big Bear Municipal was allowed to retain an amount of water in Big Bear Lake equal to the amount of water furnished in-lieu to Bear Valley Mutual. Big Bear Municipal explored and implemented the alternate sources. Providing water from these alternate in-lieu sources resulted in water being retained in Big Bear Lake to stabilize the water levels in the lake.

On May 1, 1987, Big Bear Municipal adopted operating criteria for Big Bear Lake that contain conditions regarding when Big Bear Municipal will release water from Big Bear Lake and when Big Bear Municipal will acquire in-lieu water for Bear Valley Mutual.

On February 16, 1995, the SAR Water Quality Control Board adopted Order No. 95-4, which requires that Big Bear Municipal make releases from Big Bear Lake through Bear Valley Dam to provide water for preservation of fish in Bear Creek.



On February 1, 1996, Big Bear Municipal and Valley District entered into an agreement that provides for Valley District to furnish all in-lieu water that Big Bear Municipal needs to meet the water supply demands of Bear Valley Mutual.

As a result of the stipulated Judgment, Big Bear Lake is now maintained at higher levels for recreational uses. The lake will spill (i.e., need to release water because the reservoir is full) more often than occurred under the historic irrigation supply operation. However, inflow to the SAR during irrigation months may be less than historic irrigation releases. Inflow to the SAR during winter months may be greater than under the historic operation of Bear Valley Dam. The changes in the operation of Big Bear Lake from an irrigation water supply reservoir to a recreation reservoir result in changes in the timing and amounts of water Big Bear Lake and Bear Creek contribute to the SAR.

1.5.10.3 Settlement Agreement with San Bernardino Valley Water Conservation District

Within the settlement agreement dated August 9, 2005, Valley District, Western, and the SBVWCD have agreed to work cooperatively to develop an annual groundwater management plan. A copy of the agreement is provided in Appendix A.

1.5.10.4 Memorandum of Understanding (MOU) with the City of Riverside

In September 2005, Valley District, Western, and the City of Riverside entered into an MOU. The MOU stated that the intent of Valley District/Western is to work cooperatively with the City of Riverside to devise institutional and physical arrangements through which the city could directly benefit from “new conservation” undertaken as part of the Western Judgment and the pending Valley District/Western water right applications. The MOU states, “The Parties (Valley District, Western, and the City of Riverside) shall engage in good-faith negotiations with the goal of reaching a long-term agreement relating to the purchase, storage, and sale to Riverside by Western of imported water stored in the SBBA, and relating to storage, transport and delivery of conservation water from the Seven Oaks Dam...”

1.5.10.5 Institutional Controls and Settlement Agreement (ICSA)

The City of San Bernardino Municipal Water Department (SBMWD) is a party to a consent decree lodged with the United States District Court, Central District of California, Western Division (Court), on August 18, 2004. The Consent Decree obligates SBMWD to operate and maintain a system of wells and treatment plants known as the Newmark Groundwater Contamination Superfund Site (Newmark Site). The Newmark Site specifically treats groundwater contaminated with trichloroethylene (TCE) and perchloroethylene (PCE). The

SBMWD is required by the terms of the Consent Decree, entered on March 23, 2005, to enact institutional controls and implement an ordinance providing for the protection and management of the Interim Remedy set forth in the Record of Decisions and Explanation of Significant Differences prepared by the U.S. Environmental Protection Agency.

The City of San Bernardino Ordinance No. MC-1221, approved in March 2006, establishes the management zone boundaries within the City of San Bernardino for water spreading and water extraction activities. The Consent Decree requires the City of San Bernardino to implement an ordinance to ensure that activities occurring in the management zone do not interfere or cause pass-through of contaminants from the Newmark and Muscoy Operable Units. The Interim Remedy requires the extraction of contaminated groundwater from the Bunker Hill Groundwater Basin and within the Newmark and Muscoy Operable Units, and treatment of the groundwater to meet all State and federal permits and requirements for drinking water. A permit by the SBMWD pursuant to the provisions outlined in the ordinance should first be obtained for any spreading (artificial recharge) or extracting (well pumping) within the Management Zones, as defined in the ordinance.

An ICOSA has been executed to develop and adopt a successor agreement, titled Institutional Controls Groundwater Management Program (ICGMP), between the following parties:

- (1) City of San Bernardino Municipal Water Department
- (2) Valley District
- (3) Western Municipal Water District
- (4) City of Riverside
- (5) West Valley Water District
- (6) East Valley Water District
- (7) City of Colton
- (8) Riverside Highland Water Company

The parties listed above will not be subject to the provisions of City of San Bernardino Ordinance No. MC-1221 as long as each is a party to the ICOSA and, subsequently, the ICGMP Agreement.

1.5.10.6 Settlement Agreement between City of San Bernardino and City of Riverside and Riverside Water Company

In November 1922, after a Supreme Court of the State of California decision, the City of San Bernardino (Plaintiff) and the City of Riverside and Riverside Water Company (Defendants) negotiated a settlement agreement to take, divert, and use



Upper Santa Ana River Watershed Integrated Regional Water Management Plan

water from the “San Bernardino Artesian Basin,” Lytle Creek, Warm Creek, and Devil Canyon Creek. The agreement was approved by the San Bernardino County Superior Court in a stipulated judgment that constituted authorities and rights of the parties for taking, diverting, and using the water. The court also established a provision for daily record keeping of all the diversions and use of water by all said parties.

1.6 Purpose and Need for the IRWM Plan

The primary purpose of this IRWM Plan is to assist local agencies with developing tools for optimizing management and the use of the region’s water resources while protecting the groundwater basins from water quality degradation and the threat of liquefaction. The implemented IRWM Plan will reduce reliance on imported water during the drought periods and optimize the use of both native and imported supplies to help meet water demands even during extended periods of below-average precipitation. Basin management objectives, an integral component of the IRWM Plan, will facilitate formulation of specific strategies and projects to meet local and regional drought-year water needs through conjunctive management, while ensuring that no particular water supply resource is jeopardized. The purpose of the plan as stated above is consistent with the intent and requirements of the Integrated Regional Water Management Planning Act and Groundwater Management Planning Act of 2002 described in Section 1.5. Below are the specific needs for developing this plan.

1.6.1 *Uncertainty of Imported Water Alone to Meet Long-Term Needs*

The water purveyors within the region will rely on imported water from the SWP to meet a portion of their water needs through groundwater recharge and direct deliveries into the future. Valley District’s annual entitlement to SWP water is 102,600 acre-feet. Other SWP contractors in the region include SGPWA. There is uncertainty of SWP delivery capability in dry years and the expected SWP water deliveries are less than anticipated when the contracts were signed. In November 2005, DWR released the “Public Review Draft” of “The State Water Project Delivery Reliability Report 2005.” This report presents water delivery capability of the SWP under various hydrologic conditions. Modeling was used to estimate the SWP water delivery capabilities. Table 1-1 summarizes the results of the SWP modeling efforts conducted for the report.

Table 1-1
SWP Dry Year Delivery as a Percentage of SWP Table A Entitlement

| Study | Average 1922-94 | Lowest Single-Year Delivery 1977 | Lowest Two Consecutive Year Delivery 1976-77 | Lowest Six Consecutive Year Delivery 1987-92 |
|--|--------------------|---|---|---|
| – 2005 Level of Demand | 68% | 4% | 41% | 42% |
| – 2030 Level of Demand | 77% | 5% | 40% | 42% |
| Public Draft of the State Water Project Delivery Reliability Report, 2005. | | | | |

The modeling results indicate that in a six-year dry period, SWP delivers less than half of its contractors’ entitlements and in a 1977 drought-year type, SWP



can deliver only about five percent of its contractors' entitlements. Based partly on these projected SWP deliveries, the water purveyors within the region desire to improve their local and regional water supply reliability during future droughts and, therefore, have prepared this plan to manage their groundwater basins conjunctively with other sources in an effort to optimize their use.

In addition, the Seven Oaks Accord calls for Valley District/Western to cooperatively develop an integrated groundwater management plan that is intended to maintain groundwater levels at a number of specified wells owned and operated by the other parties. The Accord requires that this integrated management program be adopted within five years of SWRCB approval of the Valley District/Western water right applications.

This IRWM Plan will satisfy these requirements of the Accord for preparation and adoption of an integrated groundwater management plan for the SBBA.



The California Aqueduct conveys water from Northern California into the Region.

1.6.2 Threat of Liquefaction in the Pressure Zone

Liquefaction is a form of seismically induced ground failure. In cohesionless, granular material having low relative density, such as loose sandy sediment, seismically induced vibrations can disturb the particle framework, leading to increased compaction of the material and reduction of pore space between the grains. If the sediment is saturated, water occupying the pore spaces resists this compaction and exerts pore pressure that reduces the contact stress between the sediment grains. With continued shaking, transfer of intergranular stress to pore water can generate pore pressures great enough to cause the sediment to lose its strength and change from a solid state to a liquid state, called liquefaction. This mechanical transformation can cause various kinds of ground failure at or near the ground surface.

The liquefaction process typically occurs at depths less than 50 feet below ground surface. Diminished susceptibility to liquefaction as depth increases is caused by an increase in overburden pressure and induration of sedimentary deposits. The depth to groundwater and distance to the causative fault affect the relative susceptibility to liquefaction. Much of the San Bernardino Valley is located in an area of liquefaction susceptibility. The most likely scenario for significant liquefaction to occur in the San Bernardino Valley would be as a

result of an earthquake on the adjacent San Andreas, San Jacinto, or Cucamonga faults (Matti and Carson 1991).

The main zones of elevated liquefaction susceptibility within the San Bernardino Valley are associated with shallow groundwater that occurs under the modern floodplains of Cajon Creek, Warm Creek, and the SAR. Recently deposited Holocene sediments that would be expected to have lower penetration resistance and higher susceptibility than older sediments underlie these areas. However, even the older Holocene and uppermost Pleistocene sediments have elevated susceptibilities comparable to those in the younger deposits. This fact accounts for zones of high and moderately high susceptibility that extend away from the modern floodplains and into adjacent areas underlain by older deposits (Matti and Carson 1991).

In the southern part of the SBBA, on the northeast side of the San Jacinto fault, there are approximately 1,200 feet of unconsolidated and partly consolidated water-bearing deposits. In the area between Warm Creek and the SAR, the upper confining member of this aquifer acts to restrict vertical flow, causing semi-confined conditions in the upper 50 to 100 feet of saturated materials (Dutcher and Garrett 1963). This area is considered the Pressure Zone of the SBBA and is also referred to as the Area of Historic High Groundwater. Historically, this scenario resulted in perched, very shallow groundwater conditions, at times rising to ground surface level, which increased the potential for liquefaction and locally flooded buildings in the City of San Bernardino. Groundwater pumping since the early 1900s increased the minimum depth to groundwater in this area to 50 feet by the 1960s but, during the 1970s and 1980s, groundwater was locally within 10 feet of the ground surface beneath the City of San Bernardino (CDMG 1976, Matti and Carson 1991).

In the past, groundwater levels in the Pressure Zone rose high enough under these semi-confined conditions to cause rising water and increase the potential for liquefaction. High groundwater levels in this area have damaged building foundations, flooded basements and utility structures, and increased the potential for liquefaction in this seismically active region. The Pressure Zone is located wholly within the City of San Bernardino. In the 1930s and 1940s, some wells in the Pressure Zone flowed artesian as shown below. Over the long-term, however, groundwater levels in the Pressure Zone are dropping with the depth to groundwater increasing.



The San Bernardino Basin area has unusually high groundwater levels in its history. This photo shows an artesian well.

High groundwater in the Pressure Zone is further aggravated by the direction of groundwater flow in the Bunker Hill Basin, which is generally in a southwesterly direction from the San Bernardino Mountains to the San Jacinto fault. The fault zone generally runs perpendicular to the groundwater flow and acts as a barrier, or partial barrier, causing the groundwater to “dam up” behind the fault and rise upward toward the land surface.

An objective of this IRWM Plan is to develop tools that might be used by water agencies to manage the groundwater levels in the Pressure Zone to reduce the risk of liquefaction in the area. Specific BMOs will be developed to manage the basin in order to reduce the associated risks.

1.7 IRWM Plan Planning Process

As the lead agency, Valley District facilitates meetings and coordinates preparation of the draft and final IRWM Plan. The district is organizing meetings and facilitating exchange and sharing of data and information among its members. Valley District has also signed a contract with DWR to receive a grant for preparation of the IRWM Plan and to provide contract administrative functions. Members of the Association who participate in the planning process and develop the IRWM Plan represent their respective agencies and provide comments on the planning process, studies, and the draft IRWM Plan. They also provide status reports to their agency boards. The final IRWM Plan will be presented to each agency's governing board or council for adoption.

1.7.1 Technical Advisory Group Member Agencies

In 2005, the TAG was formed to act as the "Regional Management Group" for preparing the IRWM Plan. The TAG consists of 14 members (see Section 1.2). Descriptions of each of the member agencies participating in the IRWM Plan preparation and their water management activities in the region are provided in Section 1.8.

1.7.2 Public Participation

The TAG developed and implemented the public involvement process to ensure that the public was also informed about the development of the IRWM Plan. This process included regularly scheduled meetings of the TAG throughout the IRWM Plan process that allowed the public recurring opportunities to provide its input. The public was given the opportunity to participate in the planning process in the following ways:

- Attending public meetings of the TAG. TAG meetings were designed to be public meetings. Notice was given in local publications about the meetings and how to get timely and up-to-date information about the planning process.
- Availability of the public draft of the plan was announced in local newspapers. The draft plan was made available to the public for review and comment. Comments were reviewed by the TAG and were incorporated as appropriate.
- The public was invited to provide written comments to Valley District throughout the planning process.
- The public was invited to attend all of the public hearings conducted during the planning process. Notice of these hearings was published in



two local newspapers prior to the scheduled meeting time. Each hearing notice included an agenda and the time and location of the hearing. Members of the TAG were at the hearings to answer questions, solicit input, and increase public awareness of the proposed IRWM Plan. Proof of Publication for each hearing can be found in Appendix D. Meeting minutes and board resolutions relating to the IRWM Plan development and adoption process are also included in Appendix D.

- The TAG held four public hearings, as follows:
 1. On May 9, 2005, Valley District, as the lead agency, conducted a public hearing to brief the public of its intent to act as the lead agency on behalf of the Association for purposes of submitting applications and entering into an agreement(s) to receive a planning grant and/or an implementation grant pursuant to the Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002, Water Code Section 79560 *et seq.*, (Proposition 50).
 2. On March 15, 2006, Valley District, as lead agency, held a public hearing and adopted a resolution of intent to prepare an IRWM Plan.
 3. On April 5, 2006, Valley District, acting as the lead agency, held a public hearing (after publication of a notice that included the schedule and location of the hearing) to inform the public of its adoption of a resolution of intent to prepare an IRWM Plan. The focus of the meeting was to brief the public and interested parties about the planning process, schedule, content, and how the public could provide input in developing the water management plan. Interested parties and the general public were encouraged to attend the hearing and provide comments to Valley District. At this hearing, the lead agency also described the manner in which interested parties could participate in developing the IRWM Plan.
 4. In December 2007, Valley District, acting as the lead agency, will hold a public hearing after publishing a notice of intent to hold a hearing to receive comments on the public draft of the IRWM Plan and the intent to adopt the plan. The notice will include a summary of the plan and state the means of providing copies of the plan to interested parties. Member agencies of the TAG will participate in this hearing.

- Each agency who participated in the TAG published a notice informing the public of its intention to participate in the planning process and held a public meeting to determine whether to adopt a resolution to engage in preparation of the agency’s IRWM Plan, as documented in Appendix D.
- Throughout the development of the IRWM Plan, members of the TAG presented quarterly, or more frequent, status updates to their governing boards or board subcommittees at regularly scheduled meetings. These public meetings included a posted agenda item for the IRWM Plan. The public was encouraged to participate in these meetings.
- The governing bodies of the participating agencies scheduled a discussion of the draft plan in their regular meetings, provided information to the public regarding the content of the draft plan, and received comments prior to adopting the IRWM Plan. The TAG also coordinated the development of the IRWM Plan with SWRCB and DWR. The final IRWM Plan will be submitted to DWR and SWRCB, pursuant to the guidelines.
- The San Bernardino Valley Municipal Water District Advisory Commission on Water Policy (Advisory Commission) has been established to advise Valley District on water policy issues within its service area. The water purveyors and governmental entities in Valley District’s service area have representatives on the Advisory Commission. During the preparation of the IRWM Plan, the Advisory Commission met on a regular basis, and the staff and consulting team briefed the Advisory Commission on development of the IRWM Plan. The Advisory Commission members showed a great level of interest in development of the IRWM Plan and provided guidance on the issues.

SBVMWD Advisory Commission on Water

Mission Statement

“It shall be the function of the Commission to study and make recommendations to the Board of Directors on matters of water policy for the District. The Commission shall study such matters of water policy as are submitted to it by the Board for Consideration and may study such other matters of water policy as the Commission deems appropriate.” SBVMWD Ordinance No. 61, July 6, 1987.

The public was invited to these meetings and participated in the discussions.

- The Advisory Commission held a public meeting on October 18, 2007, to receive public comments on the Draft IRWM Plan.



In summary, the Advisory Commission and the TAG encouraged public participation in preparation of the IRWM Plan to ensure the public's comments were considered in decisions about water management in the region.

1.7.3 Dispute Resolution Process

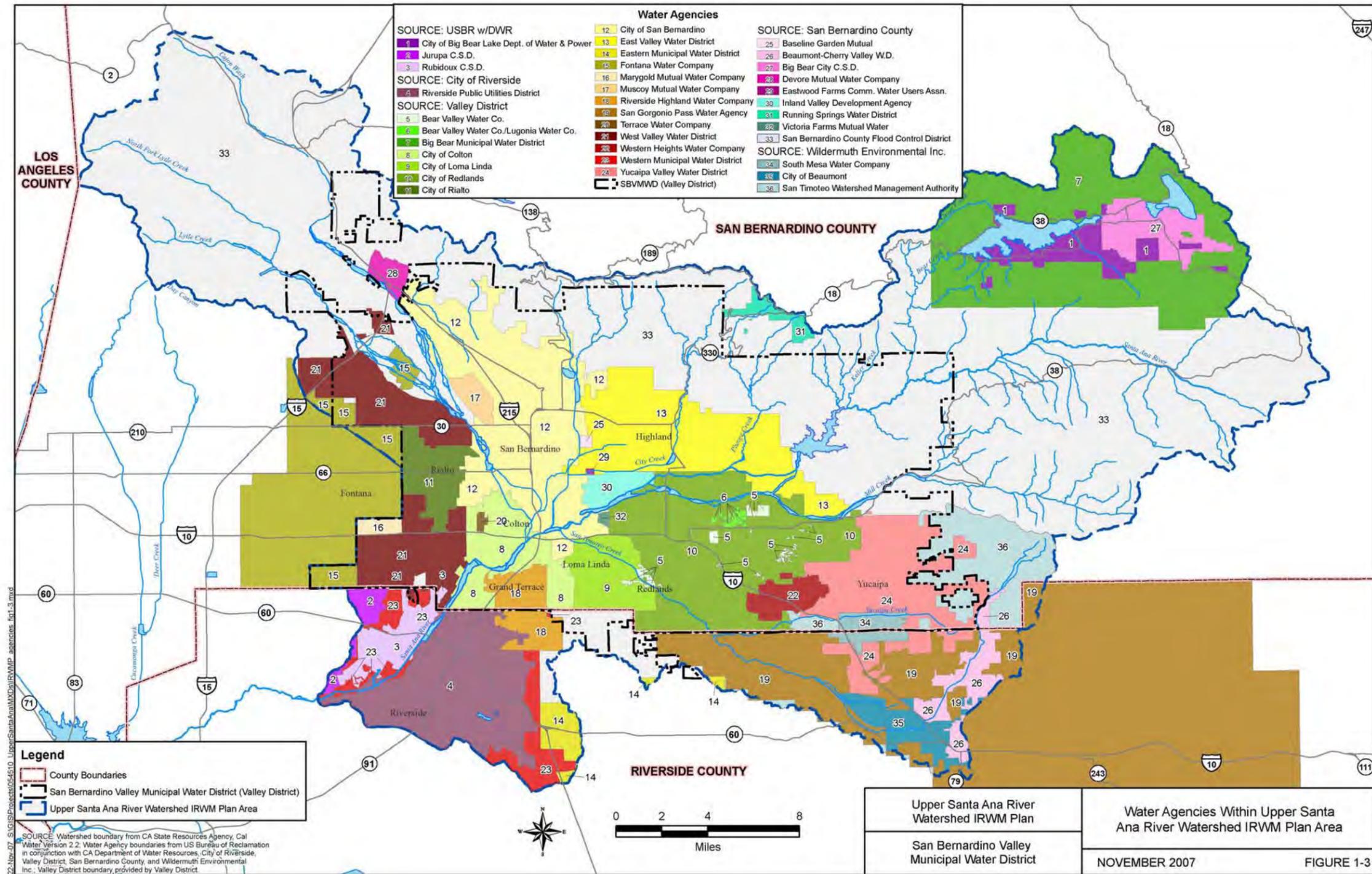
The TAG was effectively used as a tool for the resolution of water management issues in the basin. Discussion of issues in the TAG meetings, an open and transparent process, resulted in a cooperative relationship between water users of the basin. The management process for the SBBA involves the creation of the Basin Technical Advisory Committee (BTAC). It is anticipated that the BTAC will provide a forum for discussion and early resolution of water issues in the region. If the dispute cannot be resolved at this level, it will be elevated to the policy level (Advisory Commission, Board of Directors, City Councils, etc.).

1.8 Water Agencies in the Region

Numerous agencies provide water services to communities within the IRWM Plan Area. Figure 1-3 shows the boundaries of water agencies within the region. A brief description of each member of the TAG as well as other water purveyors in the region is presented below.



Figure 1-3
Water Agencies in the Region



1.8.1 San Bernardino Valley Municipal District

Valley District was formed in 1954, under the Municipal Water District Act of 1911 (California Water Code Section 71000 et seq.) as a regional agency to plan a long-range water supply for the San Bernardino Valley. It imports water into its service area through participation in the SWP and manages groundwater storage within its boundaries. Its enabling act includes a broad range of powers to provide water, wastewater and stormwater disposal, recreation, and fire protection services. Valley District does not deliver water directly to retail water customers.

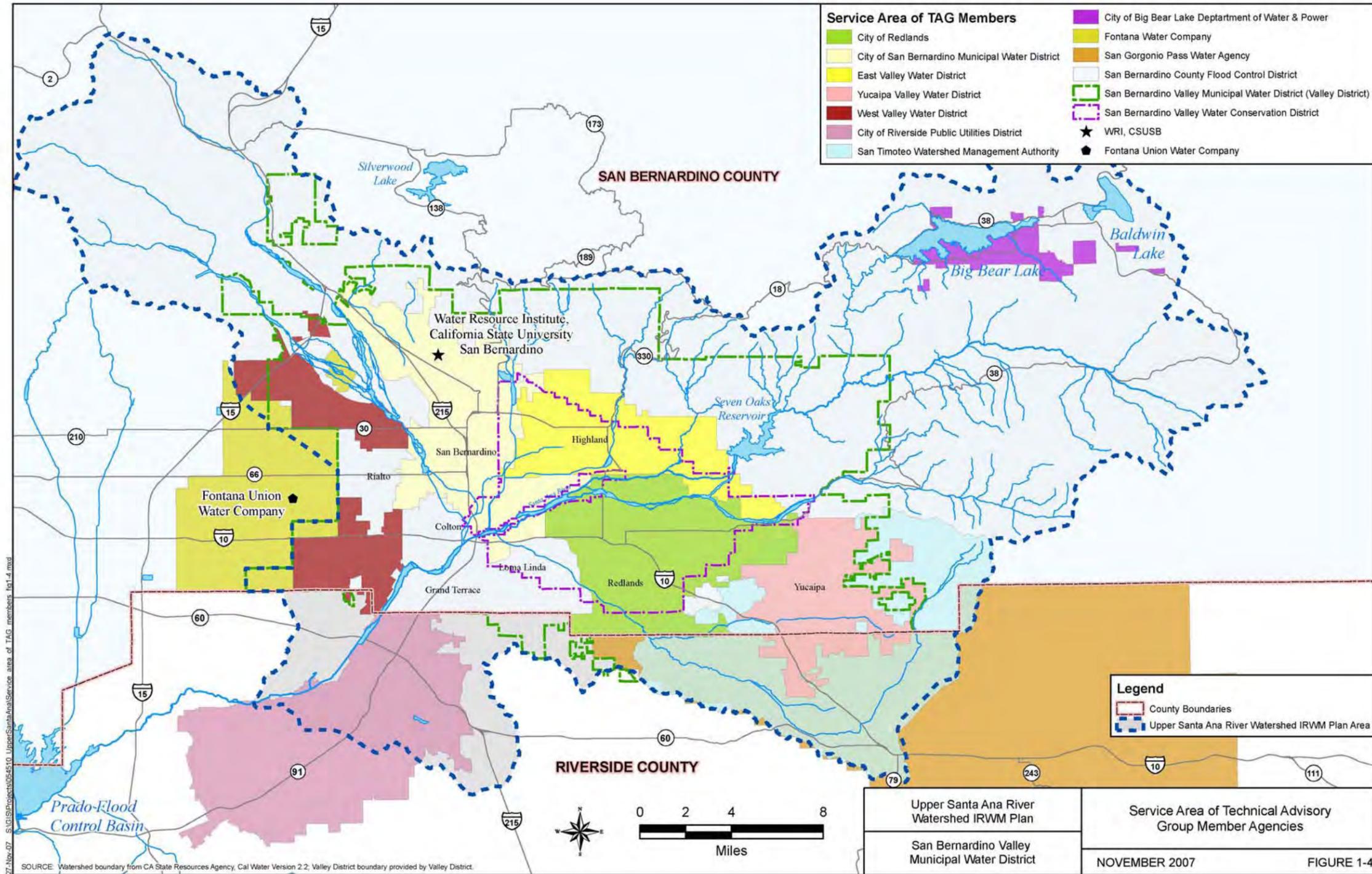
Valley District covers about 325 square miles mainly in southwestern San Bernardino County, about 60 miles east of Los Angeles, and has a population of about 600,000. It spans the eastern two-thirds of the San Bernardino Valley, the Crafton Hills, and a portion of the Yucaipa Valley and includes the cities and communities of San Bernardino, Colton, Loma Linda, Redlands, Rialto, Fontana, Bloomington, Highland, East Highland, Grand Terrace, Mentone, and Yucaipa. A map illustrating Valley District's service area and the locations of other members of the TAG are shown in Figure 1-4.

Valley District is responsible for long-range water supply management, including importing supplemental water, and is responsible for most of the groundwater basins within its boundaries and for groundwater extraction over the amount specified in the aforementioned judgments. It has specific responsibilities for monitoring groundwater supplies in the San Bernardino and Rialto-Colton Subbasin and maintaining flows at the Riverside Narrows on the SAR. It fulfills its responsibilities in a variety of ways, including importing water through the SWP for direct delivery and groundwater recharge and coordinating water deliveries to retail agencies throughout its service area.

Valley District cooperates in a program to help replenish groundwater, using both SWP water and local runoff. It takes delivery of SWP water at the Devil Canyon Power Plant Afterbay, which is located just within its northern boundary. Water is conveyed 17 miles eastward to various spreading grounds and agricultural and wholesale domestic delivery points in the San Bernardino Basin. Water is also conveyed westward for direct delivery in the Colton-Rialto Subbasin.



Figure 1-4
Service Area of Technical Advisory Group Member Agencies



In the 1960s, the over-commitment of water in the SAR watershed led to lawsuits between water users in the upper and lower watersheds regarding the use of both surface flows and groundwater. The lawsuits culminated in 1969 in the Orange County and Western Judgments as they were previously described. Under the terms of the settlements, Valley District became responsible for providing a specified SAR base flow to Orange County and maintaining the safe yield of the SBBA. If the conditions of either judgment are not met by the natural water supply, including new conservation, Valley District is required to deliver supplemental water to offset the deficiency. The judgments resolved the major water rights issues that had prevented the development of long-term, region-wide water supply plans and established specific objectives for the management of the groundwater basins.

Valley District is legally required to maintain a flow equivalent to approximately 15,250 acre-feet per year at the Riverside Narrows on the SAR. This requirement is currently met with about 25,000 acre-feet per year of treated wastewater from the Cities of San Bernardino, Colton, and Rialto that is discharged to the SAR. Valley District has contracts with the Cities of San Bernardino and Colton that obligate a portion of their treated wastewater flows to meet this requirement. As a result of this discharge and normal streamflow in the SAR, Valley District has never had to use imported water to augment flows in the SAR. In addition, under terms of the adjudication, as of the end of the 2003-2004 water year, Valley District had 275,423 acre-feet in credit for flows in excess of requirements during prior years. It could, if needed, use these water credits to meet this part of its legal obligation during dry years, subject to a minimum annual flow of 12,420 acre-feet at the Riverside Narrows.

In March 2006, Valley District and DWR entered into an agreement and signed a contract to receive funding for the preparation of the IRWM Plan. Valley District, as the regional lead agency, is responsible for the IRWM Plan completion.

1.8.2 San Bernardino Valley Water Conservation District

The mission of the SBVWCD is to ensure that recharge of the Bunker Hill groundwater basin is accomplished in an environmentally and economically responsible way using local native surface water to the maximum extent practicable.

The SBVWCD and its predecessors have conducted water conservation (groundwater recharge) activities since 1912 or earlier in two areas that overlie the Bunker Hill groundwater basin in the San Bernardino Valley. These areas are at the upper end of the SAR wash area and on Mill Creek just upstream of the confluence with the SAR (collectively, the wash area). The SBVWCD diverts



surface water flows during both storm and normal runoff from the SAR and Mill Creek and channels the flows into two separate systems of recharge basins where it percolates into the groundwater basin for later pumping and use by local entities and private producers.

The SBVWCD's boundaries encompass more than 78.1 square miles and include portions of the communities of San Bernardino, Loma Linda, Redlands, and Highland, as well as the unincorporated county area of Mentone and various county "islands" within the incorporated cities.

1.8.3 City of Redlands

For more than 90 years, the City of Redlands has been providing high-quality drinking water to the Redlands and Mentone areas. Currently, the city has 21,000 water service connections. The city completed and adopted an UWMP in 2005.

More than 75,000 residents in Redlands, Mentone, parts of Crafton Hills and San Timoteo Canyon, and a small part of San Bernardino depend on the Redlands Municipal Utilities Department to provide water service to their homes and businesses. By supplying a blend of local groundwater, local surface water, and water imported from the SWP, the Redlands Municipal Utilities Department meets its customers' daily demands, which average 25 million gallons per day and peak at 48 million gallons per day.

The city also owns and operates a sewer collection system and a six million-gallon-per-day water reclamation plant that produces water for use at the Southern California Edison Mountainview Power Plant and by other irrigation users.

1.8.4 West Valley Water District

West Valley Water District (West Valley) is located mainly within southwestern San Bernardino County and to a lesser amount within northern Riverside County. It is part of the greater San Bernardino-Riverside-Ontario metropolitan area. It is situated in the San Bernardino Valley and within the SAR watershed.

The principal service area of West Valley is approximately 29.5 square miles, with an additional 5.2 square miles within its sphere of influence. The majority of its service area lies within Valley District's boundaries. West Valley currently has 18,000 water service connections. West Valley completed and adopted an UWMP in 2005.

1.8.5 East Valley Water District

East Valley Water District is a special district formed in 1954 through an election by local residents who wanted water service by a public water agency. Originally called the East San Bernardino County Water District, it was formed to provide domestic water service to the then unincorporated and agriculturally based communities of Highland and East Highland. Later, as the population increased, the need for a modern sewer system to replace the septic tanks became apparent. The residents voted to give East Valley Water District the responsibility for their sewer system, as they had done earlier with their water service.

Over the years, some of the service area was annexed to the City of San Bernardino, but water service remained with the district, primarily due to logistics and cost. In 1987, the City of Highland incorporated. Now, the district's previously agriculture-dominated area is urbanized, and few orange groves remain. Before September 2000, the service area was approximately 28.5 square miles. An annexation in September 2000 increased the service area by approximately five square miles and includes the Greenspot area. The district services approximately 65,000 persons. All services are financed solely by rates; customers pay only for the benefits and services they receive. The district currently has 21,827 water service connections.

The forefathers of the East Valley Water District, anticipating a higher demand and a larger customer base, obtained water rights that date back over 100 years for the use of surface water from the SAR. Today, this surface water meets one-quarter of the district's water needs. The district completed and adopted an Urban Water Management Plan in 2005.

1.8.6 San Bernardino Municipal Water Department

SBMWD meets its customers' needs by providing high-quality service in water supply, water reclamation, and geothermal heating.

SBMWD produces all of its own water, using 60 wells located in 45 square miles of water service area and delivering it to more than 40,000 service connections through 551 miles of water mains. The City of San Bernardino reclaims over 30 million gallons of water each day, using innovative and cost-effective methods to make the reclaimed water safe for the environment and for reuse. The city completed and adopted an UWMP in 2005.

1.8.7 Yucaipa Valley Water District

YVWD is a special district that provides water supply, treatment, and distribution; recycled water supply and distribution services; and wastewater



collection and treatment. Formed in 1971, it acquired many of the private water companies serving the Yucaipa Valley. Its most recent consolidations of water services occurred with the acquisition of the Harry V. Slack Water Company in 1987 and the Wildwood Canyon Mutual Water Company in 1992. YVWD currently satisfies the majority of its water demands from groundwater supplied through district-owned wells located throughout the service area. An extensive distribution system provides water storage and transmission throughout YVWD's 18 pressure zones. The only supply of surface water is provided through the Oak Glen Water Filtration Plant. Additional water sources that are expected to be available to the district in the near future include imported water through the SWP and recycled water from its wastewater treatment plant. The district completed and adopted an UWMP in 2005.

1.8.8 City of Riverside

The City of Riverside Public Utilities (RPU) Department provides potable water, non-potable water, recycled water, and electricity to the City of Riverside and was established in 1895 (electricity) and 1913 (water). The City of Riverside currently serves water to a population of 287,800 through 62,985 service connections within an area of 73.9 square miles. RPU is committed to providing the highest quality water and electric services at the lowest possible rates to benefit the community. RPU completed and adopted a Water Supply Plan in 2004 and an UWMP in 2005.

RPU produced 79,275 acre-feet of water between July 2005 and June 2006. As of 2005, RPU's annual water export rights in Bunker Hill basin were about 52,033 acre-feet. Export rights may increase with acquisition of additional rights in mutual water companies. RPU produces water from other basins – Rialto-Colton, Riverside North, and Riverside South. Annual total water demand is expected to increase from 77,767 acre-feet in 2005 to an estimated 104,374 acre-feet by 2030. RPU plans to develop additional water resources to meet future growth in demand. By 2030, available and planned water resources to meet demand would total about 116,421 acre-feet per year.

1.8.9 Water Resources Institute /California State University, San Bernardino

The Water Resources Institute /California State University San Bernardino (WRI-CSUSB) was established by the faculty senate in 1999. The senate and the university administration recognized that water is one of the most precious resources in its service area (San Bernardino and Riverside Counties) and set out to make water an area of distinction at this campus.

The WRI-CSUSB operates an extensive water resource archive that includes maps; aerial photographs; newspaper articles; water and environmental reference

books; and federal, State, and local government documents, studies, and reports. This archive is gradually being digitized to make it more accessible to users. It also includes water and environmental data and metadata, thus expanding the concept of an archive beyond the original concept of hard copies of old documents.

The WRI-CSUSB is an interdisciplinary center for research, policy analysis, and education. The full-time staff is engaged in a variety of partnerships providing technical assistance to public and private water stakeholders. The WRI-CSUSB specializes in integrated watershed projects promoting land use practices that minimize the impact of development on watershed functions. The WRI-CSUSB manages the Alluvial Fan Task Force for DWR by working with stakeholders in the watershed on resource-efficient guidelines for developing on alluvial fan floodplains. The WRI-CSUSB assists the Local Government Commission with presenting the Ahwahnee Water Principles for Resource Efficient Land Use to elected officials and developers on the connection between land use and water. The WRI-CSUSB partners with California Resources Connection, Inc. on the Inland Empire Sustainable Watershed Program developing Green Building Practices and Model Ordinances to overcome obstacles in resource-efficient land use.

1.8.10 San Bernardino County Flood Control District

The San Bernardino County Flood Control District (SBCFCD) was formed as a special district in April 1939 after the 1938 floods in the County of San Bernardino. The SBCFCD's functions include flood protection from major streams, flood control planning, storm drain management, debris removal programs, right-of-way acquisition, flood hazard investigations, and flood operations. The SBCFCD has numerous Master Plans of Drainage (MPD) for various areas within the county. An MPD is a coordinated plan of flood control improvements for an area based on its future planned development. It identifies existing flood control facilities that are inadequate to convey the 100-year peak storm flows, including needed improvements to existing facilities and new facilities that need to be constructed to provide an adequate level of flood protection. Since its inception, the SBCFCD has worked with United States Army Corps of Engineers (USACE) to develop federally funded major flood control facilities in the county. It manages its activities through six physical flood control zones. The budget projections are also determined for each zone through an annual budget study with most of the zones also having a 10-year plan. SBCFCD is also participating with Inland Empire Utilities Agency and Chino Basin Water Conservation District on the Chino Basin Recharge Improvement Project.



1.8.11 San Gorgonio Pass Water Agency

The San Gorgonio Pass Water Agency (SGPWA) was established in 1961 by the California State Legislature. Its boundaries extend through the cities of Calimesa, Beaumont, and Banning, and the Riverside County areas from Cherry Valley to Cabazon. The service area includes the incorporated cities of Calimesa, Beaumont, and Banning, and the communities of Cherry Valley, Cabazon, and the Banning Bench.

SGPWA, one of 29 State Water Contractors, purchases water from the State of California and sells it to local retail water agencies. Water is imported into the service area by the California Aqueduct. The final link of the SWP to the Pass region, the East Branch Extension, was completed in 2003. Phase 2 of the East Branch Extension is expected to be completed by 2011. Phase 2 will bring the capacity of the Extension to 17,300 acre-feet, which is the Agency's official allotment of SWP water. 17,300 acre-feet of water is enough to supply approximately 35,000 families each year.

SGPWA operates the Little San Gorgonio Creek Recharge Facility on Orchard Street in Cherry Valley. The facility includes six ponds in which SWP water is placed to percolate into the ground to recharge the Beaumont groundwater basin. The facility was partially funded by a Prop 13 grant from the State and SAWPA. SWP water is pumped to the facility via the East Branch Extension. The Cherry Valley Pump Station, located at the corner of Orchard Street and Taylor Street, is the terminal pump station on the Extension.

1.8.12 City of Big Bear Lake Department of Water and Power

The City of Big Bear Lake Department of Water and Power (BBLDWP) is nestled in the San Bernardino Mountains at approximately 6,750 feet above sea level. With more than 15,000 customers, BBLDWP is dedicated to providing the City of Big Bear Lake, Moonridge, Fawnskin, Sugarloaf, Lake William, and portions of Erwin Lake and Rimforest with a safe, reliable source of water for public health and safety.

BBLDWP's water supplies come from snow and rain that percolates into the groundwater basin. As of 2006, the BBLDWP service area is in its sixth year of drought and water efficiency is more important than ever for meeting water demands of the service area. BBLDWP does not use lake water for public health and safety and no additional water is imported into the Big Bear Valley.

Key components of the water system include adequate source capacity (wells) and storage capacity (reservoirs) to meet peak holiday and weekend demands; replacement of old, leaky, undersized steel mainlines to provide adequate fire

flow; and ongoing/recurring rehabilitation of older system components (buildings, reservoirs, pumps, motors, etc.) to ensure reliable service.

BBLDWP maintains 50 wells, 13 booster stations, 17 reservoirs, 16 chlorination stations, 20 sample stations, approximately 170 miles of water main pipeline, and a complex pressure-reducing network.

BBLDWP has an aggressive water conservation program that has significantly reduced summertime consumption over the past several years. Community outreach programs keep customers informed on current water conditions, and the Technical Review Team monitors, evaluates, and analyzes well and water consumption data on a continual basis. BBLDWP's five-member Board of Commissioners is appointed by the City of Big Bear Lake's City Council and is made up of policy makers committed to safeguarding its water resources. BBLDWP is dedicated to fiscal responsibility while focusing its resources on improving the infrastructure and ensuring that the current and future water needs of the community are met. BBLDWP prepared an UWMP that was adopted in April 2006.

1.8.13 Fontana Union Water Company

Fontana Union Water Company (Fontana Union) is a mutual water company and does not directly deliver water to domestic customers. Fontana Union has long-standing adjudicated vested rights to Lytle Creek surface and subsurface flows and Lytle Creek Basin groundwater, as well as groundwater rights in Rialto Basin and "No Man's Land." It delivers its available water to its shareholders in accordance with its Articles of Incorporation, Bylaws, and mutual water company law. Fontana Union is 97 percent owned by Cucamonga Valley Water District and San Gabriel Valley Water Company. Fontana Water Company, a division of San Gabriel Valley Water Company, diverts and produces water pursuant to its rights as Fontana Union's agent in accordance with a court-approved agreement. Under that court-approved agreement, Fontana Union allocates its Chino Basin pumping rights to Cucamonga Valley Water District, and Cucamonga also retains the option of taking delivery of its share of Fontana Union's other water sources.

1.8.14 San Timoteo Watershed Management Authority

STWMA was formed in January 2001 by BCVWD, Beaumont, the South Mesa Water Company, and the YVWD. The purpose of the STWMA is to prepare and implement a water resources management program for the San Timoteo watershed and the waters tributary thereto in order to conserve local water supplies, improve surface and groundwater quality and quantity, protect and enhance groundwater storage and recreational resources, preserve open space, protect wildlife habitat and wetlands, protect and enhance agriculture, and



develop and enhance the region's water resources for the benefit of the public. The water resources management program is to include watershed and basin monitoring; groundwater storage, banking and conjunctive use; stormwater capture and management; recycled water programs and projects; wetlands, wildlife, and open space protection; water quality protection and enhancement; and water conservation and efficiency.

1.8.15 Bear Valley Mutual Water Company

Bear Valley Mutual was formed in 1903 by the citrus growers of the Redlands/Highland area to give them a dependable water supply under their control. Bear Valley Mutual has pre-1914 water rights to the first 88 cfs of surface flow of the SAR. Bear Valley Mutual has appropriative rights on Bear Creek and a storage right in Big Bear Lake, as well as ownership of all the water inflow to the lake.

1.8.16 Beaumont-Cherry Valley Water District

BCVWD was formed in 1919 under the Wright Act of 1897 (Water Code Section 20000, et seq.) The District serves approximately eight square miles located in Riverside and San Bernardino Counties. BCVWD owns approximately 2,800 acres along Little San Geronio and Noble Creeks and holds pre-1914 water rights to both streams, which amounts to 3,000 miner's inches of water (approximately 45,000 acre-feet of right). The District has 20 wells in the Beaumont and Edgar Canyon Basins and currently serves about 30,000 consumers through 9,000 metered connections.

1.8.17 Big Bear Municipal Water District

Big Bear Municipal was formed in 1964 by the people of Big Bear Valley with the express purpose of stabilizing the level of Big Bear Lake. In January 1977, as a result of a stipulated judgment, Big Bear Municipal purchased title to the dam, reservoir lands lying beneath the lake, and the surface recreation rights to Big Bear Lake. As discussed above, Bear Valley Mutual has ownership rights to all water entering Big Bear Lake.

Big Bear Municipal is responsible for the following:

- Stabilization of the level of Big Bear Lake by managing the amount of water released to Bear Valley Mutual,
- Watershed/water quality management,
- Recreation management,

- Wildlife habitat preservation and enhancement, and
- Bear Valley Dam and Reservoir maintenance.

The judgment allows Big Bear Municipal to maintain a higher water level in the lake by delivering water to Bear Valley Mutual from an alternate source of water instead of from the lake. This alternate source of water is sometimes referred to as "in-lieu" water and mainly comes from the SWP. If Big Bear Municipal does not wish to purchase "in-lieu" water, it must deliver water from the lake to satisfy Bear Valley Mutual's demands. Studies performed for Bear Valley Mutual have estimated average lake releases to be 4,279 acre-feet per year.

1.8.18 City of Colton Public Utilities Department

The City of Colton's Public Utilities Department (Colton Public Utilities) provides water service within the City of Colton along with electric and wastewater service. Water sources include groundwater from the SBBA and the Rialto-Colton subbasin. Colton Public Utilities serves water to approximately 9,000 customers.

1.8.19 City of Loma Linda

The City of Loma Linda obtains groundwater from within the Bunker Hill subbasin area. Production facilities include six production wells, four above-ground steel reservoirs, and two in-ground pre-stressed concrete storage reservoirs, with a combined storage capacity of 14 million gallons. The reservoirs provide storage to the city's five different pressure zones. There are six pressure-reducing stations in the distribution system that lower water pressure from one zone to another to provide constant regulated pressure. To transfer water between zones, there are six booster stations located in the different zones. Loma Linda also has an "emergency" connection to the City of San Bernardino to meet its supplemental needs. The city's population is approximately 20,000. Loma Linda also provides wastewater service.

1.8.20 City of Rialto

Residents of the City of Rialto obtain water from three purveyors: the Utilities Department of the City of Rialto (Rialto), West Valley, and Fontana Water Company (FWC). Rialto provides water service for approximately 12,000 connections. Generally, these are the more developed portions of the city (West Valley provides the water in the remaining areas).

Rialto obtains water from the Rialto-Colton groundwater subbasin, Lytle Creek Groundwater subbasin, SBBA, and the "Chino wells" (these wells are not located within the adjudicated boundaries of Chino Basin). In recent years, most of these



sources have been impacted by groundwater contamination (most significantly, perchlorate contamination of the Rialto-Colton subbasin and the Chino wells). Rialto has adopted a “zero tolerance” policy for perchlorate, meaning that they will not serve water with any perchlorate even if it meets all of the public health standards. Rialto has installed treatment systems on some wells and is pursuing installation of additional treatment systems. In 2003, the City of Rialto declared a water shortage emergency in accordance with California Water Code Sections 350-359. Rialto operates wastewater service within the city and has recently initiated deliveries of recycled water to the California Department of Transportation. Rialto also produces and transports water to Marygold Mutual Water Company (Marygold) under a cooperative agreement that expires in 2008. Surface water treatment of Lytle Creek water is provided by a treatment plant operated by West Valley. Rialto owns a portion of the capacity of that plant.

1.8.21 Fontana Water Company

FWC, a division of San Gabriel Valley Water Company, is a public utility regulated by the California Public Utilities Commission. FWC’s service area covers approximately 52 square miles with boundaries including the San Gabriel Mountains to the north and the Riverside County Line to the south. FWC serves most of the City of Fontana and parts of Rancho Cucamonga, Ontario, and Rialto. FWC serves a population of approximately 158,000 with over 45,000 active service connections. Each year FWC produces between 45,000 – 50,000 acre-feet of water from water supply sources that include surface water from Lytle Creek and State Water Project water, which is treated at FWC’s Sandhill Water Treatment Plant and groundwater from the Lytle, Rialto, No-Mans Land, and Chino Basins. FWC diverts and receives Lytle Creek surface water and produces groundwater in the Lytle, Rialto, and No-Mans Land Basins as an agent for Fontana Union, which holds extensive water rights to these sources of supply pursuant to longstanding court judgments.

1.8.22 Marygold Mutual Water Company

Marygold serves customers generally located in the unincorporated community of Bloomington. Marygold obtains water from the Chino Basin (Marygold has rights to the appropriative pool of Chino Basin) and the SBBA. Water from the SBBA is currently produced and transported by Rialto under a cooperative agreement that expires in 2008.

1.8.23 Muscoy Mutual Water Company

Muscoy Mutual Water Company (Muscoy) serves the majority of the unincorporated community of Muscoy. The SBMWD serves the remainder of the Muscoy community. The community is located between the cities of San Bernardino and Rialto. All water produced by Muscoy is from the SBBA.

1.8.24 Regents of the University of California

The Regents have rights to water from the SBBA, which is used by the University of California Riverside (UCR). The water is delivered to UCR by the Riverside Public Utilities Department.

1.8.25 Riverside Highland Water Company

The Riverside Highland Water Company (Riverside Highland) serves both domestic and irrigation water in San Bernardino and Riverside Counties. Riverside Highland provides water to over 3,800 customers in the community of Grand Terrace located on the Riverside Mesa south of the SAR and a portion of the Highgrove area of Riverside County. RPU owns shares in Riverside Highland and has export rights to 333 acre-feet per year of Bunker Hill groundwater through those shares. Riverside Highland obtains water from the Lytle Creek subbasin, the SBBA, the Rialto-Colton subbasin, and the Riverside North Basin.

1.8.26 Other Water Purveyors in the Region

Other water purveyors in the region include the following:

- South Mesa Water Company serves water to part of the City of Calimesa.
- Terrace Water Company services an area located between the service areas of Colton Public Utilities and West Valley.
- Western Heights Mutual Water Company serves the southeast portion of the City of Redlands and a portion of the City of Yucaipa.
- Eastwood Farms Community Water Users Association provides water to a small portion of the City of Highland.
- Arroyo Verde Mutual Water District provides water to a small portion of the City of Highland.
- Victoria Farms Mutual Water Company serves a population of approximately 1,000.
- Inland Valley Development Agency is a joint powers authority comprised of San Bernardino County and the Cities of San Bernardino, Colton, and Loma Linda. Formed in 1990, the agency is responsible for the redevelopment of the non-aviation portion of the San Bernardino International Airport. A water integration agreement between the agency



and the City of San Bernardino calls for the city taking over ownership and operation of the agency's water system.

- Devore Mutual Water Company serves an area near the intersection of Interstate 15 and Interstate 215.
- Running Springs Water District serves the community of Running Springs.
- Arrowhead Park County Water District serves an area adjacent to the Running Springs Water District.
- Big Bear City Community Services District provides water service for unincorporated areas near Big Bear Lake.
- The City of Riverside owns stock in several mutual water companies including the Meeks & Daley Water Company. Ownership interests in the Meeks & Daley Company entitle the City of Riverside to export rights of about 3,000 acre-feet from the Bunker Hill Basin. As of December 2007, the City of Riverside owns about 38.642 percent of the total shares of the Meeks & Daley Water Company. Meeks & Daley Water Company was incorporated on September 1, 1885, and is the successor company to three Mutual Water Companies - Meeks & Daley Water Company, Agua Mansa Water Company, and the Alta Mesa Water Company. Meeks & Daley Water Company provides water to the stockholders for agricultural purposes. To fund operating expenses, the company assesses all shareholders twice per year based on the number of shares owed on the date of the assessment.

The company owns water rights in the Bunker Hill Basin and pumps water from a series of wells located within that basin, transporting this water through the Riverside and Gage Canals. At the end of the canal systems, Meeks & Daley Water Company operates a pipeline and pump station to deliver irrigation water to users in the southern portion of the City of Corona.

With the construction of additional delivery facilities in 1996, Meeks & Daley Water Company began delivering water to OCWD under the Orange County Water Transfer Project, with water delivered to the SAR for storage behind Prado Dam and subsequent release and groundwater recharge downstream. Riverside owns 59 percent of the Gage Canal Company stock. This company owns surface water rights to the SAR.

1.9 Contents of the IRWM Plan

Chapter 1, **Introduction**, presents the background of the IRWM Plan, explaining the plan area and why it was selected, and describing the relationship between the IRWM Plan and other planning efforts occurring within the plan area or region. Previous water resources planning work that has influenced the plan is briefly reviewed along with the laws, judgments, and agreements that shape the existing conditions and institutional arrangements found in the region. Finally, this chapter lays out the purpose, need, and intent of the IRWM Plan, and the planning process used by the primary water agencies in the region to develop the plan.

Chapter 2, **Description of the Integrated Regional Water Management Plan Area**, provides a description of the existing physical and institutional conditions in the plan area. This chapter describes the water-related infrastructure, physical (climate, hydrology, groundwater, environment, water quality), and socioeconomic conditions that shape the region and influence plan development and implementation.

Chapter 3, **Water Budget for Integrated Regional Water Management Plan Region**, provides an overview of the published water budgets for the region, describes the data source(s), presents water demands and supplies, and anticipated future water demands and supplies conditions for each of the subareas within the region.

Chapter 4, **Develop Integrated Regional Water Management Plan**, describes the process used to develop the IRWM Plan and how the IRWM Plan is intended to serve as a roadmap for the management of water resources to ensure long-term, reliable water supplies. It defines the water management objectives and the water management strategies along with the specific projects and programs that will be required to help the region meet the stated objectives. This chapter also presents a process for actively managing the SBBA, the largest underground storage “reservoir” in the region.

Chapter 5, **Integrated Regional Water Management Plan Implementation**, describes implementation of the IRWM Plan including the identification of specific capital facilities, projects, and management actions to be implemented to help meet the established water management objectives. This chapter provides a realistic discussion of the obstacles that are likely to be encountered when implementing the IRWM Plan, and also discusses the impacts and benefits for the IRWM Plan and what is likely to occur if the plan is not put into place. The sources of funding and the institutional structures to be used to implement the plan are presented.



The report concludes with Chapter 6, **Data Management and Monitoring, Technical Analyses, and Plan Performance**, which describes the existing tools and techniques for data management and technical analyses conducted to evaluate planning alternatives, and determine the technical and scientific merit of the recommended actions. It also describes how data will be collected, managed, and reported in the future and how this information will be used to track the performance for each of the proposed projects and the overall IRWM Plan. The chapter discusses how the information and subsequent technical analysis will be used to update the plan as circumstances change and how the community will adopt the IRWM Plan.

Chapters 7 and 8 provide a glossary of terms and references, respectively. To keep the plan succinct and readable, much of the more detailed or technical information is presented in the appendices and the reader is directed to these materials for more information.

1.10 Meeting DWR Integrated Regional Water Management Plan Standards

DWR in collaboration with SWRCB has developed standards for preparation of IRWM Plans. Table 1-2 shows how the Upper Santa Ana River Watershed Integrated Regional Water Management Plan meets these standards.



Table 1-2
Upper Santa Ana IRWMP and State IRWMP Plan Standards

| Item from Minimum IRWMP Plan Standards | Reference (Chapter, Section, Figure, Table #s of the IRWMP Plan) |
|---|--|
| Adopted IRWMP Plan | Plan will be adopted in December 2007 |
| Regional Description, Study Period, and Appropriateness of Area for IRWMP Plan | Sections 2.1 and 2.11 |
| Formation of a Regional Water Management Group (TAG) | Section 1.7.1 |
| Water Management Objectives and How They Were Developed | Sections 4.1, and 4.2 |
| Water Management Strategies and How They Were Developed | Section 4.2 |
| Integration of Water Management Strategies | Section 5.1 |
| Regional Priorities and How They Were Developed | Section 5.3.5 |
| Implementation Plan and Responsible Agencies | Sections 5.3.1 through 5.3.3 |
| Impacts and Benefits of Regional Effects. | Section 5.6 |
| Impacts and Benefits to Disadvantaged Communities and Other Resources. | Section 2.5.1 |
| Technical Analysis to Develop IRWMP Plan and Monitoring Systems to Measure Plan Performance | Chapter 6 and Section 4.2.1.6 |
| Data Management, Data Dissemination, and Integration into SWAMP and GAMA | Section 6.2 |
| Financing for Project Implementation and O&M | Section 5.4 |
| Relationship between Local Planning and IRWMP Plan | Sections 2.3, 2.4, 2.5, and 4.2.3.3 |
| Plan Implementation Schedule | Section 5.3.4 |
| Stakeholder Involvement and Coordination among Participating Agencies and with State and Federal Agencies | Sections 1.7.1 and 1.7.2 |
| Public Outreach Activities Specific to Individual Stakeholder Groups | Sections 1.7.1 and 1.7.2 |
| Processes that have been or will be Used to Facilitate Stakeholder Involvement and Communication during Plan Implementation | Sections 4.2.1.3.5 and 1.7.3 |
| Partnerships Developed during the Planning Process Discussed | Sections 4.1, 4.2.1.3.2, and 4.2.1.3.5 |
| Disadvantaged Communities were Identified and Environmental Justice Concerns Addressed. | Section 2.5, Table 2-4, and Figure 2-3 |

2 Description of the Integrated Regional Water Management Plan Area

2.1 Location

The Santa Ana River (SAR) is the largest stream system in Southern California. The headwaters originate in the San Bernardino Mountains and are discharged to the Pacific Ocean approximately 100 miles to the southwest between Newport Beach and Huntington Beach. The SAR watershed covers over 2,650 square miles of widely varying forested, rural, and urban terrain and covers the more populated urban areas of San Bernardino, Riverside, and Orange Counties, as well as a lesser portion of Los Angeles County. Disputes over the use of water in the SAR led to the subdivision of the watershed into the Upper SAR watershed and Lower SAR watershed at Prado Dam.

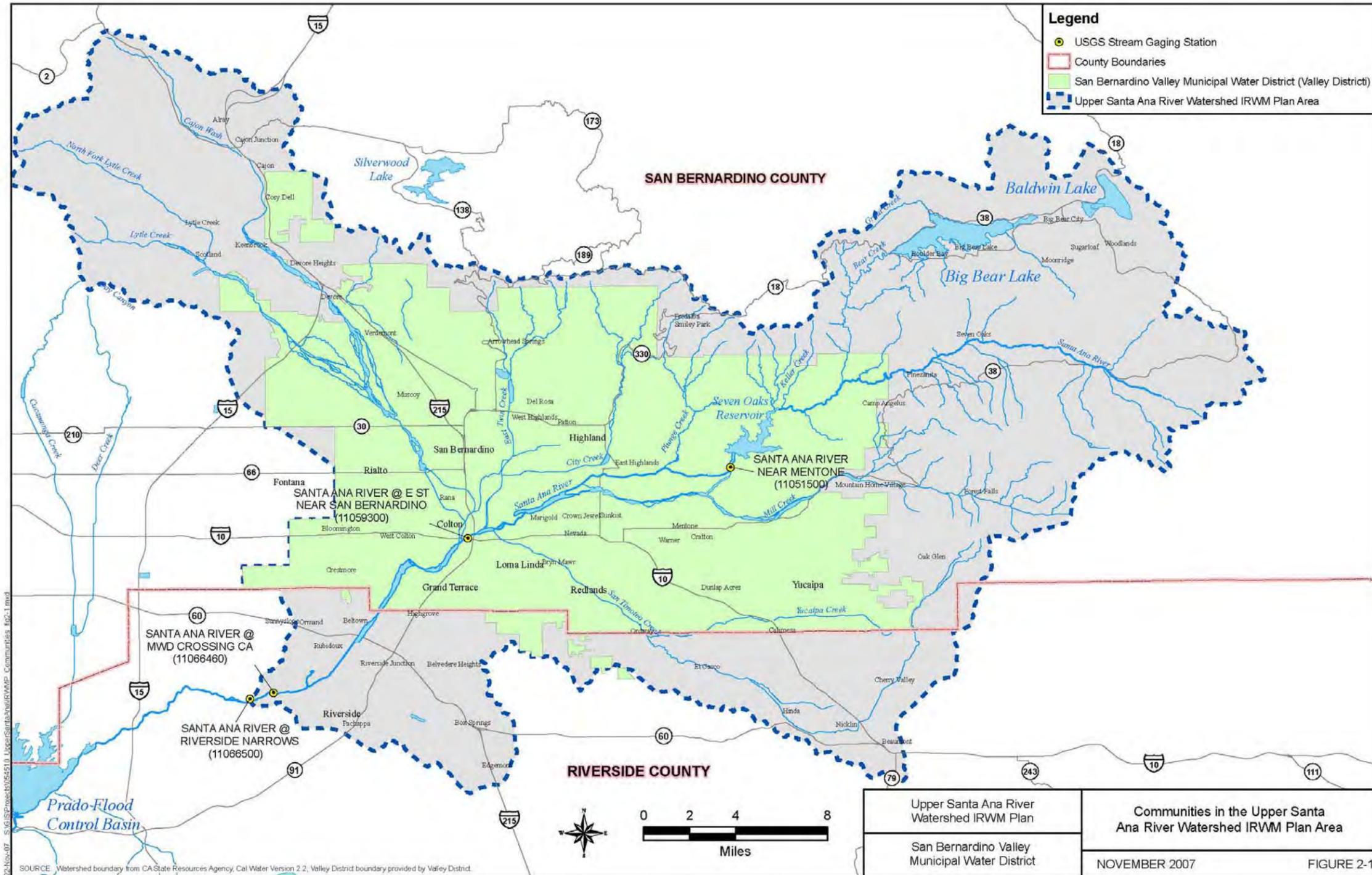
2.1.1 General Integrated Regional Water Management Plan Region

The Upper Santa Ana River Watershed Integrated Regional Water Management Plan (IRWM Plan) Area (Region) covers 852 square miles, approximately 32 percent of the total SAR watershed, and is primarily located in San Bernardino and Riverside Counties. The Region includes Big Bear Lake, the cities and communities of San Bernardino, Yucaipa, Redlands, Highland, Rialto, Mentone, Colton, Grand Terrace, Loma Linda, Beaumont, and Riverside (Figure 2-1). This region was selected for the IRWM Plan in large part because of the following factors:

- Rapid population growth in the area and the potential for continued rapid growth in the future.
- Significant institutional issues, hydrological characteristics, and court judgments separate the Upper SAR watershed from the downstream portion of the watershed at the Riverside Narrows just upstream from Prado Dam. The Orange County Water District v. City of Chino, et al., Case No. 117628 (Orange County Judgment) and the Western Municipal Water District of Riverside County v. East San Bernardino County Water District, Case No. 78426 (Western Judgment), which were discussed in more detail in Chapter 1, have significant influence on water management of the Upper SAR and dictate, to some degree, how water resources should be managed in the Upper SAR watershed.



Figure 2-1
Communities in the Upper Santa Ana Region



- The Upper SAR watershed is a region with unique physical characteristics. The Upper SAR has a widely variable hydrology, a demography that includes a high rate of population growth and urban development, and challenging water management issues, including the need to make use of local water supplies to make the region self-sufficient. The agencies in the Region plan to coordinate and manage among them the groundwater spreading and pumping and to establish a cooperative, integrated plan that will reduce or eliminate historical water right conflicts among the water agencies in the Upper SAR watershed.
- Groundwater basins in the Upper SAR watershed are generally separated from the lower basin. The groundwater basin in which most Region-related activities take place is the San Bernardino Basin Area (SBBA), which is composed of the Bunker Hill and Lytle Creek subbasins. A discussion of groundwater basins within the Region is presented later in this chapter.

The Region is defined by the area that contributes surface runoff to the Riverside Narrows at U.S. Geological Survey (USGS) Gage 11066500. The USGS has operated this site as a continuous record gaging station since March 1970. Specific conductance, temperature, and total dissolved solids (TDS) are collected bi-monthly. There are numerous tributaries that contribute flow to the main stem of the SAR in the region, including Mill Creek, City Creek, Plunge Creek (a tributary of City Creek), Mission Zanja Creek (located just upstream of the San Timoteo Creek), San Timoteo Creek, East Twin Creek, Warm Creek, and Lytle Creek.



2.2 Climate

Climate in the Region is characterized by relatively hot, dry summers and cool winters with intermittent precipitation. The largest portion (73 percent) of average annual precipitation occurs during December through March and rainless periods of several months are common in the summer. Precipitation is nearly always in the form of rain in the lower elevations and mostly in the form of snow above about 6,000 feet mean sea level (msl) in the San Bernardino Mountains. Mean annual precipitation ranges from about 12 inches in the vicinity of Riverside, to about 20 inches at the base of the San Bernardino Mountains, to more than 35 inches along the crest of the mountains. The long-term (water years 1883-84 through 2001-02)¹ mean annual precipitation recorded at the San Bernardino County Hospital Gage is 16.4 inches. The historical record indicates that a period of above-average or below-average precipitation can last more than 30 years, such as the recent dry period that extended from 1947 to 1977. Historical streamflow statistics for the SAR at the Metropolitan Water District of Southern California (Metropolitan) Crossing (located near the Riverside Narrows) show that flows vary widely from year to year. The median annual flow for SAR at Metropolitan Crossing is 75,900 acre-feet per year. During water years 1969-1970 through 2000-2001, annual flows have ranged from a high of 301,000 acre-feet to a low of 9,800 acre-feet. These data are indicative of highly variable streamflows.

Three types of storms produce precipitation in the SAR Basin: general winter storms, local storms, and general summer storms. General winter storms usually occur from December through March. They originate over the Pacific Ocean as a result of the interaction between polar Pacific and tropical Pacific air masses and move eastward over the basin. These storms, which often last for several days, reflect orographic (i.e., land elevation) influences and are accompanied by widespread precipitation in the form of rain and, at higher elevations, snow. Local storms cover small areas, but can result in high intensity precipitation for durations of approximately six hours. These storms can occur any time of the year, either as isolated events or as part of a general storm, and those occurring during the winter are generally associated with frontal systems (a “front” is the interface between air masses of different temperatures or densities). General summer storms can occur in the late summer and early fall months in the San Bernardino area, although they are infrequent.



The Region has an annual precipitation that ranges from 12 inches in low areas to 40 inches along the crest of the mountains.

¹ A water year runs from October through September of the following year. For example, water year 2000- 2001 begins on October 1, 2000, and ends on September 30, 2001.

2.3 Population

2.3.1 Historic Population and Housing Growth in the Plan Area

The Region covers part of the two-county area of San Bernardino and Riverside. Population figures for 1990 and 2000 for Riverside and San Bernardino Counties are presented in Table 2-1. Over the decade of the 1990s, both counties experienced substantial increases in population—32.6 percent for Riverside County (with an average rate of 3.3 percent annually) and over 21 percent for San Bernardino County (2.1 percent annually). The population of the two-county Region increased by over 681,400 persons or over 26 percent (2.6 percent annually) during this time period.

**Table 2-1
Riverside and San Bernardino County Population, 1990 and 2000**

| Area | Population | | Change: 1990-2000 | |
|-----------------------|------------|-----------|-------------------|------------------------|
| | 1990 | 2000 | Number | Average Annual Percent |
| Riverside County | 1,170,413 | 1,551,943 | 381,530 | 3.3% |
| San Bernardino County | 1,418,380 | 1,718,312 | 299,932 | 2.1% |

Source: U.S. Census 1990 and 2000.



In the period from 1990–2000, housing units in Riverside and San Bernardino counties grew 15.6 percent.

The number of housing units contained in the two counties grew from about 1,026,200 in 1990 to 1,186,000 in 2000. This increase of 15.6 percent took place at an average annual rate of 1.5 percent.

Population of the San Bernardino Valley Municipal Water District’s (Valley District) service area between 2000 and 2005 grew by 56,000 or 10.5 percent, which is about a 2 percent growth annually. Population of the IRWM Plan Area grew by 21,200 from 2000 to 2005.

2.3.2 Future Population Growth in the Region and Valley District Service Area

The Southern California Association of Governments (SCAG) adopted the “2001 RTP Socioeconomic Forecast” in November

2006 that includes population projections for consecutive five-year increments from 2000 to 2025 for various geographic areas (SCAG 2001). Table 2-2 presents these data for Riverside and San Bernardino Counties. The counties are projected to



experience average annual growth rates of 3.4 percent and 2 percent, respectively, between 2000 and 2025.

**Table 2-2
SCAG County Population Projections, 2010-2025**

| Area | Population | | | | | | Change: 2000-2025 | | |
|----------------|-------------------|-----------|-----------|-----------|-----------|-----------|-------------------|---------|------------------------|
| | 2000 ^a | 2005 | 2010 | 2015 | 2020 | 2025 | Number | Percent | Average Annual Percent |
| Riverside | 1,551,943 | 1,842,690 | 2,077,800 | 2,347,300 | 2,620,500 | 2,876,300 | 1,324,357 | 85% | 3.4% |
| San Bernardino | 1,718,312 | 1,919,145 | 2,059,400 | 2,229,700 | 2,397,700 | 2,558,700 | 840,388 | 48.9% | 2% |

^aBased on 2000 U.S. Census information.

Estimates of future populations were developed for this plan using U.S. Census 2000 block-level data. The service area boundaries were overlaid digitally on census maps using a Geographic Information System (GIS). Where census blocks were split by service area boundaries, the proportion of the census block contained in the service area was calculated and used to prorate the population of the particular census block to the respective service area.

The Valley District service area had a population of 585,000 in 2000, of which approximately 583,482 lived in San Bernardino County. The remaining persons lived in Riverside County. The population contained in the Valley District service area comprises about 34 percent of the population of San Bernardino County and less than 0.1 percent of the Riverside County population.

Over the period 2000 to 2025, and using SCAG county-level population projections, the number of residents in the service areas of Valley District and the IRWM Plan area is projected to increase by approximately 199,500 and 297,800, respectively (Table 2-3).

**Table 2-3
Population of Plan Area and Valley District Service Area, 2000-2025**

| Service Area | 2000 ^a | 2005 | 2010 | 2015 | 2020 | 2025 | Change: 2000-2025 | |
|-----------------------|-------------------|-----------|-----------|-----------|-----------|-----------|-------------------|---------|
| | | | | | | | Number | Percent |
| Valley District | 585,003 | 641,004 | 680,100 | 719,800 | 751,200 | 784,500 | 199,497 | 34.1 |
| San Bernardino County | 1,718,312 | 1,919,145 | 2,059,400 | 2,229,700 | 2,397,700 | 2,558,700 | 840,388 | 48.9 |
| IRWM Plan Area | 870,866 | 892,048 | 958,400 | 1,034,400 | 1,101,700 | 1,168,700 | 297,834 | 34.2 |

^a. Based on 2000 U.S. Census information for the service area populations as of April 2000.

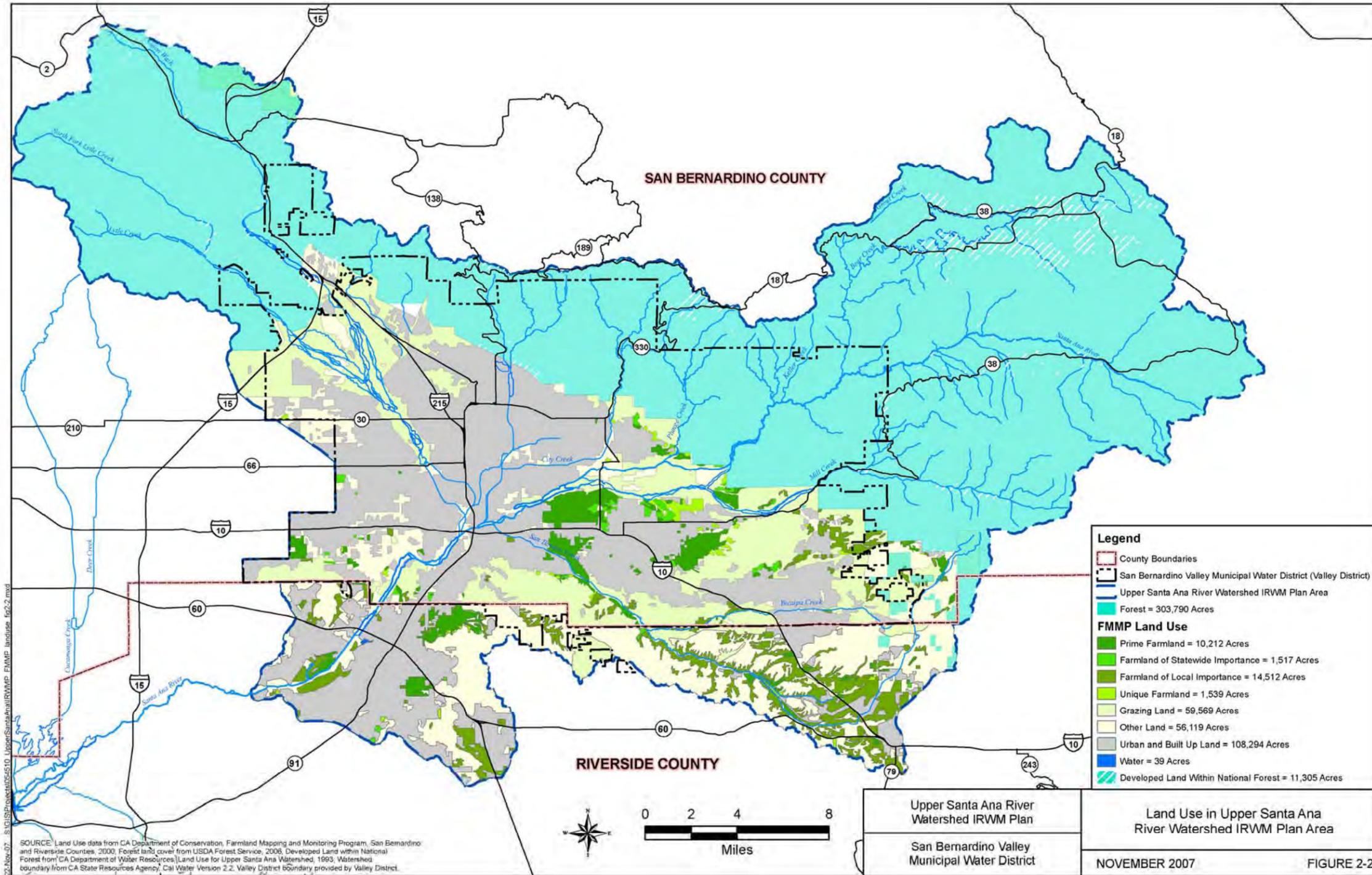


2.4 Land Use and Agricultural Lands Stewardship

Figure 2-2 presents the 2005 land use within the Region. The total area of the Region is 549,570 acres, of which 303,790 acres, or about 55 percent, are covered by the national forest located in the easterly and northerly areas of the Region. In addition to the national forest, native vegetation covers about 86,400 acres or about 16 percent of the Region. Agriculture acreage is being replaced by urban areas, and agriculture only represents a little over two percent of the land use of the Region today. Urban areas are about 15 percent of the Region. The large areas of agricultural land use are south of the SAR.

A number of local land use agencies have approved general plans and specific plans in the Region. These plans are relevant to this IRWM Plan. These local land use planning agencies play a major role in zoning and land use decisions in the Region. The California Government Code contains statutes addressing the subject of the applicability of local land use controls on planning and construction of public water facilities. However, it is generally the practice of Valley District and other local agencies to voluntarily comply with the standards specified in applicable local land use and building code regulations.

Figure 2-2
Land Use





Upper Santa Ana River Watershed Integrated
Regional Water Management Plan

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2.5 Economic Condition and Social and Cultural Composition of the Region



Food preparation and service, teaching, and construction jobs are the fastest growing employment opportunities in the Region.

Like most communities in Southern California, the Upper Santa Ana region has seen a continued increase in population and change in the economic base as agricultural and vacant land is replaced with residential housing, leading to urban and service sector jobs. The fastest growing jobs projected between 2001 and 2008 include food preparation and service, teaching, and construction, all generally showing more than a 25 percent increase. Services, retail trade, government, and manufacturing constitute the majority of jobs in the area, followed by construction, transportation, and wholesale trade. Employment growth in San Bernardino County is the third highest in the State of California (State), with a relatively low current unemployment rate of about 4.6 percent. Population estimates doubled between 1970 and 1990, increased better than 20 percent between 1990 and 2000, and continued to rise at a 14 percent rate from 2000 to 2005. San Bernardino County and Riverside County now rank fourth and fifth in county population in California, respectively. Continued residential and job growth is expected in the area.

Much of the population growth of the Upper Santa Ana region since the 1970s is linked with the economies of Los Angeles and Orange Counties because they are within commuter range, and the housing prices in the Upper Santa Ana region are more affordable. Also, population growth over the past three decades is attributed to a marked increase in immigration from Mexico, Latin America, and the Pacific Rim.

2.5.1 Composition of Population and Tribe

Most of the Region is considered economically disadvantaged. An economically disadvantaged community is defined by the State as a community with a median annual household income of 80 percent or less than the State median annual household income. In 2000, the State's annual median family income was \$47,493. Figure 2-3 shows the economically disadvantaged communities in the Region. Table 2-4 presents median annual family incomes in service areas for various water purveyors. Communities within the service areas of the City of Rialto, City of San Bernardino, East Valley Water District (East Valley), and a number of mutual water companies are considered economically disadvantaged. Water management strategies evaluated and considered for the IRWM Plan are designed to improve water supply reliability and water quality for these communities in the Region. The disadvantaged communities are dispersed throughout the Plan Area, and are served water by different water purveyors. The location of disadvantaged communities relative to project locations determines the range and extent of benefit a given project provides to an individual disadvantaged community.

Table 2-4
Median Annual Household Income for Water Purveyor and Water Agency Service Areas

| Service Area | Median Income 2000 | Percent of State Median 2000 |
|---|-----------------------------------|---|
| Baseline Garden Mutual | 24,274 | 51% |
| Bear Valley Mutual Water Company | 48,838 | 103% |
| Bear Valley Mutual Water Co./Lugonia Water Company | 51,717 | 109% |
| Beaumont-Cherry Valley Water District | 44,004 | 93% |
| Big Bear City Community Services District | 38,165 | 80% |
| Big Bear Municipal Water District | 32,764 | 69% |
| City of Beaumont | 34,543 | 73% |
| City of Big Bear Lake Department of Water and Power | 37,044 | 78% |
| City of Colton | 41,506 | 87% |
| City of Loma Linda | 43,353 | 91% |
| City of Redlands | 53,413 | 112% |
| City of Rialto | 39,072 | 82% |
| City of San Bernardino | 38,310 | 81% |
| Devore Mutual Water Company | 63,074 | 133% |
| East Valley Water District | 54,337 | 114% |
| Eastern Municipal Water District | 49,717 | 105% |
| Eastwood Farms Community Water Users Association | 20,334 | 43% |
| Fontana Water Company | 54,256 | 114% |
| Inland Valley Development Agency | 22,917 | 48% |
| Jurupa Community Services District | 53,679 | 113% |
| Marygold Mutual Water Company | 30,160 | 64% |
| Muscoy Mutual Water Company | 28,328 | 60% |
| Riverside Highland Water Company | 51,834 | 109% |
| Riverside Public Utilities District | 46,349 | 98% |
| Rubidoux C.S.D. | 41,827 | 88% |
| Running Springs Water District | 64,330 | 135% |
| San Geronio Pass Water Agency | 39,091 | 82% |
| San Timoteo Watershed Management | 50,849 | 107% |
| South Mesa Water Company | 37,683 | 79% |
| Terrace Water Company | 43,299 | 91% |
| Victoria Farms Mutual Water | 36,069 | 76% |
| West Valley Water District | 51,961 | 109% |
| Western Heights Water Company | 73,029 | 154% |
| Western Municipal Water District | 47,277 | 100% |
| Yucaipa Valley Water District | 61,135 | 129% |
| Valley District | 39,354 | 83% |
| State | 47,493 | 100% |

Source: U.S. Census Bureau, Census 2000



For example, the larger, regional projects provide water supply reliability and/or water quality benefits to a water provider's service area or the Plan Area in total. While these projects do not specifically target disadvantaged communities, the benefits of the project may extend to one or more disadvantaged communities.

In addition there are individual projects located within the disadvantaged communities that directly benefit those areas by improving water supply reliability and/or water quality to the targeted disadvantaged community.

Various tribes of Native Americans inhabited the Region in the past. Today, the San Manuel Band of Mission Indians and Morongo Band of Mission Indians are present in the region. Ethnic data for 2000 (Source: 2000 Census PL94) include 44 percent White, 39.2 percent Hispanic, 8.8 percent African American, 0.57 percent Native American, and 7.43 percent others.

2.6 Major Water-Related Infrastructure in Region

The water-related infrastructure of the Upper SAR watershed reflects the complex water history of the Region. The predecessors of many of the water agencies that are participating in this plan were constructing ditches in the 1800s. The water rights and facilities established at that time have helped determine the structure of today's water agencies and the arrangement of today's infrastructure. After State Water Project (SWP) facilities were extended into the Region in the early 1970s, State Water Contractors receiving deliveries from the East Branch, Valley District, San Geronimo Pass Water Agency (SGPWA), and Metropolitan constructed pipelines to take advantage of the imported water. Figure 2-4 shows the major water-related infrastructure in the Region.

2.6.1 State Water Project Facilities

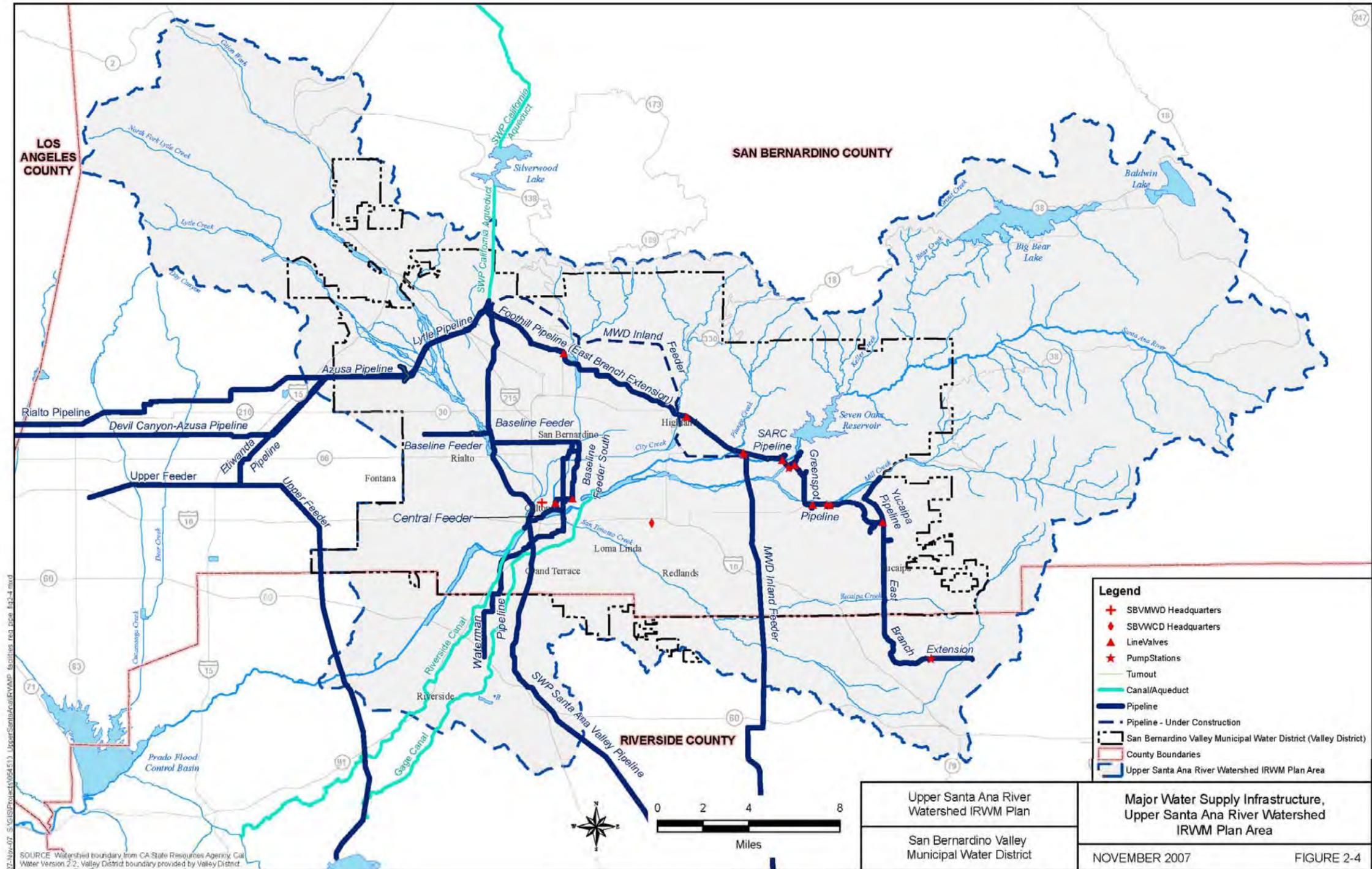
SWP water is imported into the Upper SAR watershed via the East Branch of the California Aqueduct. At the Devil Canyon Power Plant, located at the foot of the San Bernardino Mountains near Interstate 215, SWP water can be delivered in several directions in State facilities or in transmission systems belonging to three State Water Contractors.

The SWP Santa Ana Pipeline extends south, roughly paralleling Lytle Creek and on to Lake Perris. Deliveries can be made to Metropolitan member agencies including Western Municipal Water District (Western), Eastern Municipal Water District, and the San Diego County Water Authority.

The East Branch Extension of the SWP is a combination of facilities built by the Valley District and the State and funded by Valley District and SGPWA. Valley District operates these facilities for the State and for SGPWA. The East Branch Extension makes deliveries from Devil Canyon east along the foothills of the San Bernardino Mountains and as far as SGPWA. Portions of the East Branch Extension, including the Foothill Pipeline, are used to implement the Santa Ana River-Mill Creek Cooperative Water Project Agreement (Exchange Plan). This agreement provides for a three-level exchange that allows Valley District to deliver water to the Yucaipa area by exchanging SAR and Mill Creek water among ten agencies. In the past, the Foothill Pipeline was also used to deliver local water to Devil Canyon Afterbay and on to Metropolitan, the West Valley Water District (West Valley), and Fontana Water Company (FWC). The State is currently evaluating an increase in the capacity of the East Branch Extension.



Figure 2-4
Major Water-Related Infrastructure



2.6.2 State Water Contractors Facilities

Four State Water Contractors have facilities in the Region: Valley District, SGPWA, Metropolitan, and the San Gabriel Valley Municipal Water District.

Metropolitan's Inland Feeder will ultimately extend from Devil Canyon to Diamond Valley Lake when the tunnels within the San Bernardino Mountains are complete. Currently, the Foothill Pipeline is being used to make deliveries of SWP water to the completed portions of the Inland Feeder for delivery to Diamond Valley Lake.

Metropolitan's Rialto Pipeline is used to make deliveries from Devil Canyon to Metropolitan's F.E. Weymouth Treatment Plant in the San Gabriel Valley and to its Robert B. Diemer Treatment Plant, which supplies treated water to Western and Eastern Municipal Water District. In addition, the Rialto Pipeline makes deliveries to surface water treatment plants owned by Metropolitan's member agencies and to groundwater recharge facilities.

The San Gabriel Valley Municipal Water District's Devil Canyon-Azusa Pipeline is used primarily to make deliveries for replenishment of the Main San Gabriel Basin for the accounts of Alhambra, Azusa, Monterey Park, and Sierra Madre. Valley District owns capacity in this pipeline. Through this pipeline, Valley District can deliver SWP water to the western portion of its service area including West Valley and FWC as well as the Cactus Spreading Basins.

Many of Valley District's facilities have been integrated into the SWP and were described in the previous section. In addition, Valley District has three pipelines that are not integrated into the SWP. These are the Baseline Feeder, Baseline Feeder Extension South, and the Central Feeder.

The Baseline Feeder is a 48-inch pipeline that serves potable water from the San Bernardino Basin Area (SBBA) to the City of Rialto, West Valley, and Riverside-Highland Water Company. It is possible that the current hydraulic grade of this pipeline (1370 msl) will be reduced to match the Lower Zone (1249 msl) of the City of San Bernardino. The Baseline Feeder Extension South Pipeline is a 78-inch pipeline that was constructed north/south in alignment from the vicinity of 9th Street and Waterman Avenue in San Bernardino, south past the Antil area where there is a major concentration of production wells, and on to the vicinity of the SAR. This pipeline has been integrated into the Lower Zone of the City of San Bernardino and will ultimately serve water from the SBBA throughout Valley District's service area and on to Riverside County.

Valley District is currently constructing a portion of the Central Feeder, in an east/west alignment in San Bernardino Avenue from Opal Avenue Westerly to Texas Street in Redlands. The Central Feeder Pipeline may eventually be



extended and connected to the Baseline Feeder Extension South Pipeline and possibly to the Santa Ana Valley Pipeline.

2.6.3 Regional Water Supply Infrastructure

The SBBA is a major source of water supply for agencies in San Bernardino and Riverside Counties. The three major transmission systems used to deliver water to the City of Riverside are the Gage Canal, Waterman Pipeline, and the Riverside Canal. The Gage Canal is owned by the Gage Canal Company. As of 2005, the City of Riverside owned approximately 59 percent of the Gage Canal Company. The canal extends from the SAR near Loma Linda to the Arlington Heights area. The Gage Canal is used to deliver both potable and irrigation water.



The Riverside Canal is a 12-mile canal extending from the City of Colton to Jefferson Street in the City of Riverside. Non-potable water from Colton and Riverside North Groundwater Basin is conveyed in the Flume Pipeline to the Riverside Canal.

2.6.4 Regional Flood Control Infrastructure

The Upper SAR watershed consists of many tributaries flowing to the SAR. These tributaries are in various states of development from natural stream to concrete-lined channels. Many of the streams flow through heavily developed areas. The San Bernardino County Flood Control District (SBCFCD) operates and maintains many of these tributary systems deemed “regional” (750 cubic feet per second or greater of flow and/or 640 acres or greater of watershed) as well as portions of the SAR.



The San Timoteo flood channel is a concrete-lined flood channel.

2.7 Surface Hydrology

Surface hydrology of the Region is comprised of the SAR and its tributaries. A number of surface reservoirs in the Region are operated primarily for agricultural and urban water use, but are also regulated for instream flows and recharge of groundwater basins. The following sections describe the surface hydrology of the Region.

2.7.1 Natural Runoff

Runoff records provide information on the characteristics of flow in the SAR and its tributaries. Such records are available for a number of stream gaging stations located on the mainstem of the SAR and throughout the SAR watershed. The SAR runoff records demonstrate the highly variable nature of river flow, with large floods and long periods of extremely low flow. Three gaging stations provide streamflow data for the Upper SAR. Mentone Gage (USGS record 11051500) is representative of SAR flow near Seven Oaks Dam. There are two other USGS gaging stations located downstream of Seven Oaks Dam, but within the Upper SAR basin—the “E” Street Gage (USGS Gage 11059300) located in the City of San Bernardino at river mile (RM) 57.69 and the Metropolitan Water District Crossing Gage (Metropolitan Crossing) (USGS Gage 11066460) located at RM 45.7 near Riverside Narrows. Table 2-5 provides the annual median,¹ maximum, and minimum streamflow recorded at the River Only Mentone, “E” Street, and Metropolitan Crossing gages. (See Figure 2-1.)

Flow in the SAR is highly variable from year to year. Flow in the SAR increases downstream due to inflows from tributaries, rising water,² and treated water from wastewater treatment plants (WWTPs). SAR flows at the “E” Street Gage include flows from Mill Creek and San Timoteo Creek but not from Lytle and Warm Creeks, which enter the SAR below the “E” Street Gage. SAR flows at the Metropolitan Crossing include inflows from Lytle and Warm Creeks, two large public WWTPs, and rising water.

Flows in excess of about 70,000 acre-feet per year have a frequency of occurrence of only 10 percent at the River Only Mentone Gage, whereas this same flow has a frequency of occurrence of over 60 percent at the Metropolitan Crossing Gage. Additionally, in the upstream areas, minimum annual streamflows are generally much smaller than minimum annual flows in the downstream areas.

¹ Median is a measure of central tendency, as is mean (average). The median represents the 50th percentile, i.e., if data are sorted from highest value to lowest value, the median value is the value in the exact center of the range. The median is a more appropriate measure of central tendency than the mean when data are highly skewed.

² Rising water is used to describe noticeable increases in streamflow in reaches where a subsurface restriction forces groundwater to the surface.



**Table 2-5
Upper SAR Median, Maximum, and Minimum Annual Flow (in acre feet)**

| | Median Annual Flow | Maximum Annual Flow | Minimum Annual Flow |
|---|---------------------------|----------------------------|----------------------------|
| River Only Mentone ^a | 7,991 | 204,812 | 9 |
| "E" Street ^b | 25,525 | 319,976 | 0 |
| Metropolitan Crossing ^c | 75,934 | 301,004 | 9,979 |
| Source: USGS gage data. ^a . USGS Gage 11051500. Period of record is WY 1911-12 through WY 1999-00. ^b . USGS Gage 11059300. Period of record is WY 1938-39 through WY 1953-54, WY 1966-67 through WY 2000-01. ^c . USGS Gage 11066460. Period of record is WY 1969-70 through WY 2000-01. | | | |

The largest monthly flows typically occurred in February and March, and the lowest monthly flows typically occurred between August and October. Although streamflow increases downstream, the timing of flows (i.e., when the monthly maximums and minimums occur) is similar to the timing of flows observed at the Mentone Gage.

There are numerous tributaries that contribute flow to the mainstem of the SAR in the Region, including Mill Creek, City Creek, Plunge Creek (a tributary of City Creek), Mission Zanja Creek (located upstream of San Timoteo Creek), San Timoteo Creek, East Twin Creek, Warm Creek, and Lytle Creek. The flow (under 100-year flood conditions¹) contributed by each of these tributaries is provided in Table 2-6. As a reference, during a 100-year flood event, Seven Oaks Dam would release up to 5,000 cubic feet per second (cfs) (U.S. Army Corps of Engineers (USACE) 1988).

**Table 2-6
Tributary Flow Contribution to the SAR (100-Year Flood Event Discharge in cfs)**

| Tributary | Inflow | River Mile |
|--------------------------------------|---------------|-------------------|
| Mill Creek | 19,500 | 68.67 |
| City Creek & Plunge Creek (Combined) | 5,000 | 62.87 |
| Mission Zanja Creek | 3,500 | 59.08 |
| San Timoteo Creek | 15,500 | 58.44 |
| East Twin Creek | 18,000 | 58.14 |
| Lytle Creek & Warm Creek (Combined) | 70,000 | 56.74 |
| Source: USACE 2000. | | |

¹ A flood as defined under the Standard Flood Insurance Policy is a general and temporary condition of partial or complete inundation of normally dry land areas from overflow of inland or tidal waters or from the unusual and rapid accumulation of runoff of surface waters from any source. A 100-year flood refers to a flood level with a 1 in 100 percent chance of being equaled or exceeded in any given year.

Urbanization taking place in the valley areas of the SAR Basin has resulted in increased responsiveness of the basin to rainfall. The increase in impervious surfaces (such as roofs, roads, parking lots, etc.) and constructed drainages to remove surface water from urban areas has resulted in decreased groundwater infiltration and increased runoff from urban areas. These actions have reduced the lag time between peak rainfall and peak runoff (i.e., constructed drainage systems move water from the urban areas to the river faster than this water would move if the land was not developed).

Compared to a basin without the influence of urbanization, the same rainfall occurring over an urbanized segment of the basin will result in higher peak discharges, a shorter lag-time to the peak discharge, and an overall larger volume of water entering the local drainage channels. Because the SAR Basin is experiencing rapid growth, increased urbanization of the basin is expected to continue; therefore, this trend in increased discharge and decreased lag times between peak rainfall and peak streamflow is expected to continue in the future.

2.7.2 Imported Water

Imported water from the SWP is available to the study area through Valley District and the SGPWA. Valley District is the fifth largest State Water Contractor, with an annual entitlement of 102,600 acre-feet. Valley District lies on the East Branch of the California Aqueduct and takes delivery of SWP water at the Devil Canyon Power Plant. From this location, Valley District can deliver water to the west via the San Gabriel Valley Municipal Water District Pipeline (Valley District owns capacity in this pipeline) or to the east through the East Branch Extension of the SWP. SGPWA is downstream of Valley District on the East Branch of the California Aqueduct.

Water availability through the SWP is intermittent and subject to frequent shortages. As a result, Valley District's "Rules for Service" require that all of its customers have a 100 percent backup for any amount of water they order from the SWP.



2.7.3 Wastewater

There are 14 publicly owned WWTPs located above Prado Dam downstream of the Narrows (SAR Watermaster 2003). Nine of these plants contribute to surface flow of the SAR. Between 1970 and 2000, the total volume of treated wastewater contributions to SAR flows increased from 44,000 acre-feet per year to 169,000 acre-feet per year (SAR Watermaster 2003).

Redlands Wastewater Treatment Plant

Three wastewater treatment plants (Redlands, Beaumont, and Yucaipa) discharge to the SAR and its tributaries upstream of the



City of San Bernardino, but these discharges generally do not flow continuously to the SAR at “E” Street (SAR Watermaster 2003). Two plants, the Rapid Infiltration and Extraction (RIX)¹ WWTP in the City of Colton and the Rialto WWTP in the City of Rialto, discharge directly to the SAR via a discharge channel at RM 53.46. Wastewater discharges from these plants have hydraulic continuity to the SAR above Riverside Narrows. Combined wastewater discharge from these two plants has risen from around 22,000 acre-feet per year in water year 1970-1971 to 57,750 acre-feet per year in water year 2000-2001 (SAR Watermaster 2003). The combined wastewater discharge is expected to increase to about 59,000 acre-feet per year, with both facilities operating at their respective design capacities. (See Table 2-7.)

Table 2-7
Treated Wastewater Discharged Directly to the SAR above Riverside Narrows

| Facility | Current Discharge (acre-feet per year) | Potential Future Discharge (acre feet per year) |
|--|--|---|
| RIX | 49,407 ^a | 44,900 |
| Rialto | 8,346 ^a | 14,200 |
| Total Discharges Directly to the SAR in the Project Area | 57,753 | 59,000 |
| Notes: ^a Based on 2000-2001 water year data reported in the Thirty-Second Annual Report of the SAR Watermaster (SAR Watermaster 2003). | | |

Despite the likelihood that WWTP discharges will increase in the future, not all of the treated water may enter the SAR. Several cities and utilities are in the process of developing plans to recycle water, which could decrease discharges to the river. For example, the City of San Bernardino is currently evaluating a program to sell approximately 18,000 acre-feet per year of tertiary effluent (of a total potential discharge of approximately 44,900 acre-feet per year) from the RIX facility. Valley District contracted with the City of San Bernardino to ensure that the RIX facility continues to release quantities of treated effluent to the SAR adequate to fulfill Valley District’s obligations to provide 15,250 acre-feet of baseflow each year at the Riverside Narrows as called for in the Orange County Judgment.

¹ The RIX WWTP went into operation in 1996 and provides tertiary treatment to all of the effluent from the Colton and San Bernardino Water Reclamation Plants. Prior to 1996, effluent from these plants entered the SAR just above and just below “E” Street, respectively.

2.7.4 Surface Water Quality

The SAR Basin is within the boundaries of the Santa Ana Regional Water Quality Control Board (SARWQCB). The SARWQCB has divided the mainstem of the SAR into six reaches. Reaches 1 through 6 have reach numbers beginning at the Pacific Ocean and increasing upstream. Reaches 3 through 6 are located in the Upper SAR Basin. These reaches are described in more detail below, from upstream to downstream.

2.7.4.1 Reach 6 (RM 70.93 and Above)

This reach includes the river upstream of Seven Oaks Dam where flows consist largely of snowmelt and storm runoff and water tends to be of excellent quality (SARWQCB 1995).

2.7.4.2 Reach 5 (RM 70.93 to RM 57.68)

This reach extends from Seven Oaks Dam to the Bunker Hill Dike (San Jacinto fault), which marks the downstream edge of the Bunker Hill groundwater basin. This reach tends to be dry except during storm flows. The lower end of this reach sometimes has rising groundwater and San Timoteo Creek flows on an intermittent basis (SARWQCB 1995).

2.7.4.3 Reach 4 (RM 57.68 to RM 49.00)

This reach includes the SAR from Bunker Hill Dike downstream to Mission Boulevard Bridge in Riverside. The bridge is the upstream limit of rising groundwater resulting from the constriction at Riverside Narrows. Until about 1985, most water in the reach percolated to the local groundwater leaving the lower part of the reach dry. However, flows in the lower end of this reach may now intermittently contain rising groundwater and flows from San Timoteo Creek.

2.7.4.4 Reach 3 (RM 49.00 to RM 30.50)

This reach includes the SAR from Mission Boulevard Bridge in Riverside to Prado Dam. At the Riverside Narrows, rising groundwater feeds several small tributaries including Sunnyslope Channel, Tequesquite Arroyo, and Anza Park Drain (SARWQCB 1995).

The SARWQCB states that the quality of the SAR is a function of the quantity and quality of the various components of the flows (SARWQCB 1995). Three components make up the flow of the water in the SAR: (1) storm flows, (2) baseflow, and (3) non-tributary flow. The relative proportion of these components varies throughout the year.



The first component, storm flows, results directly from rainfall, usually occurring between the months of December and April. Much of the rainfall and surface water runoff from the storms is captured and percolated into the groundwater basins. The quality of storm flow water is highly variable.

Baseflow makes up the second component of water flow in the SAR, a large portion coming from the discharge of treated wastewater into the river in addition to rising groundwater in the basin. This baseflow includes the non-point source discharges as well as the uncontrolled and unregulated agricultural and urban runoff. Water quality objectives are set in relation to the baseflow in the river, not to the total flow in the river (see Table 2-8). The intent of these objectives is to protect the river's groundwater recharge beneficial use. Compliance with these objectives is verified by annual measurement of the baseflow quality.

The quantity and quality of baseflow is most consistent during the month of August. At that time of year the influence of storm flows and non-tributary flows is at a minimum and volumes of rising water and non-point source discharges tend to be low.

The major component of baseflow in August is municipal wastewater. For these reasons, this period has been selected by the SARWQCB as the time when baseflow will be measured and its quality determined. To determine whether the water quality and quantity objectives for baseflow in Reach 3 of the SAR are being met, the SARWQCB collects a series of grab and composite samples during August of each year. The results are compared with the continuous monitoring data collected by USGS and data from other sources.

The SARWQCB sets discharge requirements on wastewater discharges, the major source of baseflow in the SAR. Waste discharge requirements are developed on the basis of the limited assimilative capacity of the river. Non-point source discharges, generally from urban runoff and agricultural tailwater, are regulated by requiring compliance with Best Management Practices (BMPs), where appropriate.

The third component of flow in the SAR that influences water quality is characterized by the SARWQCB as non-tributary flow. Non-tributary flow is generally imported water released in the upper basin for recharge in the lower basin (SARWQCB 1995).

Table 2-8
SAR Basin Surface Water Quality Objectives (WQO)*

| Inland Surface Streams Upper SAR Basin | Water Quality Objectives milligrams per liter (mg/L) | | | | | | |
|---|---|-------------------------------|-------------|---------------|---|----------------------------|------------------------------|
| | Total Dissolved Solids (TDS) | Hardness (CaCO ₃) | Sodium (Na) | Chloride (Cl) | Total Inorganic Nitrogen (TIN) ^a | Sulfate (SO ₄) | Chemical Oxygen Demand (COD) |
| Reach 2 - 17th Street in Santa Ana to Prado Dam | 650 ^b | --- | --- | --- | --- | --- | --- |
| Reach 3 - Prado Dam to Mission Blvd. - Baseflow | 700 | 350 | 110 | 140 | 10 ^a | 150 | 30 |
| Reach 4 - Mission Blvd. in Riverside to San Jacinto Fault | 550 | --- | --- | --- | 10 | --- | 30 |
| Reach 5 - San Jacinto Fault in San Bernardino to Seven Oaks Dam | 300 | 190 | 30 | 20 | 5 | 60 | 25 |
| Reach 6 - Seven Oaks Dam to Headwaters | 200 | 100 | 30 | 10 | 1 | 20 | 5 |

Source: SARWQCB 1995.
^a. Total nitrogen, filtered sample.
^b. Five-year moving average.
^{*} A number of amendments to the WQOs of the Basin Plan have been proposed. However, these proposed amendments do not include changes to the WQOs applicable to Reaches 3 through 6 of the SAR (SARWQCB 2004).

2.7.4.5 Water Quality Measurement Activities

A recent USGS study conducted by the National Water Quality Assessment Program entitled, *Concentrations of Dissolved Solids and Nutrients in Water Sources and Selected Streams of the Santa Ana Basin, California, October 1998-September 2001*, examined concentrations of TDS and nutrients in selected Santa Ana Basin streams as a function of water source. The principal water sources considered in the study were mountain runoff, wastewater, urban runoff, and storm flow. The USGS study of water quality conditions in the SAR and tributaries focused on TDS and nutrient conditions representative of baseflow water of mountain sites, baseflow of the valley floor, and storm flow.

The USGS reports that streams on the Santa Ana Basin generally have increasing dissolved minerals as one goes downstream. This effect is due to the fact that water is used, recycled, and used again. The magnitude or amount of TDS concentration rises with each use of water. The USGS report notes that rising groundwater also enters basin streams in some reaches, and their sampling indicated that some of the highest TDS (and in some cases nitrates) may occur at sites on the valley floor that are dominated by rising groundwater. Nitrate concentrations are higher in Santa Ana Basin streams receiving treated wastewater than in streams without treated wastewater. The principal source of nitrate is fertilizer from historic agricultural operations.



While there are basin plan objectives for multiple constituents, water quality monitoring has focused on two constituents, TDS and nitrogen. These constituents have been reported at levels at or near regulatory standards and have thus been the focal point of regulatory activities.

Table 2-9 provides a summary of the available historical surface water quality data for TDS and nitrogen at points along the SAR.

**Table 2-9
Average Historic Surface Water Quality for Locations on the SAR (1990-2001)**

| Water Quality Constituent | Metropolitan Crossing Gage (Reach 3) | RIX-Rialto Effluent Outfall (Reach 4) | Mentone Gage (Reach 5) |
|---|--------------------------------------|---------------------------------------|------------------------|
| TDS | 560 ^a | 520 ^b | 230 ^a |
| TDS Basin Plan Objective by Reach | 700 | 550 | 300 |
| Total Inorganic Nitrogen (TIN) | 7.3 ^a | 8.5 ^b | 0.3 ^a |
| TIN Basin Plan Objective by Reach | 10 ^c | 10 | 5 |
| Source: USGS gage data. Data for River Only Mentone Gage begins in October 1998. Data for Riverside Narrows Gage begins in August 1997. ^a . USGS 2004. ^b . The TDS and TIN values assigned for RIX-Rialto are the maximum values that occurred during 2001-2002 as reported in Table 4.4-9 of the City of San Bernardino Municipal Water Department RIX Facility Recycled Water Sales Program Preliminary Environmental Impact Report (PEIR), March 2003. ^c . Total nitrogen, filtered sample. [*] Proposed amendments to the Basin Plan do not include changes to the water quality objectives in Reaches 3 through 6 of the SAR (SARWQCB 2004). | | | |

2.7.4.6 Imported Water Quality

Water is imported to the SAR Basin from the Colorado River via the Colorado River Aqueduct (CRA), owned and operated by Metropolitan, and from Northern California via SWP facilities. The TDS level in the CRA water averages approximately 700 mg/L and, during drought years, can increase to above 900 mg/L (Metropolitan and USBR 1999). Salinity projections for wet year conditions show TDS values between 650 and 800 mg/L (Metropolitan and USBR 1999). SWP water is suitable for most beneficial uses due to its low TDS levels of 200 to 300 mg/L (California Department of Water Resources (DWR) 2003a). However, TDS levels of SWP water can vary due to drought conditions, flood events, reservoir management practices, and salt input from local streams.

2.8 Geologic Setting and Groundwater Systems

The IRWM Plan Area lies on the south slope of the Transverse Ranges Geologic Province. The Transverse Ranges are an east-west trending series of steep mountain ranges and valleys. The east-west structure of the Transverse Ranges is oblique to the normal northwest trend of coastal California, hence the name *Transverse*. The province extends offshore to include San Miguel, Santa Rosa, and Santa Cruz Islands. Its eastern extension, the San Bernardino Mountains, has been displaced to the south along the San Andreas fault. Intense north-south compression is squeezing the Transverse Ranges. As a result, this is one of the most rapidly rising regions on earth.

2.8.1 Groundwater Basins in the Upper Santa Ana Region

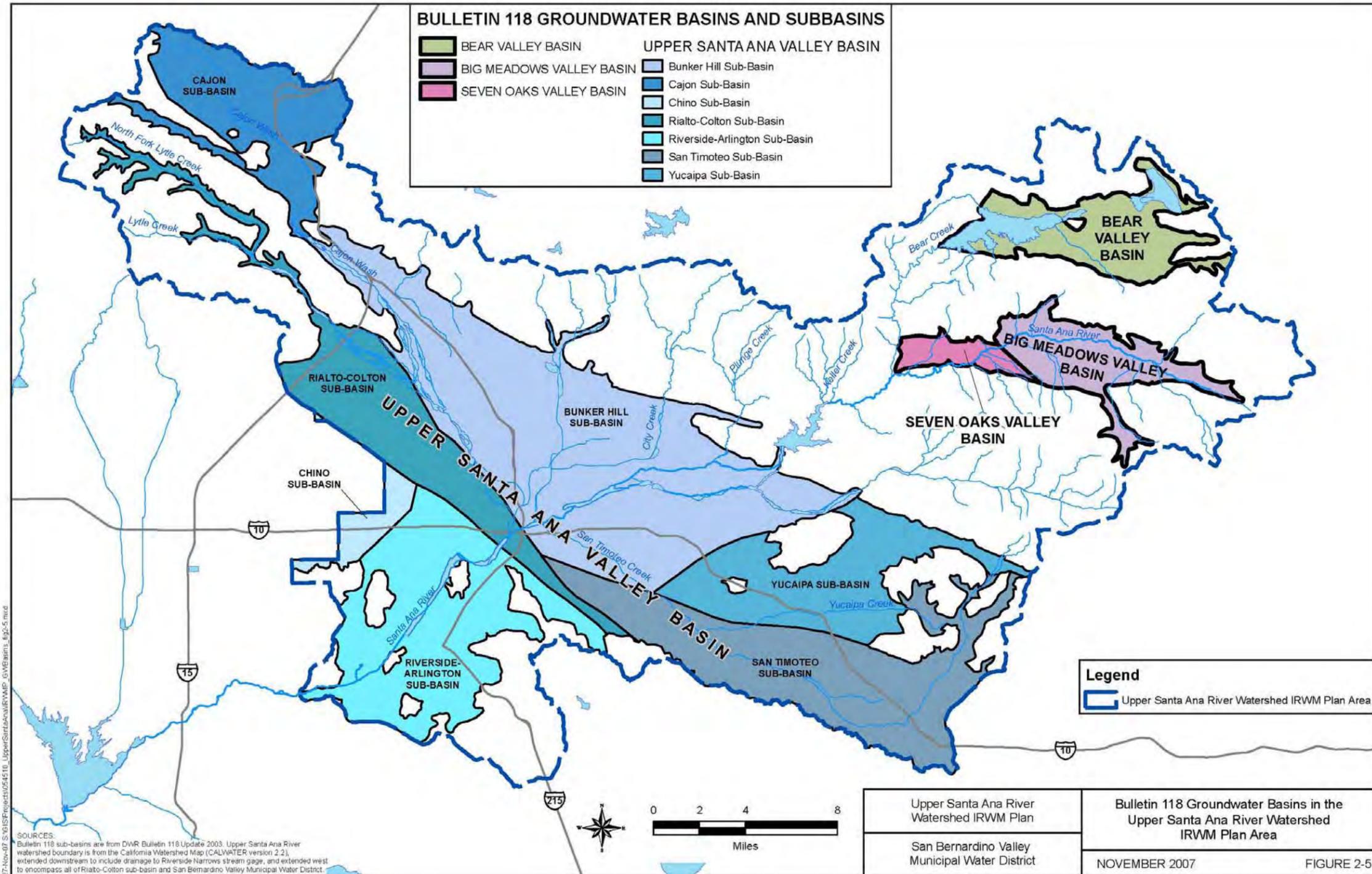
DWR Bulletin 118 shows four groundwater basins within the Region. They include Bear Valley, Big Meadows, Seven Oaks Valley, and the Upper Santa Ana Valley. The first three basins are small, with a combined storage capacity of approximately 66,000 acre-feet. The Upper Santa Ana Valley Groundwater Basin consists of nine subbasins: Bunker Hill, Rialto-Colton, Riverside-Arlington, San Timoteo, San Jacinto, Cajon, Yucaipa, Chino, and Cucamonga. Cucamonga subbasin is entirely outside this IRWM Plan Area and will not be discussed in the plan. Very small portions of the Chino and San Jacinto subbasins are within the IRWM Plan Area. Because of the small contribution of these two subbasins in overall groundwater management of the planning area, they will not be discussed in the plan. Portions of the San Timoteo and Riverside-Arlington subbasins are within the planning area. Bunker Hill, Rialto-Colton, Yucaipa, and Cajon subbasins are entirely within the Plan Area. Bunker Hill subbasin is the largest groundwater basin in the Upper SAR watershed. The storage capacity of this subbasin is 5,976,000 acre-feet (Table 2-10). A brief description of the groundwater basins and subbasins of the plan area is presented below. The basins and subbasins of the Region are mapped by DWR for Bulletin 118 as shown in Figure 2-5.



Table 2-10
Groundwater Basins in Upper Santa Ana Region

| Groundwater Basin | DWR Groundwater Basin Number | Surface Area – (acres) | Groundwater Storage Capacity - 1000 acre-feet |
|---------------------------------|---|-----------------------------------|--|
| Upper Santa Ana Valley: | 8-02 | | |
| Bunker Hill Subbasin | 8-02.06 | 89,600 | 5,976 |
| Cajon Subbasin | 8-02.05 | 23,200 | — |
| Rialto-Colton Subbasin | 8-02.04 | 30,100 | 2,517 |
| Riverside-Arlington Subbasin | 8-02.03 | 58,600 | 243 |
| San Timoteo Subbasin | 8-02.08 | 73,100 | 2,010 |
| Yucaipa Subbasin | 8-02.07 | 25,300 | 808 |
| Bear Valley | 8-09 | 19,600 | 42 |
| Big Meadows | 8-07 | 14,200 | 10 |
| Seven Oaks Valley | 8-08 | 4,080 | 14 |

Figure 2-5
Bulletin 118, Groundwater Basins in the Upper Santa Ana Region





Upper Santa Ana River Watershed Integrated
Regional Water Management Plan

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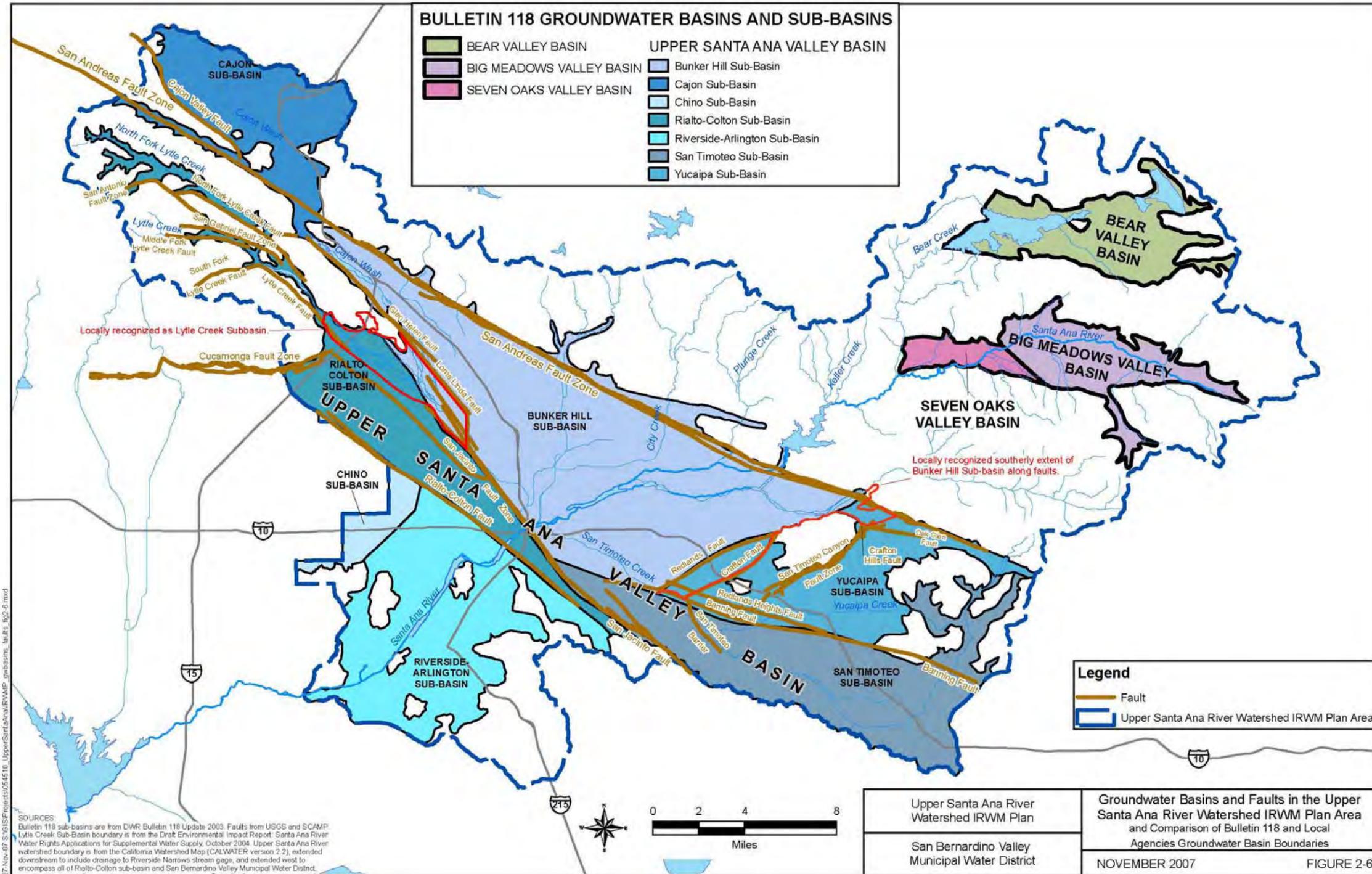
2.8.1.1 Upper Santa Ana Valley

Bunker Hill Subbasin (DWR 8-02.06)

The Bunker Hill subbasin consists of the alluvial materials that underlie the San Bernardino Valley. The basin is bordered on the northwest by the San Gabriel Mountains and Cucamonga fault zone; on the northeast by the San Bernardino Mountains and San Andreas fault zone; on the east by the Banning fault and Crafton Hills; and on the south by a low, east-facing escarpment of the San Jacinto fault and the San Timoteo Badlands (see Figure 2-6). Alluvial fans extend from the base of the mountains and hills that surround the valley and coalesce to form a broad, sloping alluvial plain in the central part of the valley. Within the central portion of the valley, relatively continuous clay produces confining conditions to underlying water-bearing sediments resulting in artesian flowing wells, high groundwater, and, historically, marshlands. The SAR, Mill Creek, and Lytle Creek are the main tributary streams in the subbasin (SBVWCD 2000). Groundwater recharge in the Bunker Hill subbasin is performed by the San Bernardino Valley Water Conservation District (SBVWCD), Valley District, and others. The Groundwater Management Plan in this IRWM Plan is the mechanism to be used to manage recharge and extractions to minimize liquefaction threats and maximize yield. The Western-San Bernardino Judgment (1969) combines the Bunker Hill subbasin with additional areas and classifies it as the SBBA. More discussion of the SBBA is included later in this report.



Figure 2-6
Groundwater Basins and Faults in the Region



Rialto-Colton Subbasin (DWR 8-02.04)

The Rialto-Colton subbasin underlies a portion of the upper Santa Ana Valley in southwestern San Bernardino County and northwestern Riverside County. This subbasin is about 10 miles long and varies in width from about 3.5 miles in the northwestern part to about 1.5 miles in the southeastern part. Figure 2-7 shows the location of the subbasin and pertinent features. This subbasin is bounded by the San Gabriel Mountains on the northwest, the San Jacinto fault on the northeast, the Badlands on the southeast, and the Rialto-Colton fault on the southwest. The SAR cuts across the southeastern part of the basin. The basin generally drains to the southeast, toward the SAR. Warm and Lytle Creek drains join near the southeastern boundary of the basin and flow to meet the SAR near the center of the southeastern part of the subbasin.

Water-bearing alluvium consists of gravel, sand, silt, and clay. Holocene-age alluvial deposits are found beneath the current courses of Lytle and Cajon Creeks. These Holocene deposits are typically less compacted and weathered than older deposits and have higher permeability (DWR 1970). Alluvial deposits of Pliocene and Pleistocene age are composed of somewhat compacted and weathered deposits of gravel, sand, silt, and clay in discontinuous lenticular bodies. The coarsest material occurs near the mouth of Lytle Creek and the material becomes finer toward the southeast where the coarsest gravels contain few cobbles.

The water-bearing units are grouped into three units—an upper, middle, and lower unit. Figure 2-8 shows the relationship of these water-bearing units. There are no distinct confining beds that separate the units. The upper unit includes the river deposits and alluvial fan deposits that grade to older river-channel deposits near the SAR. The upper unit ranges in thickness from a feather edge in the northwestern part of the basin to about 300 feet. The upper water-bearing unit was unsaturated in the northwestern part of the basin and was saturated in the southeastern part. The middle water-bearing unit exists throughout the basin and consists primarily of coarse-to-medium sand and interbedded fine sand and clay. The clay beds are more extensive in the northwestern part of the basin, southeast of Barrier J. The middle water-bearing unit is the main source of water to wells in the basin and is about 240 to 600 feet thick. The lower water-bearing unit exists throughout the basin, southeast of Barrier J and consists of interbedded sand and clay. This unit ranges from about 100 to 400 feet thick (Woolfenden 2001). Similar to the Bunker Hill subbasin, consolidated deposits underlie the lower water-bearing unit and form the base of the groundwater basin.

Groundwater within the subbasin is primarily unconfined to semi-confined (Wildermuth 2000). Specific yield ranges from about 6 percent northwest of Rialto to about 16 percent near Colton (DWR 1934).



The San Jacinto fault, its extension Barrier E, an unnamed fault that parallels the San Jacinto fault, and the Rialto-Colton fault are northwest-trending partial barriers to groundwater movement in this subbasin (DWR 1934, DWR 1970, Wildermuth 2000). Groundwater may flow relatively unrestricted in the shallow parts of the flow system; however, the faults generally become more restrictive at depth. The San Jacinto fault displaces water levels about 50 feet in older deposits, but is not a barrier in the youngest materials, particularly beneath the SAR (DWR 1970). Groundwater flows across the fault from the Bunker Hill subbasin in the vicinity of Warm Creek and the SAR, within the river deposits and upper water-bearing unit. Barrier E (Dutcher and Garrett 1963) forms the northeastern boundary of the basin. Groundwater flows across the section of Barrier E from the Lytle Creek subbasin between Barrier J and the San Gabriel Mountains (Woolfenden 2001). At depth, the fault displaces groundwater elevations by about 25 to 50 feet (Wildermuth 2000). The Rialto-Colton fault is a barrier to groundwater flow along much of its length, especially in its northern reaches where groundwater elevations can reach about 400 feet higher within the Rialto-Colton subbasin than in the Chino subbasin to the west (Wildermuth 2000). Groundwater flows across the fault in the river deposits and in the upper and middle water-bearing units in the southeastern part of the basin (Woolfenden 2001). Barrier J (Dutcher and Garrett 1963) is a northeast-trending, southward step in groundwater elevation of about 100 feet in the northern part of the subbasin that may be a barrier to groundwater movement southward (Dutcher and Garrett 1963, Wildermuth 2000) or may be a groundwater cascade (DWR 1970).

The principal recharge areas are Lytle Creek, Reche Canyon in the southeastern part, and the SAR in the south-central part. Lesser amounts of recharge are provided by percolation of precipitation to the valley floor, underflow, and irrigation and septic returns (DWR 1970, Wildermuth 2000). Underflow occurs from fractured basement rock (DWR 1970, Wildermuth 2000) and through the San Jacinto fault in younger SAR deposits at the south end of the subbasin (Dutcher and Garrett 1958) and in the northern reaches of the San Jacinto fault system (Wildermuth 2000).

Groundwater recharge has been augmented through the use of two spreading basins, the Linden Ponds and the Cactus Basin. Figure 2-9 shows the locations of the basins. Groundwater modeling simulations showed that artificial recharge at the Cactus Basin may be more effective than recharge at Linden Ponds (no longer available as a spreading ground) at raising water levels in a greater part of the basin and that the imported water can be captured by production wells (Woolfenden 2001).

Figure 2-7
Rialto-Colton Subbasin and Faults

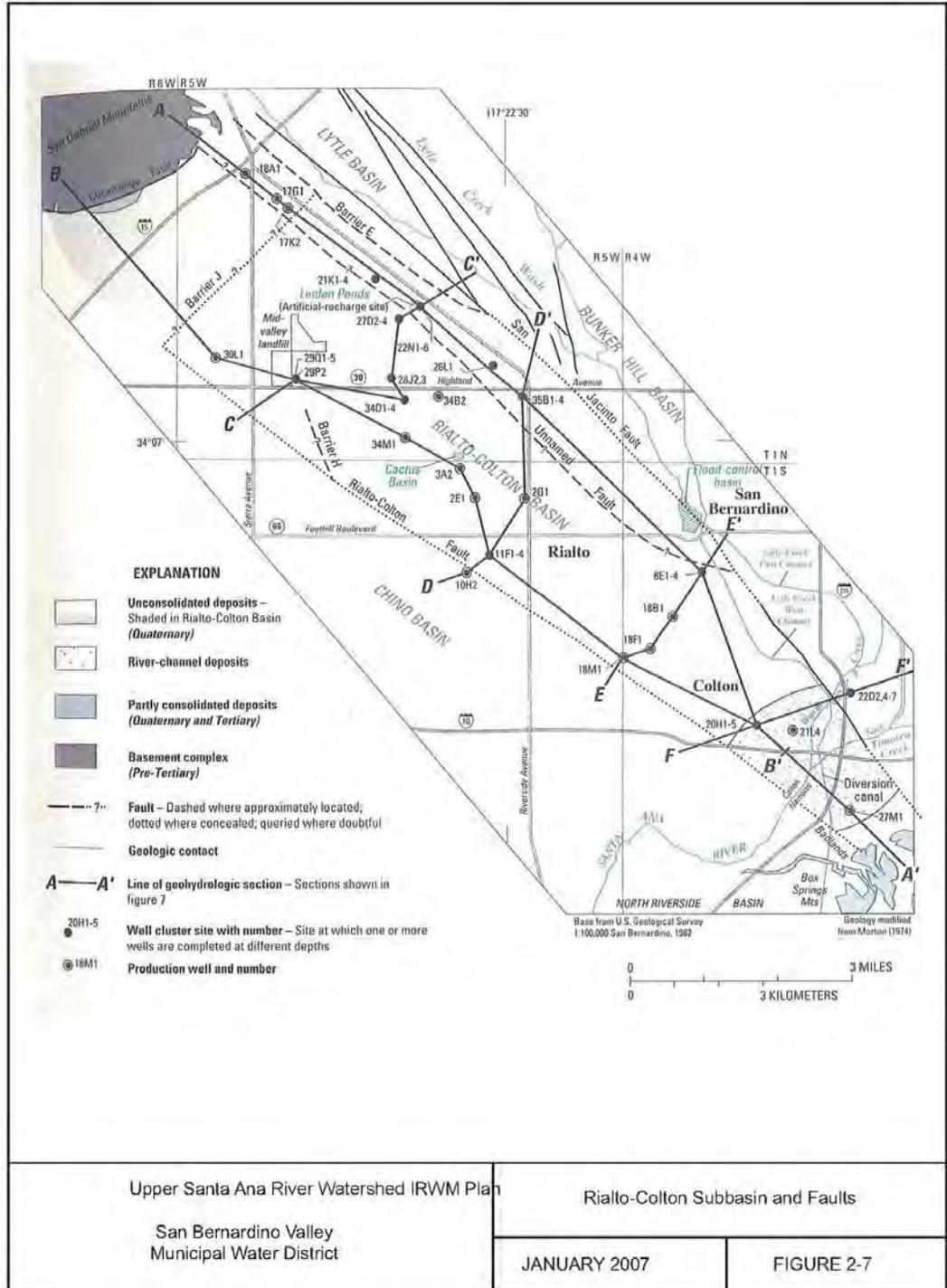
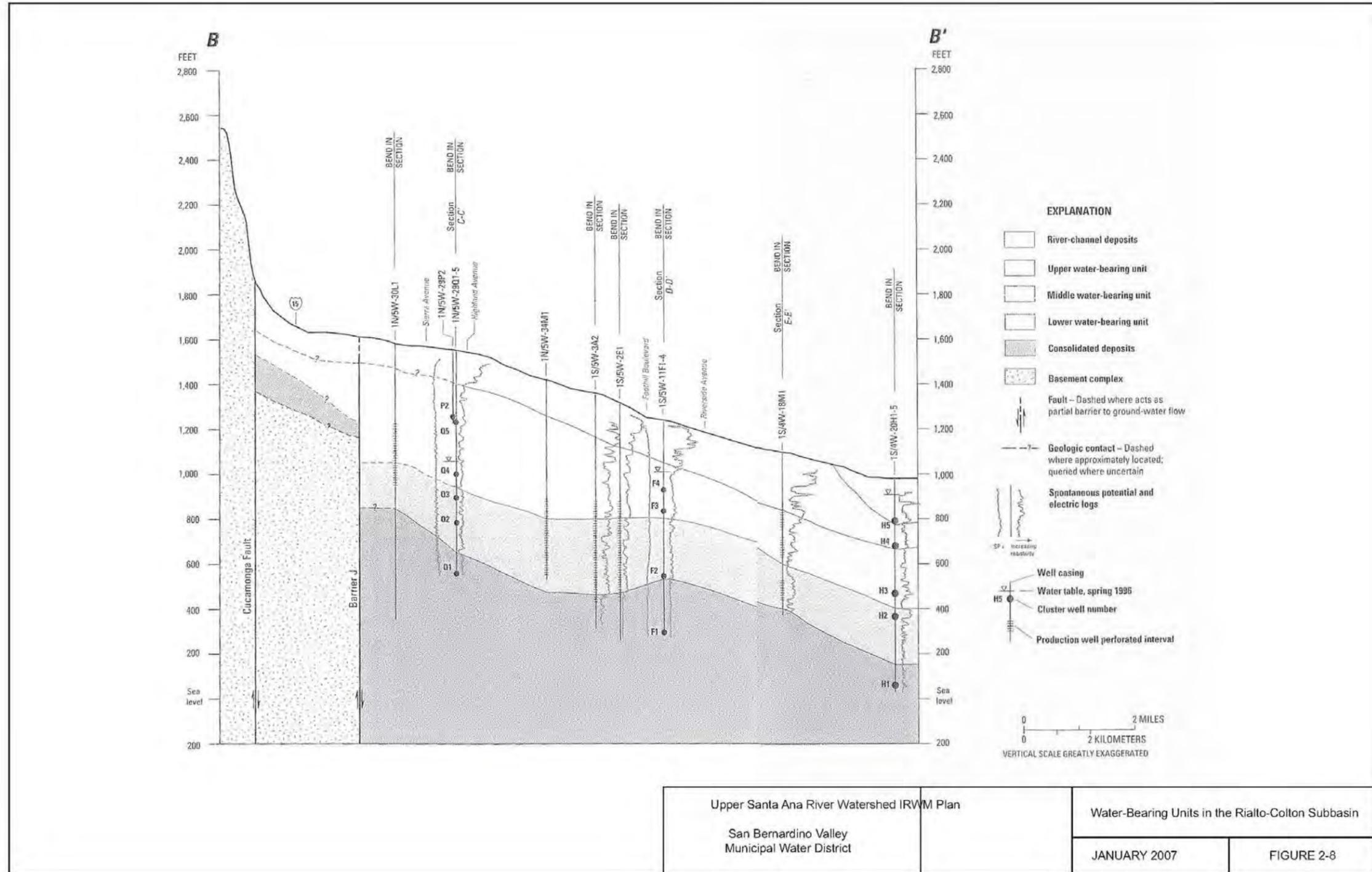


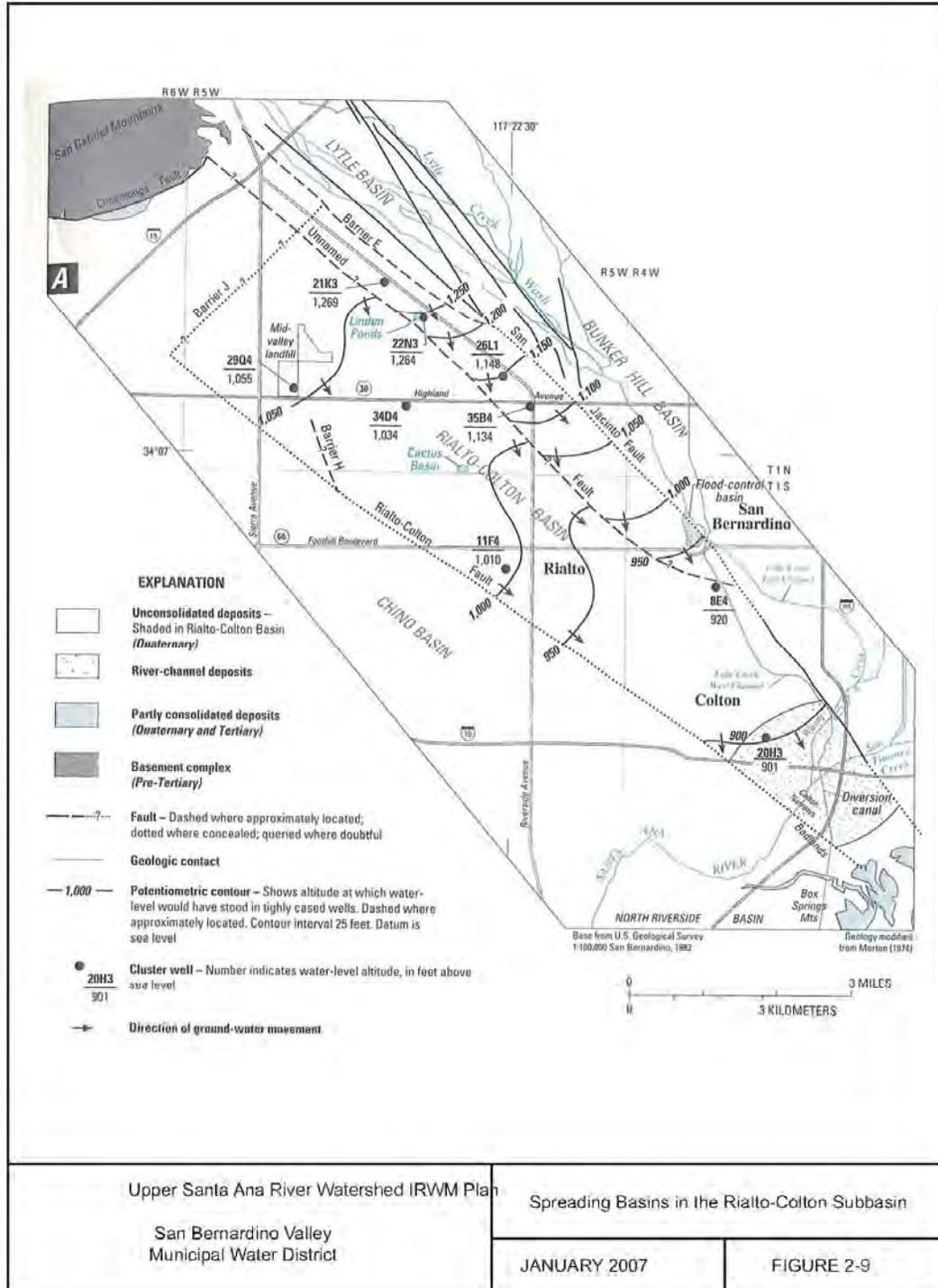


Figure 2-8
Water-Bearing Units in the Rialto-Colton Subbasin



Source: USGS, 2002

Figure 2-9
Spreading Basins in the Rialto-Colton Subbasins



Source: USGS, 2002



Cajon Subbasin (DWR 8-02.05)

The Cajon subbasin underlies Cajon Valley and Lone Pine Canyon, mostly in Cajon Pass, which is the boundary between the San Gabriel and San Bernardino Mountains. This subbasin is bounded by the Upper Mojave River Valley Groundwater Basin on the north along a surface drainage divide and the Bunker Hill subbasin of the Upper Santa Ana Valley Groundwater Basin on the south. The subbasin is bounded by impermeable rocks of the San Gabriel Mountains on the west and the San Bernardino Mountains on the east. Cajon and Lone Pine Creeks drain the valley southward as tributaries to the SAR. Annual precipitation throughout the subbasin ranges from 23 inches to 33 inches. The San Andreas fault zone crosses the southern part of the subbasin and cuts up Lone Pine Canyon. Springs are found along the trace of the fault zone indicating it is a barrier to groundwater. Lost Lake is a spring-fed sag pond formed in older alluvium where there is a step in the fault trace.

The chief water-bearing material in the Cajon subbasin is alluvium. Holocene-age alluvium consists of relatively unweathered sand, silt, and gravel deposited in active creek beds (DWR 1970). Older Pleistocene-age alluvium is found as alluvial fan deposits derived from the bordering mountains. Recharge is derived from percolation of precipitation, return irrigation water, and streamflow.

Riverside-Arlington Subbasin (DWR 8-02.03)

The Riverside-Arlington subbasin underlies part of the SAR Valley in northwest Riverside County and southwest San Bernardino County. This subbasin is bounded by impermeable rocks of Box Springs Mountains on the southeast, Arlington Mountain on the south, La Sierra Heights and Mount Rubidoux on the northwest, and the Jurupa Mountains on the north. The northeast boundary is formed by the Rialto-Colton fault, and a portion of the northern boundary is a groundwater divide beneath the community of Bloomington. The SAR flows over the northern portion of the subbasin. Annual average precipitation ranges from about 10 to 14 inches.

Groundwater in the subbasin is found chiefly in alluvial deposits. Quaternary-age alluvial deposits in the subbasin consist of sand, gravel, silt, and clay deposited by the SAR and its tributaries. Near the City of Riverside, the upper 50 feet of deposits are principally clay; however, deposits near the neighborhood of Arlington have considerable sand and little clay. At the northern end of the subbasin, coarser gravels with cobbles four to six inches in diameter are common. Based on data from wells, a minimum specific yield of 15 percent was assigned to unweathered gravels at the extreme northern end of the subbasin. The specific yield increases sharply to 18 percent near the SAR, then increases gradually to a maximum of 20 percent near the neighborhood of Arlington (DPW 1934).

The Rialto-Colton fault to the northeast separates the Riverside-Arlington subbasin from the Rialto-Colton subbasin. The fault is a barrier to groundwater flow along its length, especially in its northern reaches (Wildermuth 2000). A groundwater divide in the alluvium separates the Riverside portion from the Arlington portion of the subbasin (DPW 1934). The Riverside-Arlington subbasin is replenished by infiltration from SAR flow, underflow past the Rialto-Colton fault, intermittent underflow from the Chino subbasin, return irrigation flow, and deep percolation of precipitation (DPW 1934, Wildermuth 2000).

San Timoteo Subbasin (DWR 8-02.08)

The San Timoteo subbasin underlies Cherry Valley and the City of Beaumont in southwestern San Bernardino and northwestern Riverside Counties. The subbasin is bounded to the north and northeast by the Banning fault and impermeable rocks of the San Bernardino Mountains, Crafton Hills, and Yucaipa Hills; on the south by the San Jacinto fault; on the west by the San Jacinto Mountains; and on the east by a topographic drainage divide with the Colorado River hydrologic region. The surface is drained by Little San Gorgonio Creek and San Timoteo Canyon to the SAR. Average annual precipitation ranges from 12 to 14 inches in the western part to 16 to 18 inches in the eastern part of the subbasin.

Holocene-age alluvium, which consists of unconsolidated clay, silt, sand, and gravel, is the principal water-bearing unit in this subbasin. The alluvium, which is probably thickest near the City of Beaumont (DPW 1934), thins toward the southwest and is not present in the central part of the subbasin.

The Pliocene-Pleistocene-age San Timoteo Formation consists of alluvial deposits that have been folded and eroded. These deposits are widely distributed and principally composed of gravel, silt, and clay, with comparatively small amounts of calcite-cemented conglomerate. The clasts are chiefly granitic, with lesser amounts of volcanic and metamorphic pebbles and cobbles (DPW 1934). The total thickness of the San Timoteo Formation is estimated to be between 1,500 and 2,000 feet, but logs of deep wells near the central part of the subbasin indicate water-bearing gravels to depths of only 700 to 1,000 feet (DPW 1934).

The Banning and Cherry Valley faults and two unnamed faults in the northeast part of the subbasin offset impermeable basement rocks, stepping down to the south (DWR 1965a, 1967b). Water levels change across the Banning fault, dropping 100 to 200 feet to the south (DWR 1967b, Dutcher and Fenzel 1972). In the western part of the subbasin, water levels drop to the south about 75 feet across the Loma Linda fault and about 50 feet across the San Timoteo barrier (Dutcher and Fenzel 1972). In the northeastern part of the subbasin, water levels drop to the south across two unnamed faults (DWR 1965a, 1967b). Each of these faults appears to disrupt groundwater movement in the subbasin.



Groundwater is replenished by subsurface inflow and percolation of precipitation, runoff, and imported water. Runoff and imported water are delivered to streambeds and spreading grounds for percolation (DWR 1967a, 1970). Groundwater is found in alluvium in the San Timoteo Formation. Estimated specific yields in the subbasin range from 3 percent for fine materials to 35 percent for coarser materials (DWR 1970), with an average of about 11 percent (DWR 1967b).

Yucaipa Subbasin (DWR 8-02.07)

The Yucaipa subbasin underlies the southeast part of San Bernardino Valley. It is bounded on the northeast by the San Andreas fault, on the northwest by the Crafton fault, on the west by the Redlands fault and the Crafton Hills, on the south by the Banning fault, and on the east by the Yucaipa Hills. The average annual precipitation ranges from 12 to 28 inches. This part of the San Bernardino Valley is drained by Oak Glen, Wilson, and Yucaipa Creeks south and west into San Timoteo Wash, a tributary to the SAR.

Groundwater is found chiefly in alluvium, with lesser quantities in the San Timoteo Formation and fractured bedrock beneath the alluvium (Moreland 1970). Specific yield is estimated to vary from less than 4 percent northeast of Yucaipa, to a maximum of about 10 percent in the southeastern part of the subbasin (DPW 1934). Alternatively, specific yield is estimated to range from about 6 to 22 percent (DWR 1967a), with the average for the subbasin being about 10 percent (DWR 1979).

Alluvial deposits in the subbasin are divided into older and younger units. The Holocene-age younger alluvium consists of unconsolidated boulders, gravel, sand, silt, and clay (Moreland 1970). This unit forms a thin veneer and is mostly above the water table (Moreland 1970). The middle to late Pleistocene age older alluvium consists of boulders, gravel, sand, silt, and clay (Moreland, 1970), and holds the primary source of groundwater in the subbasin. Clays present in this section are due to weathering and soil formation during accumulation of the deposits (DPW 1934).

The Pliocene-Pleistocene age San Timoteo Formation consists of alluvial deposits that have been folded and eroded. These deposits are widely distributed and principally composed of gravel, silt, and clay, with comparatively small amounts of calcite-cemented conglomerate. The clasts are chiefly granitic, with lesser amounts of volcanic and metamorphic pebbles and cobbles (DPW 1934). The total thickness of the San Timoteo Formation is estimated to be between 1,500 and 2,000 feet, but logs of deep wells near the central part of the subbasin indicate water-bearing gravels to depths of only 700 to 1,000 feet (DPW 1934).

Dominant recharge to the subbasin is from percolation of precipitation and infiltration within the channels of overlying streams, particularly Yucaipa and Oak Glen Creeks; underflow from the fractures within the surrounding bedrock beneath the subbasin; and artificial recharge at spreading grounds. Four artificial recharge facilities with a total capacity of about 56,500 acre-feet per year were noted in 1967 (DWR 1967b). By increasing the spreading acreage along Oak Glen Creek by 25 to 50 acres, the capability exists to spread 7,000 to 14,000 acre-feet of surface water annually to recharge the Yucaipa subbasin (Yucaipa Valley Water District (YVWD) 2000a).

2.8.1.2 Lytle Creek Subbasin

Lytle Creek subbasin is adjoined on the west by the Rialto-Colton subbasin along the Lytle Creek fault, and on the east and southeast by the Bunker Hill subbasin along the Loma Linda fault and Barrier G. The northwestern border of the subbasin is delineated by the San Gabriel Mountains, and runoff from the mountains flows south/southeast through Lytle and Cajon Creeks into the basin.



The Lytle Creek tributary to the Santa Ana River contributes significantly to groundwater recharge.

Lytle Creek subbasin is not mapped in DWR Bulletin 118-2003; however, the subbasin is an integral part of the Upper Santa Ana Valley Groundwater Basin and a major recharge area for both the Bunker Hill and Rialto-Colton subbasins. Historically, local agencies have recognized Lytle Creek subbasin as a distinct groundwater subbasin. It is important to note that the water rights in Lytle Creek are set forth in long-standing court judgments governing the rights of the parties in that basin. For purposes of this report, the Bunker Hill and Lytle Creek subbasins are generally considered as one groundwater basin—the SBBA. However, the

three separate water-bearing zones and intervening confining zones of the Bunker Hill subbasin are not observed in the Lytle subbasin. Sediments within the Lytle subbasin are, for the most part, highly permeable, and the aquifer has a high specific yield. High permeability and specific yield tend to result in an aquifer that responds rapidly to changes in inflow (precipitation and streamflow) and outflow (groundwater pumping, streamflow, and subsurface outflow).

Numerous groundwater barriers are present within Lytle Creek subbasin, resulting in six compartments within the subbasin. Barriers A through D divide the northwestern portion of the subbasin into five sub-areas and the southeastern



portion of the subbasin comprises the sixth sub-area. Barrier F divides the northwestern sub-areas from the southeastern sub-area. Studies have shown that the groundwater barriers are less permeable with depth (Dutcher and Garrett 1963). When groundwater levels are high during wet years, more leakage occurs across the barriers than when groundwater levels are lower (i.e., during dry years). The amount of pumping in each sub-area, in large part, controls the movement of groundwater across the barrier within the older alluvium but not the younger alluvium (Dutcher and Garrett 1963).

2.8.1.3 San Bernardino Basin Area

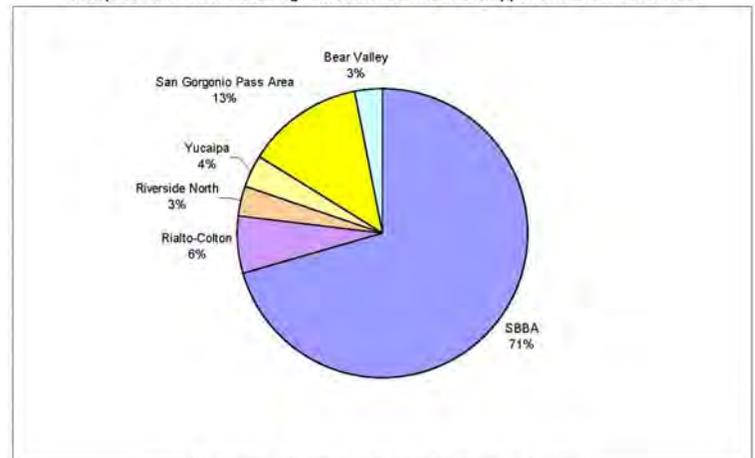
The 1969, Western-San Bernardino Judgment defines an area known as the SBBA. This area is defined as the "...area above Bunker Hill Dike [San Jacinto fault], but excluding certain mountainous regions and the Yucaipa, San Timoteo, Oak Glen and Beaumont Basins" (Figure 2-10). The SBBA is the focus of this IRWM Plan and plays a central role in the water supply for communities within the Region. The SBBA traditionally refers to two groundwater subbasins—Bunker Hill and Lytle Creek. The Western-San Bernardino

Watermaster provides a careful accounting of the SBBA on an annual basis. If pumping in the area exceeds the safe yield of the basin, then water must be imported to offset the amount exceeding the safe yield. If pumping in the area is below the safe yield, then the basin accrues "credits" in a like amount.

The SBBA has a surface area of approximately 140.6 square miles and lies between the San Andreas and San Jacinto faults. The basin is bordered on the northwest by the San Gabriel Mountains and Cucamonga fault zone; on the northeast by the San Bernardino Mountains and San Andreas fault zone; on the east by the Banning fault and Crafton Hills; and on the south by a low, east-facing escarpment of the San Jacinto fault and the San Timoteo Badlands. Alluvial fans extend from the base of the mountains and hills that surround the valley and coalesce to form a broad, sloping alluvial plain in the central part of the valley. The Pressure Zone, which is within the SBBA, is described in more detail in this chapter because of high groundwater levels that historically have been of concern in the Region.

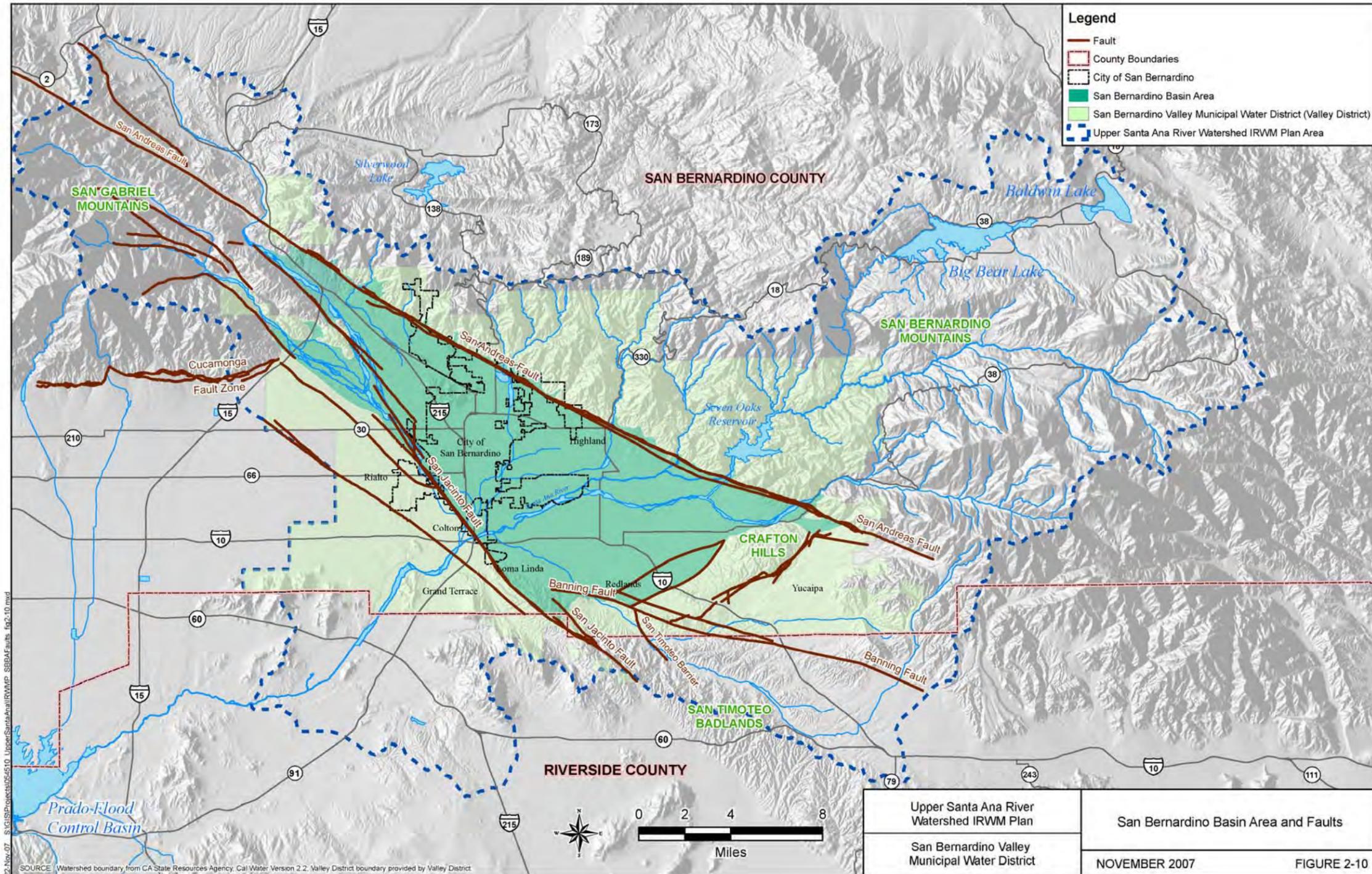
Per the provisions of the Western-San Bernardino Judgment, Valley District and Western are responsible for managing the SBBA. The judgment does not allow extractions to exceed the long-term natural safe yield without replacing the incremental amount over the safe yield with water from an outside source.

2005 production from various groundwater basins in the Upper Santa Ana watershed.



SBBA is a major source of groundwater for the region.

Figure 2-10
San Bernardino Basin Area





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Geologic Structure of SBBA

Although mountain belts tend to be associated with the uplift of rock material to several miles in height, they are bordered by regions of subsidence called foreland sedimentary basins. These basins are wedge shaped in the cross-section, with a depth that gradually increases away from the mountain front. The SBBA is a foreland basin and receives sediment eroded from the San Bernardino Mountains. The foreland basin refers to the area of intake or recharge where most recharge occurs by direct percolation of SAR water. The SBBA foreland basin is characterized by highly permeable sands and gravel with few clay and silt deposits.

The San Andreas fault zone impedes movement of groundwater, producing springs and a groundwater-level change that marks the fault trace along the northern boundary of the subbasin. The San Jacinto fault forms a strong barrier to the lateral southwest flow of groundwater. The water table rises on the upstream side of the San Jacinto fault nearly to the surface below the course of the SAR. The combination of alluvial material with a high water table in a seismically active area creates a hazard for liquefaction. The Redlands and Banning faults also impede groundwater movement along the borders of the subbasin (DWR 1986).

Geologic Units of SBBA

The water-bearing material in the subbasin consists of unconsolidated alluvial deposits and consolidated sediments. Most municipal and agricultural supply wells obtain water from the unconsolidated alluvial deposits. Figure 2-11 shows the relationship of the sediments in the basin (USGS 2006).

The unconsolidated alluvial deposits consist of sand, gravel, and boulders interspersed with deposits of silt and clay. The deposits are divided into older (Pleistocene) and younger (Holocene) alluvium and Holocene river-channel deposits. Near the mountain front, the unconsolidated deposits tend to be coarse-grained and poorly sorted, becoming finer-grained and better sorted downstream. The older alluvium consists of continental, fluvial deposits, ranging in thickness from some tens of feet to more than 800 feet. The younger alluvium is about 100 feet thick, composed mainly of floodplain deposits. The relatively recent river channel deposits are less than 100 feet thick but are among the most permeable sediments in the SBBA and contribute to large seepage losses from streams (Danskin et. al. n.d.). Wells yield up to 5,000 gallons per minute (gpm) and average about 1,245 gpm. Specific yield of these deposits ranges from 7 to 21 percent and averages 13 percent (WE 2000).

Within the unconsolidated alluvial deposits are three (upper, middle, and lower) fine-grained sequences that are separated by coarse-grained sediment. Both the

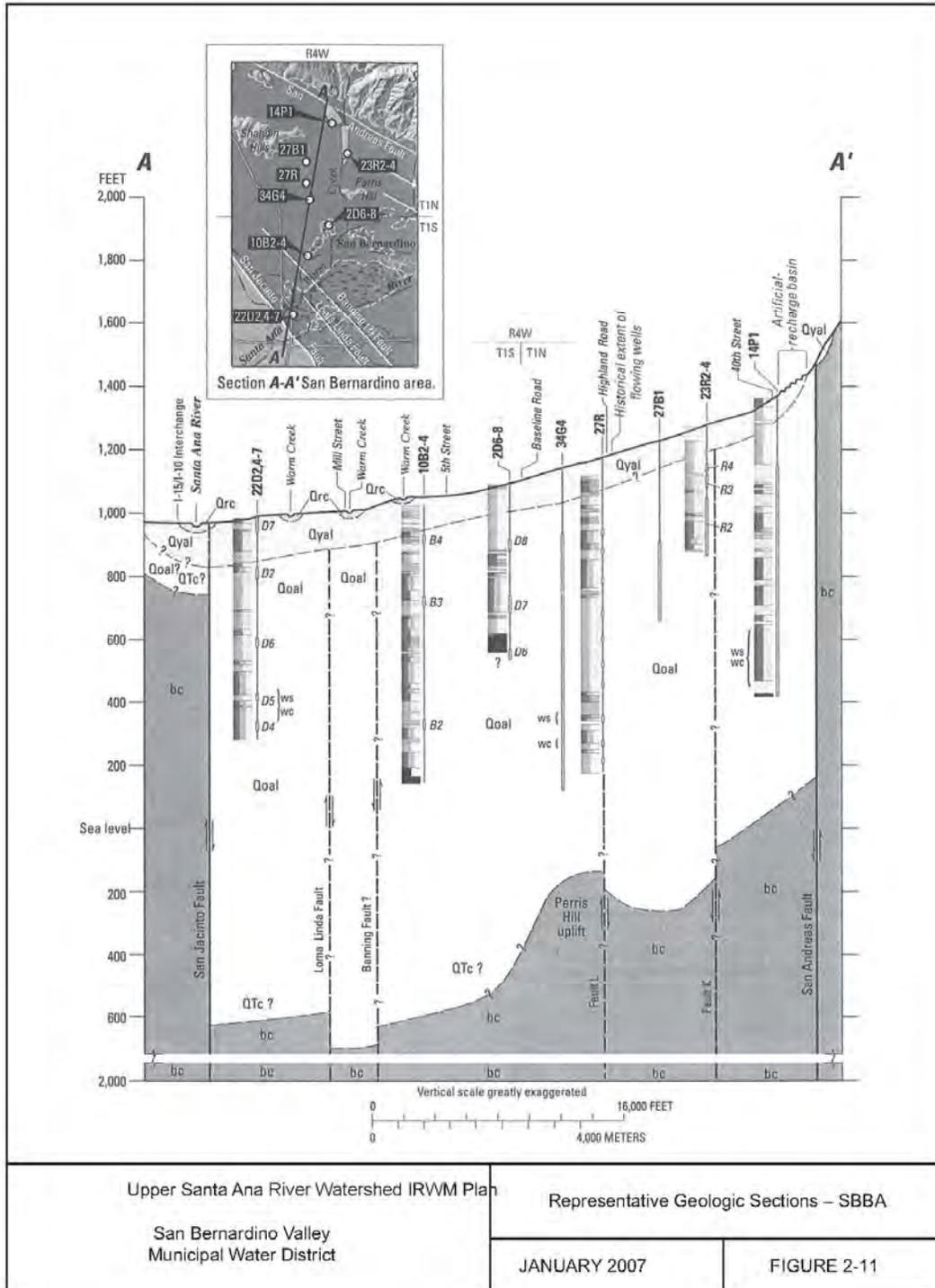


upper and middle fine-grained layers are present in the central portion of the valley and cover about 25 square miles. The upper fine-grained deposits (clay and silt) are part of the younger alluvium and are exposed on ground surface near the San Jacinto fault but, to the north, are covered by coarser-grained sediments. The clay layer may be locally eroded and replaced with coarse sand and gravel. Boreholes drilled in the vicinity of the SAR and the San Jacinto fault indicate a predominance of coarse sand and gravel, not fine-grained silt and clay. The middle fine-grained sequence is part of the older alluvium and is present at a depth of about 350 feet below ground surface (bgs). The sequence is as much as 300 feet thick and consists of interbedded silt, clay, and sand and thins towards the margins of the basin. Although previously conceived as a moderately clay unit, geophysical logs show this fine-grained sequence to consist of relatively continuous zones of silt and sand (Danskin 2006). Little is known about the lower fine-grained interval because most production wells do not penetrate to that depth.

The consolidated sedimentary rocks crop out mainly in the southern part of the San Bernardino area between the San Jacinto fault and Crafton Hills and underlie unconsolidated deposits throughout most of the valley. In the badlands, these sedimentary rocks are referred to as the San Timoteo Formation and are composed of partly lithified, non-marine alluvial and lacustrine sediments ranging in age from late Tertiary to early Quaternary. Well yields are moderate from the more permeable layers and are generally less than 500 gpm (Dutcher and Garrett 1963). Both the unconsolidated and consolidated sediments rest on and abut basement complex, which, for the purposes of this report, are considered to be essentially non-water bearing.

Faults in the area have both vertically and horizontally offset these geologic units.

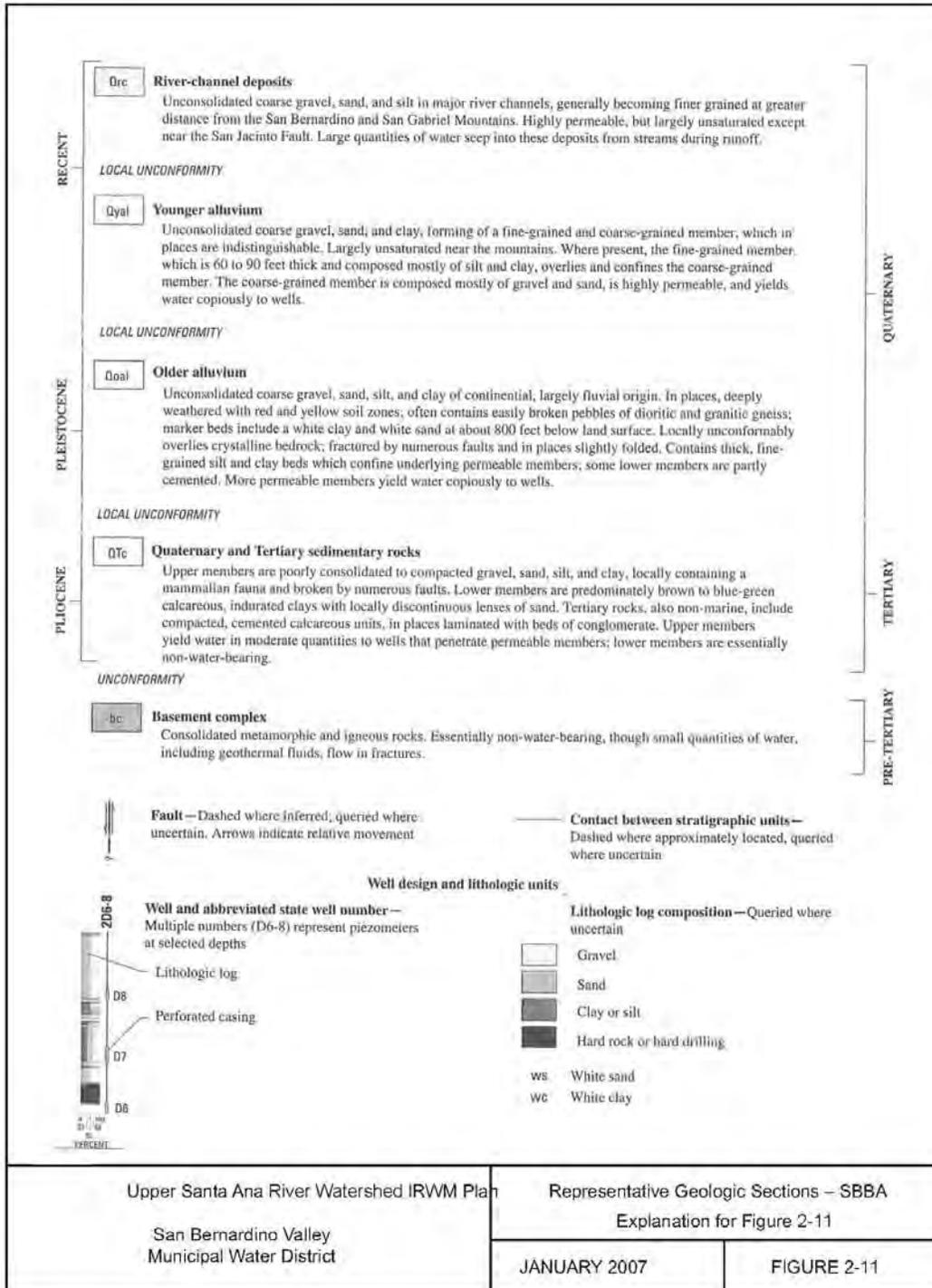
Figure 2-11
Representative Geologic Sections – SBBA



Source: USGS, 2002, Water Resources Investigative Report 02-4243



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Aquifer Systems of SBBA

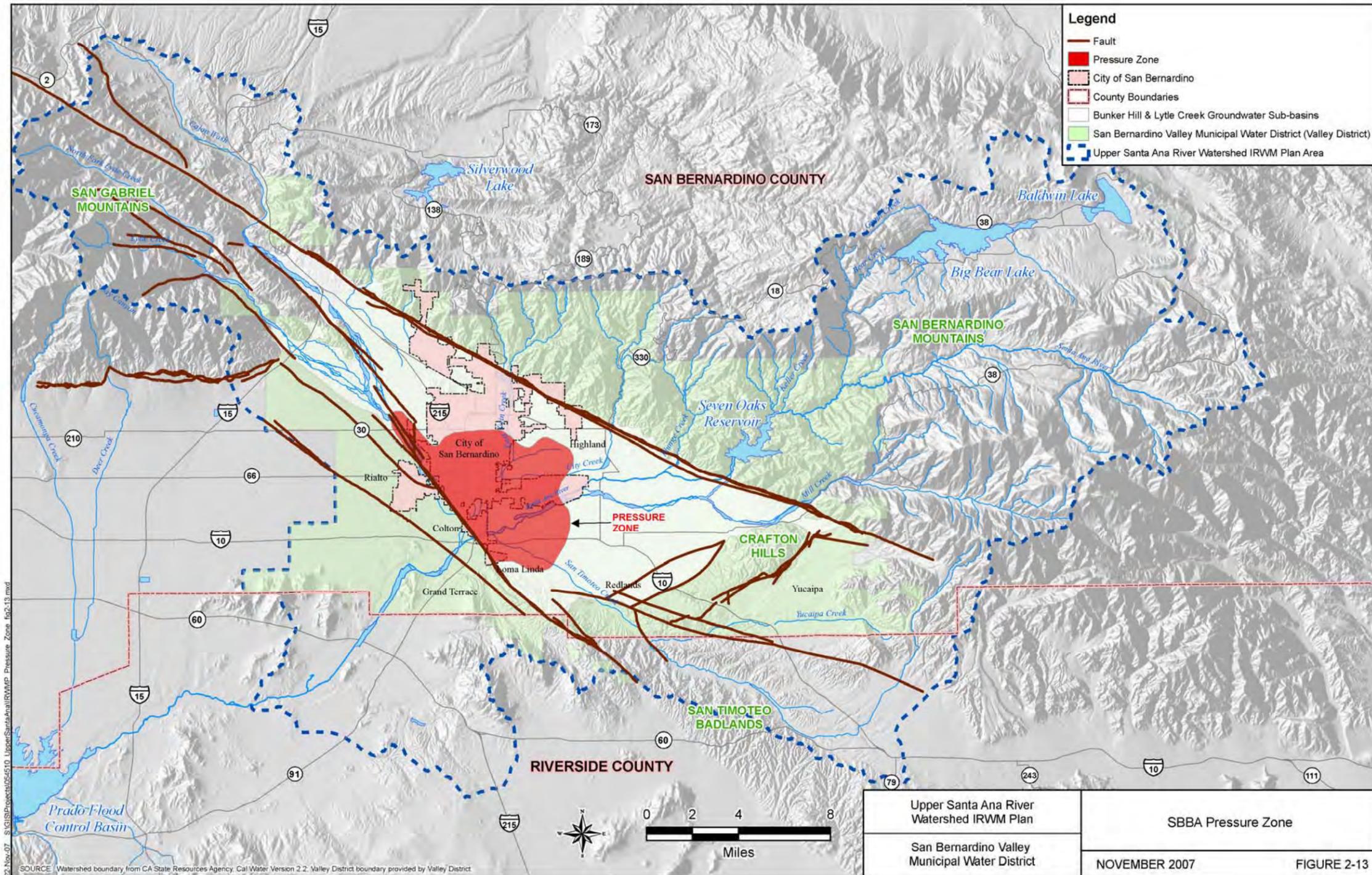
Dutcher and Garrett (1963) divided the SBBA alluvial sediments into the upper, middle, and lower water-bearing members that are separated by the upper, middle, and lower confining members (fine-grained sequences). Figure 2-12 shows a profile of the water-bearing and confining members (Danksin et. al., 2006). The aquifer system of the SBBA is generally unconfined, however, with water moving vertically between the multiple water-bearing layers. The confining members are more accurately described as very leaky aquitards¹ of finer-grained sediments.

The upper confining member is a near-surface deposit with low hydraulic conductivity. The upper confining member extends over a relatively large area from the San Jacinto fault to Highland Road, but only produces confining conditions in a relatively small area referred to as the “Pressure Zone” (see Figure 2-13). As shown in Figure 2-12, the upper confining member is effectively at land surface between the San Jacinto fault and Banning fault and would prevent recharge from precipitation from reaching the upper water-bearing member. In the area between Warm Creek and the SAR, the upper confining member acts to restrict vertical flow causing semi-confined conditions within the upper water-bearing member. North of the Banning fault to about Highland Road, the upper confining member is covered with coarse sediments. Perched water may occur in these areas and springs or seeps may occur where the contact is exposed at ground surface. In the vicinity of the SAR and San Jacinto fault, the upper confining member appears to have been eroded and replaced with coarse sand and gravel. In these areas, the coarse-grained sediments are essentially part of the upper water-bearing member and allow recharge or discharge of water from the upper water-bearing member.

The upper water-bearing member is not usually filled with groundwater. Near the foothills, as shown in Figure 2-12, the member is essentially dry as the groundwater levels are below the base of the unit. Localized areas of perched groundwater may be present as recharge percolates through the sediments. Within the central portions of the valley, the member becomes fully saturated as water moves from the upper portions of the valley to lower elevations. The upper water-bearing aquifer is likely full along the course of the SAR.

¹ An aquitard is a low-permeability sedimentary unit that can store groundwater and also transmit it slowly from one aquifer to another (Fetter 1988). An aquitard is generally considered to be a barrier or partial barrier to movement of groundwater because water tends to move substantially slower through aquitards than aquifers.

Figure 2-13
SBBA Pressure Zone





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The upper and middle water-bearing members provide most of the water to municipal and agricultural wells. Flow meter testing in three production wells shows that most of the water is extracted from the shallow, younger deposits (Izbicki et. al., 1998). In the central part of the SBBA, these water-bearing members are separated by as much as 300 feet of interbedded silt, clay, and sand (the middle confining member). This middle confining member produces confined conditions over the central part of the basin (referred to locally as the “confined area”), but thins and becomes less effective toward the margins of the basin (Dutcher and Garrett 1963). As shown in Figure 2-12, USGS shows that the middle confining bed extends to the northern edge of the basin. Other sections prepared for the basin show that the middle confining member pinches out before reaching the edge of the basin (Numeric Solutions 2006). Although the middle confining member is not as permeable as the adjacent water-bearing zones, this unit consists primarily of continuous sand and silt (not silt and clay as is found in most aquitards), and there is water production from this zone in many wells (Danskin et al. 2006). It appears that groundwater recharge to the middle water-bearing aquifer is from vertical leakage through the middle confining member and near the fringes of the valley where the upper and middle aquifers may merge.

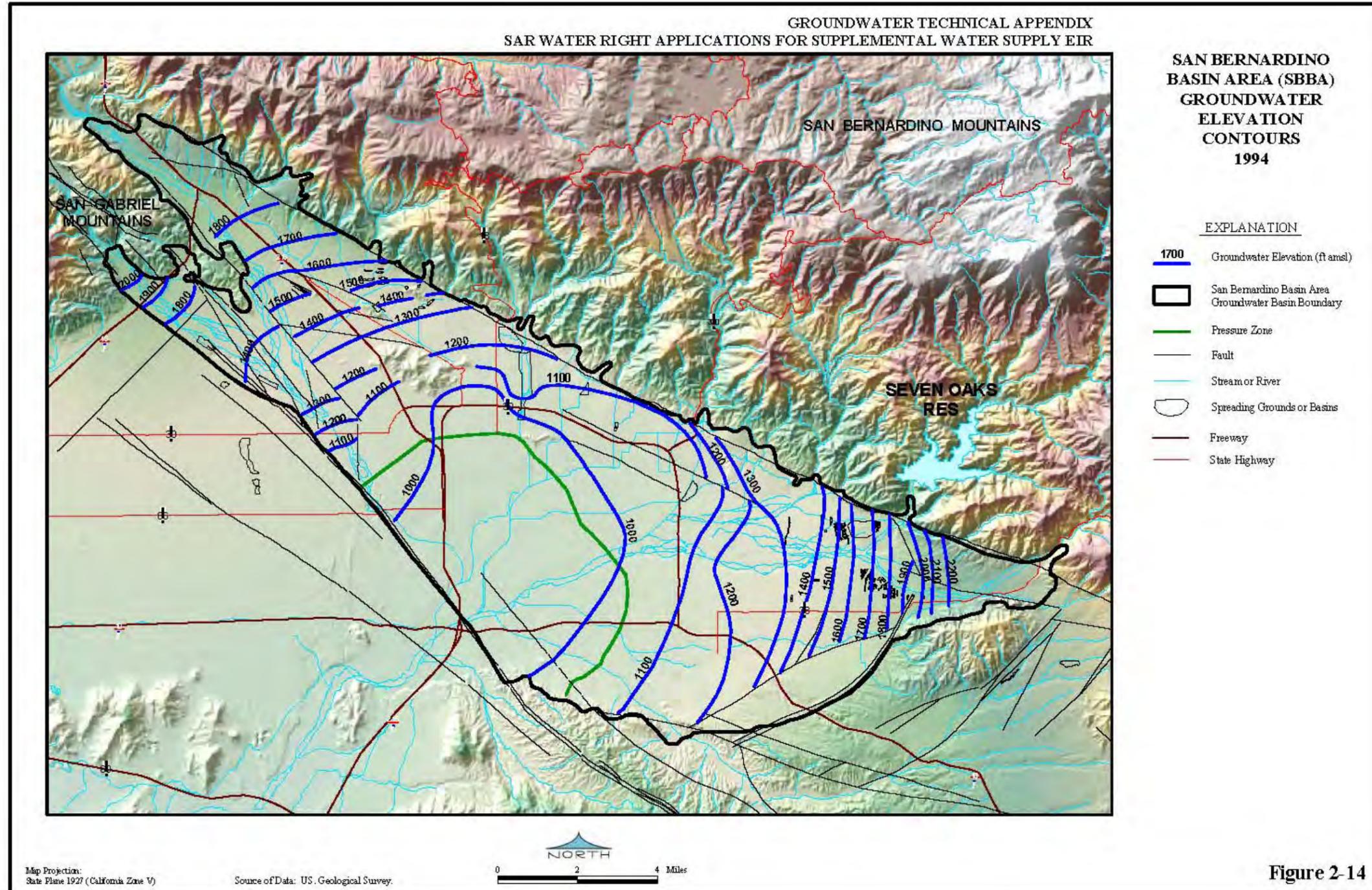
The lower confining and lower water-bearing members are not typically penetrated by most production wells and play a smaller role in the valley-fill aquifer, mainly due to deeper depth and generally lower permeability. The lower water-bearing member may be consolidated older alluvium or part of the consolidated sediments (Danskin, et. al. 2006).

The areal pattern of groundwater flow is from areas of recharge along the base of the mountains to areas of discharge where the SAR crosses the San Jacinto fault and has remained relatively unchanged over the period of record. Groundwater elevation contours shown in Figure 2-14 illustrate this flow regime in the Bunker Hill subbasin. However, vertical groundwater movement has changed through time due to groundwater extraction and artificial recharge. Groundwater pumping has occurred from increasingly deeper depths, altering the natural vertical movement of groundwater by progressively draining deeper zones of groundwater (Danskin et. al. n.d.).

Recharge to the Bunker Hill subbasin historically has resulted from infiltration of runoff from the San Gabriel and San Bernardino Mountains in areas where the upper confining member is absent or from the forebay. The SAR, Mill Creek, and Lytle Creek contribute more than 60 percent of the total recharge to the groundwater system (USGS 1989). Lesser contributors include Cajon Creek, San Timoteo Creek, and most of the creeks flowing southward out of the San Bernardino Mountains. The subbasin is also replenished by deep percolation of



Figure 2-14
SBBA Groundwater Contours





Percolation from streams, such as Devil Canyon Creek above, is the major source of recharge in the SBBA.

water from precipitation and resulting runoff, percolation from delivered water, and water spread in streambeds and spreading grounds.

Percolation from streams (such as the SAR, Lytle Creek, Cajon Creek, Devil Canyon Creek, East Twin Creek, Warm Creek, City Creek, Plunge Creek, and Mill Creek) is the major source of recharge in the SBBA. Recharge occurs both in the stream channels and in nearby artificial recharge basins. As a result of the highly permeable river channel deposits and the artificial recharge operations, nearly all of the flow in the smaller streams

(Devil Canyon, Waterman, East Twin, Plunge, and San Timoteo Creeks) is recharged to the upper and middle aquifers close to the mountain front.

During floods, the major streams (SAR, Mill Creek, and Lytle Creek) transmit large volumes of water over a short period, resulting in some surface water exiting the basin without contributing to groundwater recharge. Recharge to the SBBA also results from underflow (subsurface inflow), direct infiltration of precipitation, return flow, infiltration from underground sanitary sewer lines and storm drains, and artificial recharge of imported water. Subsurface inflow to the SBBA occurs across the Crafton fault and through the poorly transmissive materials comprising the Badlands, across a small section of unconsolidated deposits north of the Crafton Hills, and through materials beneath the Cajon Creek and Lytle Creek channels. Figure 2-15 shows the areas of underflow into the basin. Total underflow for 1945 to 1998 averaged about 5,000 acre-feet per year (Danskin et. al. 2006). Annual values have declined from a maximum of about 7,000 acre-feet in 1945 to about 4,000 acre-feet in 1998, predominately as a result of declining water levels in the Yucaipa subbasin. With the exception of unusually wet years, recharge from direct precipitation on the valley floor is minimal. An additional source of recharge is that derived from return flow of water pumped from and used locally within the SBBA. Hardt and Hutchinson (1980) estimated return flow to be 30 percent of total extractions, except for wells that export groundwater directly out of the San Bernardino area.

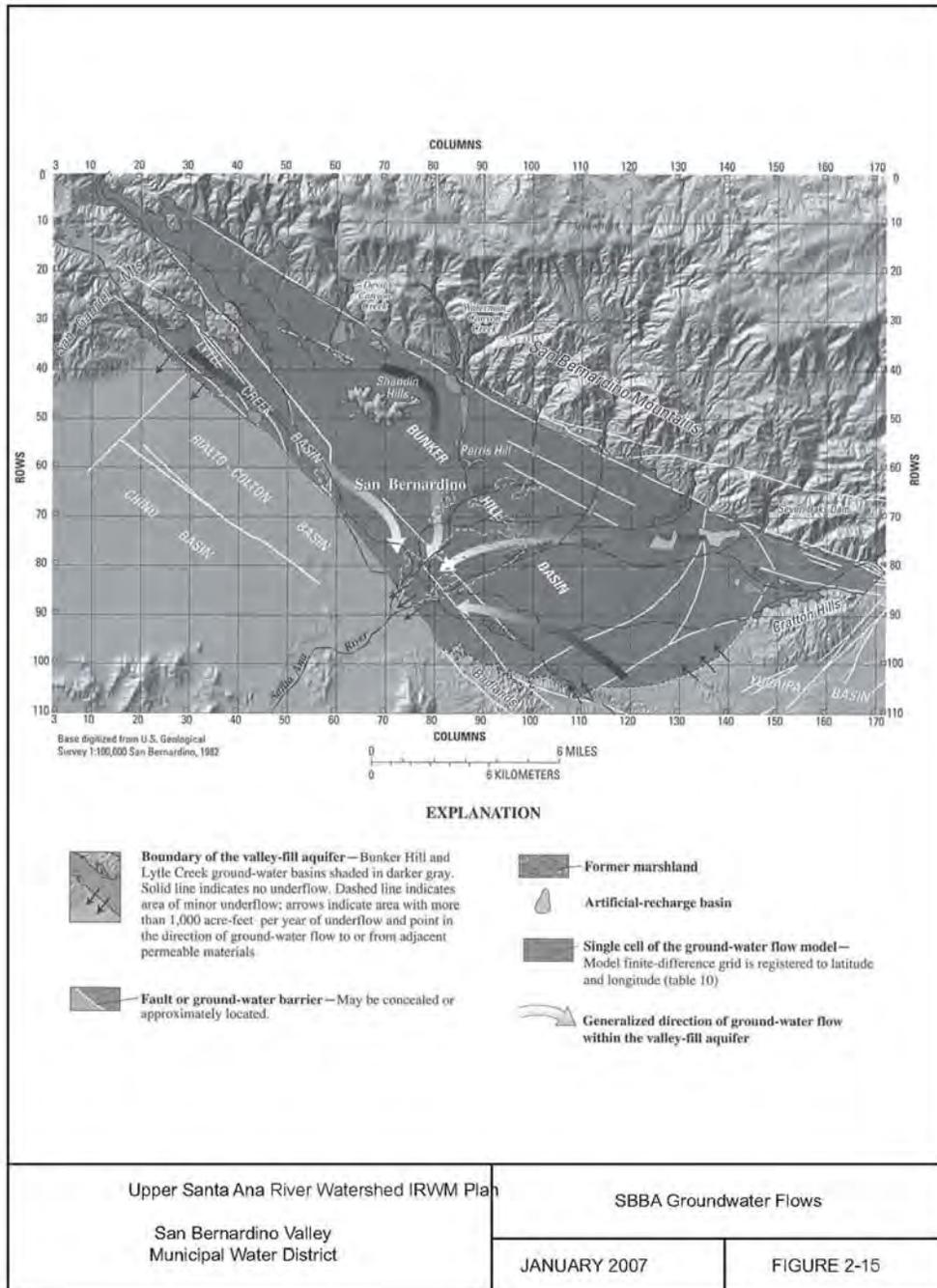
Subsurface outflow from the basin occurs only in the upper 100 feet of the younger alluvium through a breach in the San Jacinto fault, carved by the SAR (Danskin, et. al. 2006). Outflow also occurs through Barrier E at two locations, near the SAR and near Barrier J where Lytle Creek emerges from the San Gabriel Mountains. Subsurface outflow near the Barrier J fault is into the Rialto-Colton



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subbasin. Figure 2-15 shows the location of the subsurface outflow from the basin.

Figure 2-15
SBBA Groundwater Flows



Source: USGS, 2002, Water Resources Investigative Report 02-4243



2.8.1.4 Bear Valley Groundwater Basin 8-9

This groundwater basin underlies Bear Valley and is bound by crystalline rocks of the San Bernardino Mountains in southern San Bernardino County. Big Bear Lake, which lies in the western portion of the valley, receives runoff from Grout Creek to the northwest, Van Dusen Canyon to the northeast, Sawmill Canyon and Sand Canyon to the southeast, Knickerbocker and Metcalf Creek to the south, and North Creek to the southwest. Baldwin Lake, which is typically dry, lies in the northeast portion of the valley and receives occasional runoff from Van Dusen Canyon to the northwest and Shay Creek to the south (GEOSCIENCE 2001). Average annual precipitation to the valley ranges from 23 to 29 inches.

Groundwater in the Bear Valley Groundwater Basin is found primarily in the unconsolidated alluvial deposits. The water-bearing deposits in the valley have been separated into upper, middle, and lower aquifers (GEOSCIENCE 1999). The upper and middle aquifers are the primary water producers. In addition, wells completed in underlying bedrock produce as much as 300 gpm (GEOSCIENCE 1999).

A groundwater divide exists between Big Bear Lake and Baldwin Lake in the vicinity of the Big Bear Airport (GEOSCIENCE 1999). Faults are mapped cutting Pleistocene alluvium but it is not known if these are barriers to groundwater movement.

Recharge of this basin is likely from percolation of precipitation and runoff and underflow from fractured crystalline rocks.

2.8.1.5 Big Meadows Valley Groundwater Basin 8-7

This basin underlies a mountain valley in the upper reach of the SAR. The basin is bounded on the west by Seven Oaks Valley Groundwater Basin along the Slide Peak fault (Rogers 1967) and elsewhere by impermeable crystalline rocks of the San Bernardino Mountains. The valley is drained by the SAR and receives an average annual precipitation ranging from 24 to 36 inches. Groundwater in the basin is found in alluvium that typically consists of clay, silt, sand, and gravel. Alluvial material appears to reach about 400 feet in thickness in some parts of the basin. The Slide Peak, Santa Ana, and San Gorgonio faults are mapped as cutting through basin materials (Rogers 1967); however, it is not known whether these faults impede groundwater movement.

2.8.1.6 Seven Oaks Valley Groundwater Basin 8-08

This basin underlies a mountain valley in the upper reach of the SAR. The basin is bounded on the east by Big Meadows Valley Groundwater Basin along the Slide Peak fault (Rogers 1967) and elsewhere by impermeable crystalline rocks

of the San Bernardino Mountains. The valley is drained by the SAR and receives an average annual precipitation ranging from 24 to 36 inches. Groundwater in the basin is found in alluvium that typically consists of clay, silt, sand, and gravel that reaches at least 50 feet thick. The Slide Peak and Santa Ana faults are mapped as cutting through basin materials (Rogers 1967); however, it is not known whether these faults impede groundwater movement.

Recharge is probably derived principally from percolation of precipitation and streamflow in the SAR.



2.9 Groundwater Management in the Region

Conjunctive use of surface water and groundwater is a long-standing practice in the Region. Part of the potable water used in the Region is imported from sources in the Sierra and Northern California through the SWP. Several reservoirs are operated primarily for the purposes of storing surface water for domestic and irrigation use, but groundwater basins are also recharged from the outflow of some reservoirs. The concept is to maintain streamflow over a longer period of time than would occur without regulated flow and thus provide for increased recharge of groundwater basins. Most of the larger basins in this Region are managed with many



Numerous groundwater spreading grounds have been developed to recharge the groundwater basins.

conjunctive use projects being developed to optimize and manage water supply. Numerous groundwater spreading grounds have been developed to recharge the groundwater basins when adequate surface water supply is available. Management of the water level in the SBBA, in general, and the Pressure Zone, in particular, is a focus of the groundwater management of this IRWM Plan. Management of the SBBA is discussed in more detail in Chapter 4.

2.9.1 Recharge Area Programs

The SBVWCD and its predecessors have conducted groundwater recharge activities since 1912 in the Bunker Hill groundwater subbasin. Artificial recharge of imported water to the SBBA began in 1972. Because of the extremely permeable sand and gravel deposits, maximum instantaneous recharge rates are high. Based on a recharge efficiency rate of 95 percent, the total quantity of artificial recharge in the basin averaged about 7,400 acre-feet per year from 1972 to 1992. Because of the size of several of the recharge basins and exceptionally permeable material, a larger quantity of water could be imported and recharged along the base of the San Bernardino Mountains, if necessary (i.e., recharge basin capacity and infiltration rates are not currently limiting the amount of imported water recharged). Any additional recharge and extraction should be carefully planned and implemented to avoid liquefaction and unacceptable decreases in groundwater levels in the basins.

Numerous existing groundwater recharge facilities (spreading grounds or spreading basins) are located in the SBBA, Rialto-Colton, and Yucaipa subbasins. The locations of these facilities are shown in Figure 2-16, and selected characteristics are summarized in Table 2-11. Existing turnouts serve each recharge facility, with the exception of the Cactus Spreading and Flood Control Basins, which would be served by the Cactus Basins Pipeline proposed by Valley District. A description of each spreading ground follows.

**Table 2-11
Recharge Facilities**

| Facility Name | Owner or Operator | Conveyance Used to Serve Facility | Recharge Facility Characteristics ^a | | | |
|---|--|---------------------------------------|--|--|------------------------------|---|
| | | | Active Recharge Facility Area ^b (acres) | Percolation Rate ^c (feet/day) | Monthly Capacity (acre-feet) | Groundwater Basin (and Subbasin) Recharged ^d |
| SAR Spreading Grounds | SBVWCD | Foothill Pipeline | 64 ^d | 3 | 12,000 | SBBA (Bunker Hill) |
| | | Santa Ana Low Flow (288) | | | | |
| | | Santa Ana Intake (200 Max) | | | | |
| Devil Canyon and Sweetwater Basins | SBCFCD ^f | Foothill Pipeline | 30 | 1.5 | 1,350 | SBBA (Bunker Hill) |
| | | Sweetwater (37) | | | | |
| Lytle Basins | Lytle Creek Water Conservation Association | Fontana Power Plant | Variable | 1.5 | Variable | SBBA (Lytle Creek) |
| | | Constructed drainage channel | | | | |
| City Creek Spreading Grounds | SBCFCD | Foothill Pipeline | 75 | 1.5 | 3,375 | SBBA (Bunker Hill) |
| | | City Creek (60) | | | | |
| Patton Basins | SBCFCD | Foothill Pipeline | 3 | 0.3 | 27 | SBBA (Bunker Hill) |
| | | Patton (12) | | | | |
| Waterman Basins | SBCFCD | Foothill Pipeline | 120 | 0.5 | 1800 | SBBA (Bunker Hill) |
| | | Waterman (135) | | | | |
| East Twin Creek Spreading Grounds | SBCFCD | Foothill Pipeline | 32 | 1.5 | 1440 | SBBA (Bunker Hill) |
| | | Waterman (135) | | | | |
| Badger Basins | SBCFCD | Foothill Pipeline | 15 | 0.5 | 225 | SBBA (Bunker Hill) |
| | | Sweetwater (22) | | | | |
| Mill Creek | SBVWCD | Greenspot Pipeline | 66 | 3 | 6,000 | SBBA (Bunker Hill) |
| | | Mill Creek Spreading (50) | | | | |
| | | Mill Creek Intake (110) | | | | |
| Cactus Spreading and Flood Control Basins | SBCFCD | San Gabriel Valley MWD Lytle Pipeline | 46 | 1.5 | 2,070 | Rialto-Colton |
| | | Lower Lytle Creek (55) | | | | |
| Wilson Basins | SBCFCD | East Branch Exten. | 12 | 1 | 360 | Yucaipa subbasin |
| | | Wilson Basins (30) | | | | |
| Garden Air Creek | Valley District | East Branch Exten. | n/a | n/a | n/a | San Timoteo subbasin |
| | | Garden Air Creek (16)0 | | | | |

^a Values are from tabulation on map contained in Water Right Application by Valley District and Western to appropriate water from the SAR or by engineering evaluation of spreading grounds.

^b Recharge facility area is the geographical extent of each basin that can be inundated for recharge.

^c Estimated percolation rate. This is the estimated rate at which water can percolate into the ground through the basin, expressed in feet per day. The values used have generally been computed from the annual recharge capacity. These rates are typically about one-half of the percolation rates presented by the USGS (1972). The use of the small percolation rates is reasonable in that it would involve longer-term percolation rates that are typically smaller than short-term rates.

^d Note that there may be flow out of the subbasin or basin identified. For example, a report by Geoscience Support Services, Inc. (1992) estimated that only 36 percent of the water recharged in the upper Lytle Creek area remains in the Lytle Creek subbasin, while most of it flows to the Rialto-Colton subbasin.

^fRecharge facility area based upon 4/11/03, SBVWCD Report: "SBVWCD Basin Storage Capacity for SAR and MC." Or by estimating using GIS.



2.9.1.1 SAR Spreading Grounds

The SAR spreading grounds, located downstream of Seven Oaks Dam on the alluvial fan of the SAR, are operated by the SBVWCD. The SAR spreading grounds include a borrow pit that was a source of materials used in the construction of Seven Oaks Dam.

The percolation rate for the SAR spreading grounds is approximately 3 feet per day, which results in a recharge rate (based on 64 acres) of about 6,000 acre-feet per month, or about 97 cubic feet per second (cfs). Absorptive capacity is estimated by multiplying the active area of the recharge facility by the estimated percolation rate. Water delivered to the SAR spreading grounds recharges the Bunker Hill subbasin of the SBBA (Table 2-11).

2.9.1.2 Devil Canyon and Sweetwater Basins

The Devil Canyon and Sweetwater Basins, located northwest of the California State University, San Bernardino campus, are operated by the SBCFCD and have an active spreading area of 30 acres. The estimated long-term percolation rate for the site is about 1.5 feet per day, which results in a recharge rate of about 1,350 acre-feet per month, or about 23 cfs. The Devil Canyon and Sweetwater Basins recharge the Bunker Hill subbasin of the SBBA (Table 2-11).

2.9.1.3 Lytle Creek Subbasin

Gravel Pits and spreading grounds have been used for recharge of the subbasin for over 80 years. Significant groundwater recharge occurs in the gravel pits adjacent to Lytle Creek. However, evaluating recharge potential can be more complicated for recharge in a gravel pit than in a spreading facility dedicated to recharge.

2.9.1.4 The City Creek Spreading Grounds

The spreading grounds located along City Creek, between State Highway 30 and Boulder Avenue, are operated by SBCFCD. These spreading grounds have an active spreading area of about 75 acres and an estimated percolation rate of about 1.5 feet per day, which results in a recharge rate of about 3,375 acre-feet per month, or about 57 cfs. The City Creek spreading grounds recharge the Bunker Hill subbasin of the SBBA.

2.9.1.5 Patton Basins

The Patton Basins are located along Sand Creek, north of East Highland and west of the Patton State Hospital. The Patton Basins have an active spreading area of about 3 acres and an estimated percolation rate of about 0.3 foot per day. This

equates to a recharge rate of about 27 acre-feet per month, or about 1 cfs. Recharge at this site contributes to the Bunker Hill subbasin of the SBBA.

2.9.1.6 Waterman Basins

The Waterman Basins are located northeast of Wildwood Park and north of 40th Street in the City of San Bernardino. These basins are operated by SBCFCD, have an active spreading area of about 120 acres, and have an estimated percolation rate of about 0.5 foot per day. This percolation rate equates to a recharge rate of about 810 acre-feet per month, or about 14 cfs. However, the absorptive capacity used in the Allocation Model is 30 cfs, based on historic use. The Waterman Basins recharge the Bunker Hill subbasin of the SBBA (Table 2-11).

2.9.1.7 East Twin Creek Spreading Grounds

The East Twin Creek spreading grounds are located south of 40th Street, immediately south of the Waterman Basins, and are operated by SBCFCD. These spreading grounds have an area of about 32 acres and an estimated percolation rate of about 1.5 feet per day, which results in a recharge rate of about 225 acre-feet per month, or about 4 cfs. However, the absorptive capacity used in the Allocation Model is 24 cfs, based on historic use. The East Twin Creek spreading grounds recharge the Bunker Hill subbasin of the SBBA (Table 2-11).

2.9.1.8 Badger Basins

The Badger Basins, located in the Sycamore Flood Control Basin immediately east of the California State University, San Bernardino campus, are operated by the SBCFCD and have an active spreading area of about 15 acres. The estimated percolation rate for this site is 0.5 foot per day, which results in a recharge rate of about 225 acre-feet per month, or about 4 cfs. The Badger Basins recharge the Bunker Hill subbasin of the SBBA (Table 2-11).

2.9.1.9 Mill Creek Spreading Grounds

The Mill Creek spreading grounds are located south of the main channel of Mill Creek, about one mile upstream of the confluence with the SAR, and are operated by the SBVWCD. The Mill Creek spreading grounds have an active spreading area of about 66 acres and an estimated percolation rate of about 3 feet per day. This equates to a recharge rate of about 6,000 acre-feet per month. Recharge at this site contributes to the Bunker Hill subbasin of the SBBA (Table 2-11).



2.9.1.10 Cactus Spreading and Flood Control Basin

The Cactus recharge basins are located within the central portion of the Rialto-Colton subbasin. The basins are operated by the SBCFCD. Artificial recharge operations have an active spreading area of about 46 acres. The estimated percolation rate for this site is 1.5 feet per day.

2.9.1.11 Wilson Basins

The Wilson Basins are located northeast of the intersection of Oak Glen Road and Bryant Street, just north of the City of Yucaipa, and are operated by SBCFCD. The Wilson Basins have an active spreading area of about 12 acres and an estimated percolation rate of about 1 foot per day, which results in a recharge rate of about 360 acre-feet per month, or about 6 cfs. The Wilson Basins recharge the Yucaipa Basin.

2.9.1.12 Garden Air Creek

Garden Air Creek is a tributary of San Timoteo Canyon Creek. There are no plans for a formal spreading facility at this location and recharge will be accomplished by percolation from existing natural channels, up to a rate of 16 cfs. Although the turnout is outside Valley District and inside the boundary of SGPWA, the recharge area is in the San Timoteo Canyon region, and thus inside the Valley District service area boundary. This delivery will recharge the San Timoteo Basin.

2.9.1.13 Linden Ponds

Though no longer in existence the Linden Ponds were located between the San Jacinto fault and an unnamed fault in the northeastern portion of the Rialto-Colton subbasin. The basins were operated by the SBCFCD. Imported water was recharged between 1982 and 1994. Artificial recharge operations had an active spreading area of about 46 acres. The estimated percolation rate for this site was 1.5 feet per day.

2.9.2 SAR Natural Recharge

Most groundwater recharge occurs in the natural channels of the Upper SAR. However, evaluating the actual recharge potential for a natural channel is more complicated. The recharge rate depends on the wetted area, which varies substantially in a natural channel depending on flow conditions. The area of the “active” channel of the SAR (defined by the area on aerial photographs with limited vegetation) has been estimated to be about 79 acres, while the area from the mouth of the canyon to Sterling Avenue (i.e., to about the San Bernardino International Airport or former Norton Air Force Base), including overflow lands, is about 2,110 acres (Danskin et al. n.d.).

Danskin et al. estimated the potential percolation rate to be about four feet per day. Consistent with the percolation rates for spreading grounds included in the applications, a percolation rate of two feet per day is used here as the long-term percolation rate that might be achieved in the channel. Using the two-feet-per-day rate, the recharge rate may be about 4,740 acre-feet per month (or about 80 cfs) for the active channel from the mouth of the canyon to Sterling Avenue, and about 126,600 acre-feet per month (or about 2,128 cfs) if the overflow lands are included. Percolation in the river could recharge the Bunker Hill subbasin of the SBBA and the Rialto-Colton subbasin. In a similar analysis, USACE (1997) estimated that recharge in the active channel to Sterling Avenue would be approximately one cfs per wetted acre, which approximates to 79 cfs.

The maximum recharge area (including overflow lands) for SAR reaches from Sterling Avenue to Lower Warm Creek and from Lower Warm Creek to the San Bernardino/Riverside County line (Danskin et al. n.d.). No recharge rate is provided, however, because those reaches overlie an area where the upward flow of groundwater into the stream channel is greater than the downward recharge of streamflows. It was estimated that there was a net recharge of approximately 95 cfs from Sterling Avenue to Prado Dam (USACE 1997).

2.9.3 Groundwater Discharge from SBBA

Groundwater discharge from the SBBA occurs from (1) rising water, (2) subsurface outflow, and (3) groundwater extractions. Rising water primarily occurs in the lower reaches of Warm Creek, when groundwater rises above the level of the ground surface or channel bottom and contributes to surface flows. The quantity of groundwater discharge into the creek for the period 1945 to 1992 was determined to be highly variable, with a maximum discharge exceeding 40,000 acre-feet per year and a minimum discharge of zero for 16 consecutive years, from 1963 to 1978 (Danskin et al. n.d.).

Subsurface outflow occurs across the San Jacinto fault and Barrier E at two locations, in the vicinity of the SAR at the Colton Narrows and where Lytle Creek emerges from the San Gabriel Mountains north of Barrier J. In the vicinity of the SAR at the Colton Narrows, subsurface outflow occurs in the younger alluvium. For the period 1936 to 1949, subsurface outflow in this area was estimated to range from 14,300 to 23,700 acre-feet per year (Dutcher and Garrett 1963). Subsurface outflow north of Barrier J was estimated to be approximately 4,000 acre-feet per year (Dutcher and Garrett 1963) and between 2,700 and 4,200 acre-feet per year during water years 1935 to 1960 (DWR 1970b).

While streamflow and subsurface outflow contribute to basin discharge, groundwater extraction is the primary discharge of groundwater from storage. Extracted water is used for agricultural, municipal, and industrial purposes. Most



pumping is located near major streams, including the SAR, Lytle Creek, Warm Creek, and East Twin Creek. This areal distribution of pumpage reflects the exceptionally permeable deposits that underlie the stream channels and the abundant nearby recharge (Danskin et al. n.d.). As the area has become urbanized, the quantity of agricultural pumpage has declined considerably, presently accounting for less than 20 percent of the gross pumpage (Danskin et al. n.d.). However, overall pumpage has increased in the basin due to increased pumping for municipal and industrial purposes. Prior to 1940, gross pumpage in the basin was less than 110,000 acre-feet per year, while current pumping has reached as high as about 200,000 acre-feet per year (Western-San Bernardino Watermaster 2002).

2.9.4 Groundwater Storage

Estimates of the change in groundwater volume, or storage, in the SBBA are made annually by both Valley District and the SBVWCD from which a cumulative change in basin storage is calculated. The approach employed by Valley District calculates the change in storage for nine sub-areas: Cajon, Devil Canyon, Lytle Creek, Pressure Zone, City Creek, Redlands, Mill Creek, Reservoir, and Divide. Calculating the change in storage for the SBBA is accomplished by summing the individual values for each of the sub-areas (Table 2-12).

Table 2-12
Summary of Groundwater Storage Capacities and Basin Surface Area

| Basin | Storage Capacity (af) | Surface Area (acres) |
|---------------------|-----------------------|----------------------|
| SBBA | 5,976,000 | 90,000 |
| Rialto-Colton | 2,517,000 | 30,100 |
| Yucaipa | 783,000 – 1,230,000 | 25,300 |
| San Timoteo | 2,010,000 | 73,100 |
| Source: DWR, 2003b. | | |

The first change in storage calculation was completed for the years 1934 to 1960 by DWR (DWR 1970b). The values were calculated using the Specific Yield Method and a mathematical model developed by TRW, Inc. (TRW 1967). In 1980, Valley District updated the change in storage calculation to include the years 1961 to 1980. In the early 1990s, Valley District created a new change in storage model using software developed by Environmental Systems Research Institute (ESRI). In years of low precipitation, infiltration (direct from precipitation and surface streams) decreases while groundwater extractions increase, thereby causing the cumulative storage to decrease. The cumulative change in storage is cyclical based upon weather conditions. For example, 1934

through 1949 and 1979 through 1987 were wet periods, which produced increases in storage, while 1950 through 1978 was a dry period, resulting in decreased storage.

In general, the far eastern and northwestern portions of the Bunker Hill subbasin show the largest decreases, while the rest of the subbasin shows mostly stable or increasing groundwater elevations.

Groundwater in the Bunker Hill subbasin generally flows in a southwesterly direction from the San Bernardino Mountains to the Colton Narrows. The San Jacinto fault generally runs perpendicular to the groundwater flow and acts as a partial barrier resulting in water level differences across the fault. This phenomenon also contributes to the high groundwater located within the City of San Bernardino, commonly referred to as the Pressure Zone. Figure 2-13 depicts depth to groundwater contours throughout the SBBA, Rialto-Colton subbasin, and Yucaipa subbasin, including those reflecting shallow groundwater conditions in the Pressure Zone. In the past, water levels in the Pressure Zone were raised high enough to cause artesian conditions.¹

For the basin as a whole, there can be wide fluctuations in the average depth to groundwater from year to year, with annual changes as high as almost 40 feet. However, for the most part, annual changes register less than 20 feet (+ or -), with only six years exceeding this range. There are, however, noticeable variations in behavior across subbasins.

The Lytle Creek subbasin (Figure 2-6) contains Lytle Creek, with extensive headwaters in the adjacent mountain areas and a river channel comprised of deep, porous alluvial deposits. Due to the presence of Lytle Creek and its relatively small size, this subbasin exhibits far greater and more extreme changes than any other subbasin of the SBBA. In 40 of 68 years, the annual average change in depth to groundwater exceeds 20 feet, with 8 years showing changes greater than 50 feet, and 3 years showing changes greater than 100 feet.

The Bunker Hill and Lytle Creek subbasins are generally considered as one groundwater basin, the SBBA. However, the three separate water-bearing zones and intervening confining zones of the Bunker Hill subbasin are not observed in the Lytle Creek subbasin. Sediments within the Lytle Creek Basin are, for the most part, highly permeable and the aquifer has a high specific yield. High permeability and specific yield tend to result in an aquifer that responds rapidly to changes in inflow (precipitation and streamflow) and outflow (groundwater pumping, streamflow, and subsurface outflow). Water levels in the Lytle Creek subbasin have fluctuated in excess of 200 feet over relatively short periods (less than 5 years) and in select wells (e.g., FWC's Well F34A). From 1934 to 2002,



depth to groundwater as measured in various wells in the basin has ranged from approximately 8 feet in the south-central portion of the basin to over 500 feet in the north-central portion of the basin (SBVMWD 2003).

Lytle Creek subbasin is adjoined on the west by the Rialto-Colton subbasin, along the Lytle Creek fault, and on the east and southeast by the Bunker Hill subbasin, along the Loma Linda fault and Barrier G. The northwestern border of the subbasin is delineated by the San Gabriel Mountains, and runoff from the mountains flows into the Rialto-Colton subbasin. Numerous faults that act as barriers to groundwater flow create six compartments within the basin. Barriers A through D divide the northwestern portion of the basin into five sub-areas and the southeastern portion of the basin comprises the sixth sub-area. Barrier F divides the northwestern sub-areas from the southeastern sub-area. Studies have shown that the groundwater barriers are less permeable with depth (Dutcher and Garrett 1963). When groundwater levels are high during wet years, more leakage occurs across the barriers than when groundwater levels are lower (i.e., during dry years). The amount of pumping in each sub-area, in large part, controls the movement of groundwater across the barriers (Dutcher and Garrett 1963).

2.9.5 Groundwater Quality

Groundwater quality varies among the subbasins of the Upper SAR due to geology and faulting patterns and recharge points, and from anthropogenic sources of contamination.

2.9.5.1 San Bernardino Basin Area

Groundwater in the SBBA is generally a calcium-bicarbonate type, containing equal amounts (on an equivalent basis) of sodium and calcium in water near the land surface and an increasing predominance of sodium in water from deeper parts of the valley-fill aquifer. A TDS range of 150 to 550 mg/L, with an average of 324 mg/L, is found in public supply wells (DWR 2003). Electrical conductivity (EC) is a measure of total dissolved ionic constituents. EC has been measured within a range of 95 to 2,920 microMhos (μ Mhos) with an average of 523 μ Mhos.



Perchlorate treatment facilities, similar to the West Valley Water District plant above, treat groundwater for use in the Region.

The inorganic composition of the groundwater may be affected by geothermal water emanating from faults and fractures in the bedrock surface underlying the aquifer. For example, concentrations of fluoride that exceed the public drinking

¹ Conditions where groundwater levels rise above the land surface in confined aquifers.

water standard have limited the use of groundwater extracted near some faults and from deeper parts of the aquifer.

In some public supply well locations in the SBBA, some inorganics (primary and secondary), radiological constituents, nitrates, pesticides, Volatile Organic Compounds (VOCs), Synthetic Organic Compounds (SOCs), and Perchlorate were found above the maximum contaminant level (MCL) (Table 2-13).

**Table 2-13
Prevalence of Contaminants in SBBA Wells**

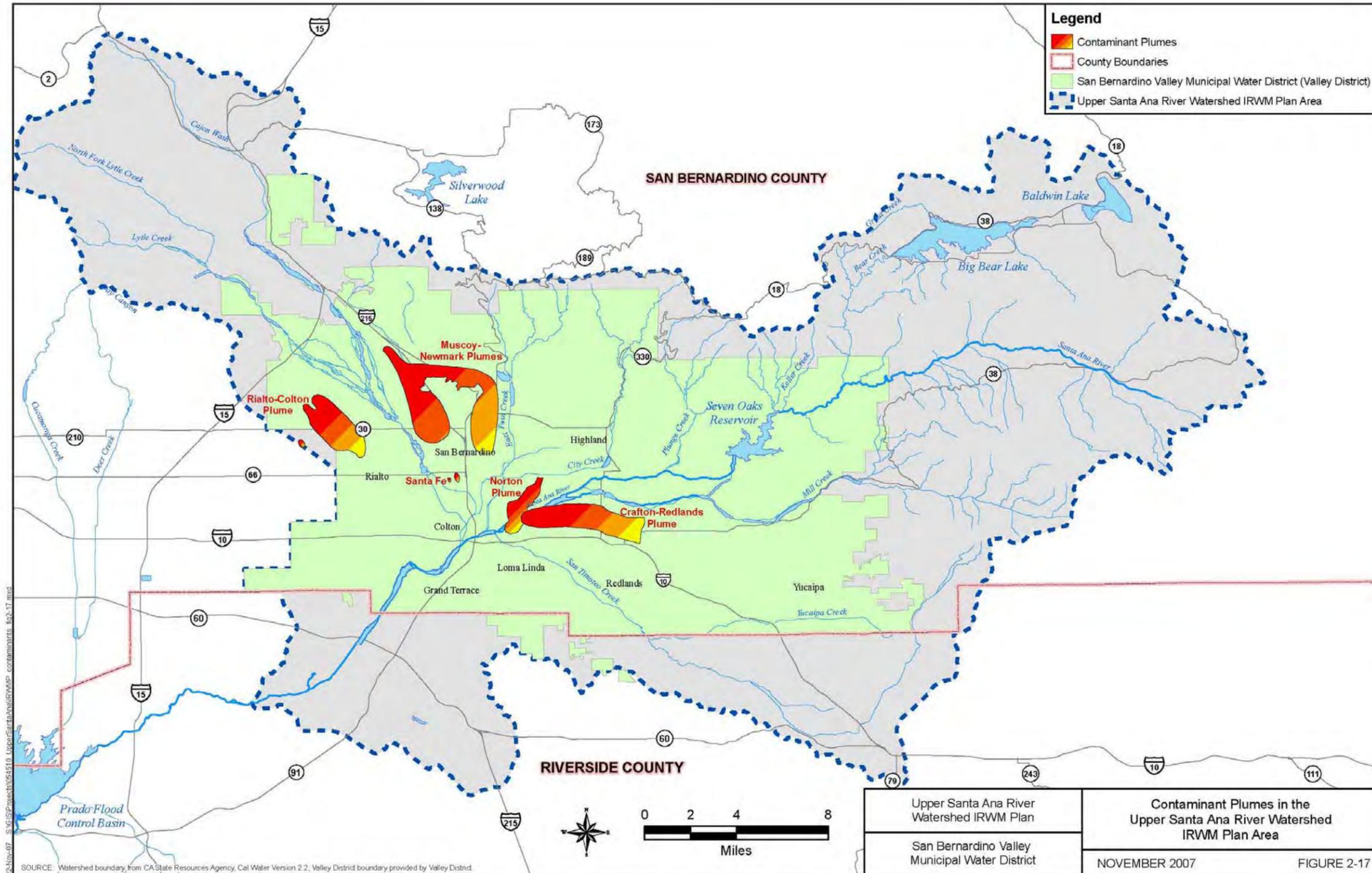
| Constituent | No. Wells Sampled | No. of Wells with a Concentration Above MCL |
|--|-------------------|---|
| Inorganics (primary) | 212 | 13 |
| Radiological | 207 | 34 |
| Nitrates | 214 | 34 |
| Pesticides | 211 | 20 |
| VOCs and SOCs | 211 | 32 |
| Inorganics (secondary) | 212 | 25 |
| Perchlorate | 369 | 156 (1) |
| Source: DWR 2003. and Geoscience | | |
| 1. No MCL has been established for Perchlorate. But "action level" is 4ug/l. | | |

The SBBA is affected by five major groundwater contaminant plumes (Figure 2-17). Plumes in the basin include (1) the Crafton-Redlands plume, with TCE and lower levels of perchloroethylene (PCE) and debromochloropropane (DBCP); (2) the Norton Air Force Base TCE and PCE plume, stretching 2.5 miles from its source and contaminating 100,000 acre-feet of groundwater; (3 and 4) the Muscoy and Newmark plumes near the Shandon Hills, which are Superfund sites with TCE and PCE; and (5) the Santa Fe plume with PCE, TCE, and 1,2 dichloroethylene (1,2-DCE) contamination.

Within the City of San Bernardino, the Newmark plume and the Muscoy plume consist primarily of PCE. The plumes have impacted San Bernardino water supply wells. Under the federal Superfund Program, the U. S. Environmental Protection Agency (EPA) has implemented cleanup of these plumes, including use of groundwater extraction and treatment using granulated activated carbon. The treated water is then used to supplement the City of San Bernardino's potable water supply. It appears that cleanup efforts will be adequate to protect 32 down-gradient water supply wells (Santa Ana River Watershed Project Authority (SAWPA) 2002). However, groundwater model simulations suggest that containment of the plume will need additional extraction wells that will result in pumping of at least 14,000 acre-feet per year (Danskin, et al 2006).



Figure 2-17
Contaminant Plumes in SBBA



The Norton Air Force Base plume, located just to the southwest of the former installation in the City of San Bernardino, is a major contaminant plume, consisting primarily of TCE and PCE. The plume has impaired 10 wells owned by the City of Riverside and the City of San Bernardino. Cleanup efforts by the Air Force, consisting of soil removal, soil gas extraction, and groundwater treatment, have significantly reduced this plume. The treatment plants now operate in a standby mode (SAWPA 2002).

Two commingled plumes, comprising the Crafton-Redlands plume, have impacted water supply wells for the cities of Riverside, Redlands, and Loma Linda, including Loma Linda University wells. One plume contains TCE and the other perchlorate; both are in the upper 300 to 400 feet of groundwater. TCE has been measured in water supply wells at over 100 parts per billion (ppb), over 20 times the MCL of 5 ppb. Currently, however, water supply well concentrations are around 7 ppb. Perchlorate is present in water supply wells at concentrations up to 77 ppb.

As required by the SARWQCB, the Lockheed Martin Corporation (Lockheed) has prepared contingency plans to address impacts of the plume on water supply wells. These include blending, treatment, and/or providing alternative water supply sources. The plumes are currently being captured by the City of Riverside's Gage Well Field. Lockheed has installed granular activated carbon treatment units at some of the gage wells to remove TCE and has installed ion exchange units on some of these wells for the removal of perchlorate (SAWPA 2002).

The Santa Fe groundwater plume consists primarily of 1,2-DCE, TCE, and PCE; this plume is currently being monitored (ERM 2001).

Separately from the foregoing remediation efforts, FWC currently operates and maintains a groundwater remediation project at its Plant F10 pursuant to a long-term agreement with San Bernardino County, the owner and operator of the Mid Valley Sanitary Landfill and corresponding Clean-Up and Abatement Order issued to San Bernardino County by the RWQCB. The 5,000 gpm treatment plant utilizes liquid phase granular activated carbon to treat for volatile organic compounds including, but not limited to, PCE, TCE, 1,1-DCE, and cis-1,2-DCE. The plant treats and removes those contaminants from groundwater extracted from both the Rialto-Colton and No-Mans Land subbasins.

2.9.5.2 Rialto-Colton Groundwater Subbasin

In public supply well samples in the Rialto-Colton subbasin, the average TDS is 264 mg/L, with a range of 163 to 634 mg/L (DWR 2003). Other source samples show an average TDS of 230 mg/L and a range of 201 to 291 mg/L. This is a



lower TDS range than the groundwater in the Bunker Hill subbasin, where TDS levels from 1995 through 1997 ranged as high as 1,000 mg/L along the SAR. The San Jacinto fault markedly affects the groundwater chemistry in the basin. The TDS in groundwater downstream from the San Jacinto fault is greater than that in the surface water found in the Bunker Hill outflow area.

Of 38 public supply wells sampled, two were over the MCL for nitrates, and in three wells, secondary inorganics, VOCs, and SOCs exceeded the MCL (Table 2-14). Most reported NO₃ concentrations are less than 22.5 mg/L, with a few samples ranging from 45 to 90 mg/L. Most of the wells sampled did not contain constituents over the MCL concentration.

More than 143 water source wells in Riverside and San Bernardino Counties alone now exceed 4 ppb of perchlorate contamination (California Department of Health Services 2003a). In the Valley District service area, the City of Rialto, the City of Colton, West Valley, and FWC have shut down or restricted the use of 20 wells due to perchlorate contamination in the Rialto-Colton subbasin, where concentrations reach above 4 ppb (SARWQCB 2003b).

Table 2-14
Prevalence of Contaminants in Rialto–Colton Subbasin Wells

| Constituent | No. Wells Sampled | No. Wells with a Concentration Above an MCL |
|---|-------------------|---|
| Inorganics (primary) | 38 | 0 |
| Radiological | 40 | 0 |
| Nitrates | 38 | 2 |
| Pesticides | 40 | 0 |
| VOCs and SOCs | 40 | 3 |
| Inorganics (secondary) | 38 | 3 |
| Perchlorate | 38 | 7 (1) |
| Source: DWR 2003 and Geoscience. 1 No MCL has been established for Perchlorate. But "action level" is 4 ug/L | | |

2.9.5.3 Riverside-Arlington Groundwater Subbasin

The Riverside subbasin contains groundwater that is predominantly calcium or sodium bicarbonate. Of the water sampled from 46 wells, TDS ranged from 210 to 889 mg/L, with an average of 463 mg/L (see Table 2-15) (DWR 2003). From other sources, TDS has been found to range from 320 to 756 mg/L. This is a higher TDS range than in the Rialto-Colton and Bunker Hill subbasins.

In some of the sampled public supply wells, MCLs were exceeded for inorganics (primary and secondary), radiological constituents, nitrates, pesticides, VOCs, and SOCs. Nitrate (as NO₃) concentrations of greater than 20 mg/L were detected as early as the 1940s, probably due to historical land use, including citrus production. NO₃ was the constituent found most frequently in the sampled wells, followed by pesticides. Only a few wells were found to have concentrations of primary and secondary inorganics.

**Table 2-15
Prevalence of Contaminants in Riverside Subbasin Wells**

| Constituent | No. Wells Sampled | No. Wells with a Concentration Above an MCL |
|------------------------|-------------------|---|
| Inorganics (primary) | 48 | 2 |
| Radiological | 48 | 11 |
| Nitrates | 51 | 21 |
| Pesticides | 50 | 19 |
| VOCs and SOCs | 50 | 8 |
| Inorganics (secondary) | 38 | 3 |
| Source: DWR 2003 | | |

2.9.5.4 Yucaipa Groundwater Subbasin

Most of the recent groundwater samples from the Yucaipa subbasin indicate a calcium bicarbonate-type groundwater, generally meeting drinking water standards, with little variation across the basin. Groundwater has higher mineral concentrations, but otherwise is similar to the surface water in the area. The average TDS from public supply wells is 322 mg/L, with a range of 200 to 630 mg/L. This is similar to average TDS values of 343 mg/L and 334 mg/L estimated from other sources (DWR 2003). The TDS estimates in the Yucaipa subbasin are lower than the Riverside subbasin and slightly higher than the Rialto-Colton and Bunker Hill subbasins.



Table 2-16 contains data from wells sampled for various pollutants (DWR 2003). Some samples contained concentrations above the MCL. This was true for one sample with primary inorganics, VOCs, and SOCs; four samples with pesticides and secondary inorganics; and 12 samples with nitrates. As in the Riverside subbasin, nitrates were found more than any other constituent in the sample well set.

Table 2-16
Prevalence of Contaminants in Yucaipa Subbasin Wells

| Constituent | No. Wells Sampled | No. Wells with a Concentration Above an MCL |
|------------------------|-------------------|---|
| Inorganics (primary) | 43 | 1 |
| Radiological | 44 | 1 |
| Nitrates | 46 | 12 |
| Pesticides | 43 | 4 |
| VOCs and SOCs | 44 | 1 |
| Inorganics (secondary) | 43 | 4 |
| Source: DWR 2003. | | |

2.9.5.5 San Timoteo Groundwater Subbasin

The mineral character of groundwater beneath San Timoteo Canyon is sodium bicarbonate; calcium bicarbonate in the alluvium of Little San Gorgonio Creek; calcium bicarbonate in younger alluvium near Beaumont; and sodium bicarbonate in older deposits. Water samples from 24 public supply wells have an average TDS content of approximately 253 mg/L, with a range of 170 to 340 mg/L. The TDS range is lower than in the Riverside, Bunker Hill, and Yucaipa subbasins and comparable to the Rialto–Colton subbasin. Out of 27 sampled wells, one well contained secondary inorganics above the MCL (Table 2-17). Otherwise, no contaminants were found (DWR 2003).

Table 2-17
Prevalence of Contaminants in San Timoteo Subbasin Wells

| Constituent | No. Wells Sampled | No. Wells with a Concentration Above an MCL |
|------------------------|-------------------|---|
| Inorganics (primary) | 27 | 0 |
| Radiological | 26 | 0 |
| Nitrates | 28 | 0 |
| Pesticides | 27 | 0 |
| VOCs and SOCs | 27 | 0 |
| Inorganics (secondary) | 27 | 1 |
| Source: DWR 2003. | | |

2.9.5.6 Cajon Subbasin

The mineral character of groundwater within the Cajon subbasin has an average TDS content of about 130 mg/L, with a range of 99 to 155 mg/L. The TDS range is lower than in the Riverside, Bunker Hill, and Yucaipa subbasins, and comparable to the Rialto–Colton subbasin. Only two public supply wells have been sampled. No exceedance of MCL in drinking water has been reported.



2.10 Ecological and Environmental Resources

2.10.1 *San Bernardino National Forest Land and Resource Management Plan*

The U.S. Forest Service (USFS) has jurisdiction over land uses in the San Bernardino National Forest. The *San Bernardino National Forest Land and Resource Management Plan of 1988* (USDA Forest Service 1988) directs the management of the forest. Its goal is to provide a management program that reflects a mix of activities that allows both the use and protection of forest resources; fulfills legislative requirements; and addresses local, regional, and national issues.

The San Bernardino National Forest is divided into 15 management areas based on (1) combinations of watersheds that have similar characteristics, (2) wilderness areas, and (3) potential wilderness areas. The Seven Oaks Dam and adjacent areas are located in the Central Section of the San Gorgonio District of the Santa Ana Management Area. Much of the area in this district is classified as the Santa Ana Recreation Area, a designation designed to provide continued protection of the recreation values for which it was established.

The management for this area emphasizes (1) fire management, (2) recreation (dispersed recreation opportunities in the lower SAR area), and (3) other integrated activities (including wildlife management and non-motorized recreation).

2.10.2 *U.S. Bureau of Land Management (BLM) Area of Critical Environmental Concern*

The BLM designated an Area of Critical Environmental Concern (ACEC) in the SAR in 1994. The purpose of the ACEC designation is to protect and enhance the habitat of federally listed species occurring in the area while providing for the administration of valid existing rights (BLM 1996). The species of concern in the SAR area include the SAR woolly-star, the Slender-Horned spineflower, and the San Bernardino kangaroo rat. The BLM manages over 1,100 acres that are part of the ACEC. Although the establishment of the ACEC is important in regard to conservation of sensitive habitats and species in this area, the administration of valid existing rights supersedes BLMs conservation abilities in this area. Existing rights include a withdrawal of federal lands in this area for water conservation through an act of Congress, February 20, 1909 (Pub. L. 248). The entire ACEC is included in this withdrawn land and may be available for water conservation measures such as the construction of percolation basins, subject to compliance with the act.



The San Bernardino Kangaroo rat is a species of concern in the SAR area. (Photo, courtesy of NPS).

2.10.3 U.S. Army Corps of Engineers Woolly-Star Preserve Area

To protect significant populations of the SAR woolly-star (a federally protected plant species), lands within the corridor of the SAR and portions of the alluvial fan terraces were set aside as a conservation area. The Woolly-Star Preserve Area (WSPA) is a 764-acre area located west of the Greenspot Bridge that crosses the SAR. The WSPA was established by mitigation in the 1990s by the USACE and local sponsors to address impacts related to the construction of Seven Oaks Dam.

2.10.4 Western Riverside County Multi-Species Habitat Conservation Plan

The Multi-Species Habitat Conservation Plan (MSHCP) is a comprehensive, multi-jurisdictional plan that focuses on the conservation of species and their habitats in western Riverside County. The plan area includes all unincorporated land in Riverside County west of the crest of the San Jacinto Mountains to the Orange County line, as well as the jurisdictional areas of a number of cities. The MSHCP established a conservation area of more than 500,000 acres and focuses on the conservation of 146 species.

2.10.5 SAR Corridor

The SAR corridor is defined as the area located within the incised channel of the river. Persistent aquatic and riparian habitats are present immediately downstream of the Seven Oaks Dam plunge pool; in oxbows; in fault zones; in areas with manmade or natural water sources, such as a tributary confluence or a storm drain outfall; in areas with perched water tables; and downstream of river mile (RM) 54.5, where groundwater emerges and flows on the surface of the riverbed (USACE 2000). Much of the habitat within the project area provides optimal foraging opportunities and several areas provide adequate breeding areas for raptors. Trees found in the riparian woodlands provide perches for foraging over the scrub and grassland.

Except during the winter months of December through March, surface flows in the SAR between Seven Oaks Dam and the San Bernardino International Airport are generally absent, and the riverbed is a braided, dry channel. Riparian habitat from Cuttle Weir to the airport is uncommon and limited to a few patches.

Downstream from the airport, surface flows are more prevalent and large areas of contiguous, well-developed riparian habitat as well as giant reed (*Arundo donax*) infestations along the banks of the SAR are common. Just downstream of the region are Prado Flood Control Basin and Prado Dam. Approximately 2,150 acres of land upstream of Prado Dam are owned by Orange County Water District (OCWD), the local sponsor for Prado Dam. Within this area are



approximately 465 acres of constructed wetlands as well as large areas of mature riparian habitat, naturally occurring wetlands, and deepwater habitats.

The vegetation communities discussed above provide wildlife habitat throughout most of the SAR corridor. In general, wildlife within the area is extremely diverse and abundant due to the amount of natural open space and diversity of habitat types from the active river channels to the uppermost flood terraces. While a few wildlife species depend entirely on a single habitat type, the mosaic of all the vegetative communities within the study area and adjoining areas constitutes a functional ecosystem for a variety of wildlife species.

The SAR contains a variety of riverine conditions and habitat types that support a number of fish species throughout nearly the entire river when winter and spring flows are present. Portions of the SAR, such as the segment that traverses the alluvial fan, are dry during most of the year and, consequently, offer only temporary habitat for fish.

The scrub, woodland, and riparian habitats in the SAR corridor provide foraging and cover habitat for song birds including year-round residents, seasonal residents, and migrating individuals. The overall condition of these communities in the corridor is good and mostly undisturbed. In addition, portions of the SAR and its tributaries provide a perennial water source for birds.

The SAR wash is a state-designated Significant Natural Area. Approximately 27 sensitive plant and animal species are known to occur in the wash. About 760 acres of BLM land within the Upper SAR wash area downstream from the Greenspot Bridge have been designated by BLM as an ACEC because of the presence of the federally listed species, SAR woolly-star, and the San Bernardino kangaroo rat (U.S. Fish and Wildlife Service (USFWS) 1988).

Wildlife corridors link areas of suitable habitat that are separated by unsuitable habitat such as rugged terrain, development, or changes in vegetation. Riverbeds often provide a favorable passageway for wildlife movement to otherwise disconnected areas. Historically, the SAR bed was likely to have supported substantial regional wildlife movement. In addition, the SAR floodplain may have acted as a hub for wildlife movement with many major tributaries converging in a relatively short section of the river. In recent years, however, loss of habitat due to development on the floodplain and surrounding lowlands, as well as construction of Seven Oaks Dam, are likely to have greatly reduced the amount of regional movement through the corridor.

3 Water Budget for Integrated Regional Water Management Plan Region

The water budget for the Integrated Regional Water Management Plan (IRWM Plan) Area (Region) compares the supply and demand for the Region. The water supply and water demand data that comprise the water budget are used in the development of integrated water management strategies that will be used to manage both supplies and demands into the future.

The data presented in this report are based upon water demand figures provided by each water agency in the Region. Actual demand figures for each agency may be different based upon the water agency's water right(s) recognized by the State of California (State).

3.1 Review of Previously Published Water Budgets

The San Bernardino Valley Municipal Water District (Valley District) compiled a water budget for its 352-square-mile service area in its Regional Water Facilities Master Plan (1995). The original Valley District water budget, with some modifications, was used by the Santa Ana Watershed Project Authority (SAWPA) as the basis for water budget tables in the SAWPA Integrated Water Resources Plan (2002). In 2004, Valley District and Western Municipal Water District (Western) updated the water budget by incorporating projections from the 2000 Urban Water Management Plans (UWMPs) in the Valley District/Western Santa Ana River (SAR) Water Right Application Draft Environmental Impact Report (DEIR) (2004).

3.2 Data Sources

The IRWM Plan water budget relies primarily on the 2005 update of the UWMPs within the Region. Table 3-1 provides a list of the water agencies within the Region and the UWMPs that were used in this analysis. Not all water agencies have completed the update of their UWMPs, and not all agencies are required to publish a UWMP (agencies that provide water to less than 3,000 connections and less than 3,000 acre-feet per year are not required to publish a UWMP). For these agencies, the necessary data for the water budget were obtained from the Western-San Bernardino Watermaster Report (see Chapter 2). For the purpose of preparing the water demands and supplies, the Region's water agencies were divided into four groups: (1) Non-Plaintiffs (water agencies in San Bernardino County of the Western Judgment (Western Municipal Water District of Riverside County v. East San Bernardino County Water District, Case No. 78426),



(2) Plaintiffs of the Western Judgment (water agencies in Riverside County),
(3) water agencies outside the Western Judgment and located in the San Geronio Pass Water Agency (SGPWA) service area, and (4) water agencies outside the Western Judgment and located in the San Bernardino Mountains area.

Table 3-1
Data Utilized in the Water Budget

| Water Agency | 2005 UWMP | Other Documents |
|--|-----------|-------------------------------|
| <i>Non-Plaintiffs of the Western Judgment</i> | | |
| Colton, City of | | Watermaster, SCAG |
| East Valley Water District | X | |
| Fontana Water Company | X | 2005 Master Plan, Pers. Comm. |
| Loma Linda, City of | | 2002 UWMP |
| Marigold Mutual WC | | Rialto, WWWD 2005 UWMP |
| Muscoy Mutual WC | | 2005 Community Plan |
| Redlands, City of - Water Utility | X | |
| Rialto, City of | X | Updated in 2006 |
| San Bernardino MWD | X | |
| Terrace Water Co. | | Watermaster |
| West Valley Water District | X | Personal Communication |
| Yucaipa Valley Water District ¹ | X | |
| Other/Private ² | | Watermaster |
| <i>Plaintiffs of the Western Judgment</i> | | |
| Meeks and Daley WC | | Watermaster |
| Riverside-Highland WC | X | Watermaster |
| Riverside Public Utilities | X | Watermaster |
| <i>San Geronio Pass Area</i> | | |
| Beaumont Cherry Valley WD | X | 2006 LAFCO Report |
| Banning, City of ³ | X | 2006 LAFCO Report |
| Cabazon Water District ³ | | 2006 LAFCO Report |
| South Mesa Water Company | X | 2006 LAFCO Report |
| Yucaipa Valley Water District ¹ | X | 2006 LAFCO Report |
| <i>San Bernardino Mountains Area</i> | | |
| Big Bear City CSD | | 2000 UWMP |
| City of Big Bear Lake DPW | X | |
| Big Bear Municipal WD | | Personal Communication |

¹Yucaipa Valley Water District overlies the SGPWA and the Valley District. Yucaipa Valley WD includes Western Heights WC and Oak Valley.

²Includes Devore WC, Crafton WC, Inland Valley Development Company, Mount Vernon WC, Pioneer Mutual WC, Pharaoh-Powell Mutual WC, Redlands WC, Tennessee WC, California Portland Cement Company, Corridor Land Company, El Rivino Country Club, and Elsinore Valley MWD.

³Agencies outside of the Santa Ana River Watershed but inside the SGPWA service area.

3.2.1 Applied Water Demands

The applied water demands developed for the water budget are based on the demand projections provided by each individual agency. If demand projections were unavailable for an agency, a per-capita applied water demand was calculated using Southern California Association of Governments (SCAG) data along with the water demands published by Western-San Bernardino Watermaster. Projections for the water users that do not belong to a city or water agency are based on historical demand trends using historical data compiled by the Watermaster. The applied water demands from 2005 to 2030 are summarized in Table 3-2.

The Urban Water Management Planning Act requires that water demands be broken down into water use categories. The categories selected for this Region are Residential, Commercial/Industrial, Agricultural, and Other. The Other category includes uses such as unaccounted-for system losses, water sales to other agencies, and water used in construction. Figure 3-1 displays the total water demands in the region and breaks them down by water use. The projected total demand in the Region is expected to increase by about 50 percent from 349,200 acre-feet in 2005 to 519,700 acre-feet in 2030 (See Table 3-2).



**Table 3-2
Future Applied Water Demands in the Region (Acre-Feet per Year)**

| Water Agency | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|----------------|----------------|----------------|----------------|----------------|----------------|
| Non-Plaintiffs of the Western Judgment | | | | | | |
| Colton, City of | 11,900 | 13,500 | 14,800 | 16,100 | 17,300 | 17,300 |
| East Valley Water District | 27,000 | 30,400 | 34,200 | 35,900 | 35,900 | 35,900 |
| Fontana Water Company ¹ | 31,300 | 37,200 | 39,600 | 39,600 | 39,600 | 39,600 |
| Loma Linda, City of | 7,600 | 8,800 | 9,400 | 9,900 | 10,200 | 10,600 |
| Marygold Mutual WC | 0 | 0 | 1,500 | 1,500 | 1,500 | 1,500 |
| Muscoy Mutual WC | 2,100 | 2,100 | 2,100 | 2,100 | 2,100 | 2,100 |
| Redlands, City of - Water Utility | 45,500 | 50,600 | 55,000 | 59,500 | 61,500 | 65,300 |
| Rialto, City of | 14,300 | 13,300 | 13,900 | 13,900 | 13,900 | 13,900 |
| San Bernardino MWD | 47,500 | 54,800 | 61,900 | 67,700 | 73,500 | 73,500 |
| Terrace Water Co. | 900 | 900 | 900 | 900 | 900 | 900 |
| West Valley Water District | 25,300 | 30,000 | 33,700 | 39,000 | 45,000 | 56,400 |
| Yucaipa Valley Water District ² | 13,900 | 13,200 | 15,600 | 17,300 | 19,400 | 20,000 |
| Other/Private ³ | 28,600 | 28,300 | 28,000 | 27,700 | 27,400 | 27,100 |
| Subtotal | 255,900 | 283,100 | 310,600 | 331,100 | 348,200 | 364,100 |
| Plaintiffs of the Western Judgment⁴ | | | | | | |
| Meeks and Daley WC | 7,800 | 7,800 | 7,800 | 7,800 | 7,800 | 7,800 |
| Riverside-Highland WC | 4,300 | 4,300 | 4,300 | 4,300 | 4,300 | 4,300 |
| Riverside Public Utilities | 52,200 | 52,200 | 52,200 | 52,200 | 52,200 | 52,200 |
| Regents of California | 500 | 500 | 500 | 500 | 500 | 500 |
| Subtotal | 64,800 | 64,800 | 64,800 | 64,800 | 64,800 | 64,800 |
| San Gorgonio Pass Area | | | | | | |
| Beaumont Cherry Valley WD | 8,800 | 22,300 | 27,900 | 29,300 | 30,000 | 30,500 |
| Banning, City of | 9,500 | 12,500 | 15,500 | 18,500 | 21,600 | 24,600 |
| Cabazon Water District | 1,000 | 4,000 | 8,000 | 12,000 | 16,000 | 16,000 |
| South Mesa Water Company | 2,500 | 2,700 | 3,200 | 3,600 | 3,700 | 4,300 |
| Yucaipa Valley Water District ² | 1,800 | 5,400 | 6,100 | 7,100 | 7,300 | 8,600 |
| Subtotal | 23,600 | 46,900 | 60,700 | 70,500 | 78,600 | 84,000 |
| San Bernardino Mountains Area | | | | | | |
| Big Bear City CSD | 1,300 | 1,400 | 1,500 | 1,600 | 1,600 | 1,600 |
| City of Big Bear Lake DPW | 2,600 | 2,900 | 3,200 | 3,500 | 3,900 | 4,200 |
| Big Bear Municipal Water District | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 |
| Subtotal | 4,900 | 5,300 | 5,700 | 6,100 | 6,500 | 6,800 |
| TOTAL | 349,200 | 400,100 | 441,800 | 472,500 | 498,100 | 519,700 |

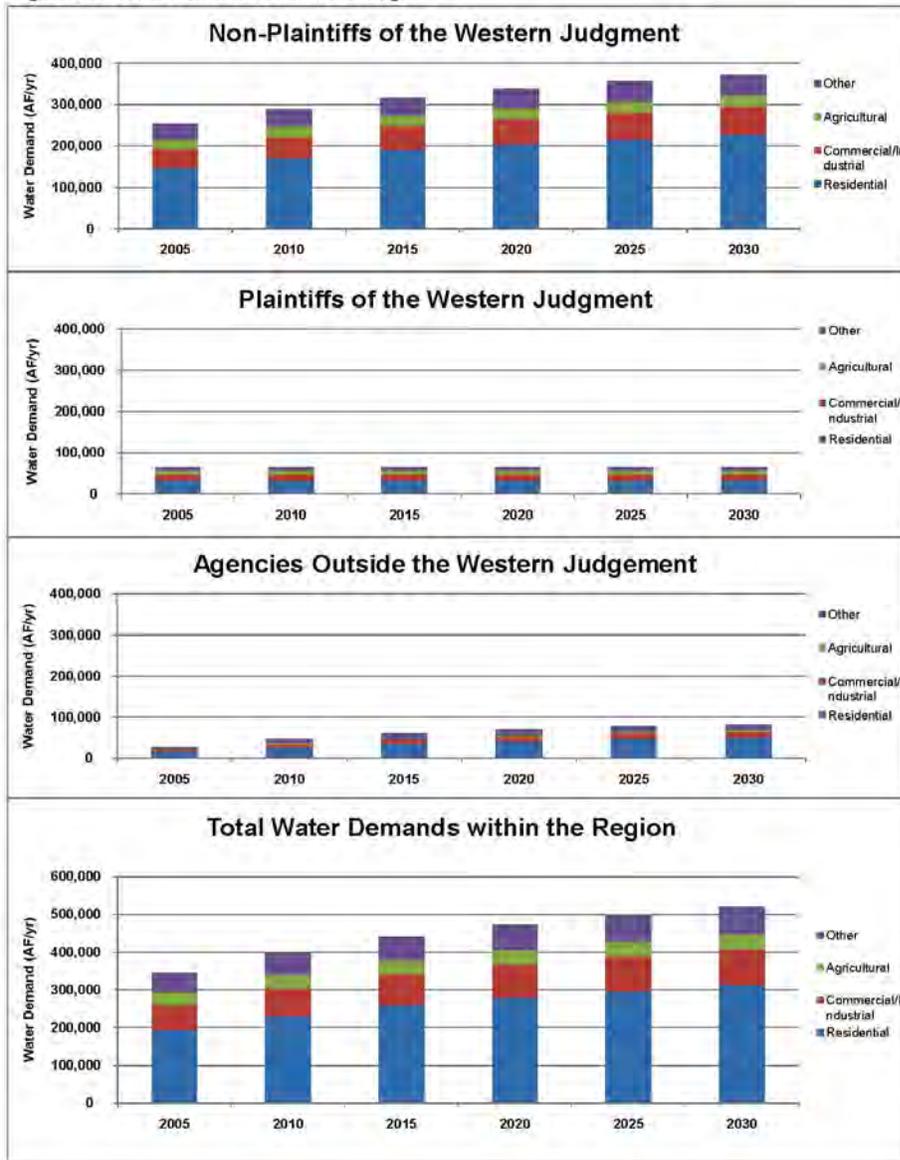
¹The demands shown for Fontana Water Company are their projected supplies from the Region, not FWC total demand. Portions of the supplies will be delivered outside the Region.

²Includes Western Heights WC and Oak Valley and overlies both SGPWA and Valley District.

³Includes Bear Valley Mutual WC, Devore WC, Crafton WC, Inland Valley Development Company, Mount Vernon WC, Pioneer Mutual WC, Pharaoh-Powell Mutual WC, Redlands WC, Tennessee WC, California Portland Cement Company, Corridor Land Company, El Rivino Country Club, Elsinore Valley MWD, San Gabriel Valley Water Company, and Reche Canyon Mutual WC.

⁴The demands for the Plaintiffs are their adjusted rights to the SBBA, not the total demand of the Plaintiff water agencies

Figure 3.1, Water Demands within the Region



3.2.1.1 Increase in Water Demand in Dry Years

During drought periods, water demands increase due to the increased irrigation demands for agriculture and landscaping. The demands outlined in Table 3-2 and Figure 3-1 are the average water demands projected by the water agencies. For the purposes of the modeling of the San Bernardino Basin Area (SBBA) analysis, water demands were assumed to increase in “critically dry” years by four percent (California Department of Water Resources (DWR) Bulletin



160-93). Critically dry years were defined to be the driest 20 percent of years using the SAR annual flows near Mentone from 1962 to 2000.

3.2.1.2 Reduced Demand Due to Conservation

Conservation reduces water demand in ways that are not easily measured. Demand is reduced through changed consumer behaviors and more water-efficient fixtures like ultra-low-flow toilets and showerheads. These savings happen gradually over time as non-conserving fixtures are replaced with newer water-efficient models. The agencies within the Region implement a prescribed set of urban water conservation best management practices (BMPs) according to the Urban Water Planning Act. The current water demands reflect the effect of water conservation projects that are implemented by the purveyors. However, in general, demand projections of the UWMPs do not include estimates of conservation due to the implementation of future water conservation programs.

3.2.2 Water Supplies

The following sections provide a description of each water supply within the Region, the projected demands on each supply, and an estimate of the available water supply based on data presented in UWMPs and the Western-San Bernardino Watermaster report. The majority of the groundwater basins in the Region are adjudicated. The projected demands on each water supply were based on the UWMPs. The projected water supplies of water purveyors were scaled to meet the projected demand. This was necessary to make a realistic projection of demand on shared water supplies within the Region.

3.2.2.1 San Bernardino Basin Area

The San Bernardino Basin Area (SBBA) was adjudicated by the Western Judgment in 1969. The judgment established the natural safe yield of the SBBA to be a total of 232,100 acre-feet per year for surface water diversions and groundwater extractions. Surface water is diverted from Mill Creek, Lytle Creek, and the SAR. The average surface water diversions in the SBBA for direct use from 1968 to 2000 were 39,000 acre-feet per year. It was determined in the Western Judgment that the Plaintiffs have a 64,862 acre-feet per year share of the safe yield, which equates to 27.95 percent of the safe yield. The Plaintiffs include the City of Riverside (the successor to the Riverside Water Company and the Gage Canal Company), Riverside Highland Water Company, Meeks & Daley Water Company, and the Regents of the University of California (Regents).

The Non-Plaintiffs' (agencies within San Bernardino County) rights are 167,238 acre-feet which equates to 72.05 percent of the safe yield. If the Non-Plaintiff extractions exceed the safe yield of the SBBA, Valley District is obligated to import and recharge a like amount of water into the SBBA. The Western-San Bernardino Watermaster produces an annual report calculating the total

extractions and comparing it to the safe yield. If the total extractions are less than the safe yield, it results in a “credit.” If the total extractions are more than the safe yield, it results in a replenishment obligation. Table 3-3 and Figure 3-2 outline the projected increase in demands for the local surface water and groundwater in the SBBA and provide an estimate of how much replenishment will be needed in the future. According to the 2006 Annual Western-San Bernardino Watermaster Report, Valley District has 256,000 acre-feet of credit accumulated in the SBBA.

The SBBA is forecasted to supply over 60 percent of the future water demand within the Region. Computer models were used to help determine whether the available surface water (local surface water and imported water) and groundwater supplies would meet ultimate demands (2030). Based on the modeling results (described in Chapter 4.3), if the State Water Project (SWP) is as reliable as DWR estimated in 2005 (77%) and the Valley District’s water rights application on the SAR is approved, the SBBA storage can be maintained to meet the 2030 demands.



**Table 3-3
Projected SBBA Local Surface Water Diversions and Groundwater Extractions
(Acre-Feet per Year)**

| Water Agency | 2005 ¹ | 2010 | 2015 | 2020 | 2025 | 2030 |
|--|-------------------|----------------|----------------|----------------|----------------|----------------|
| Non-Plaintiffs | | | | | | |
| Colton, City of | 5,600 | 7,000 | 7,700 | 8,300 | 9,000 | 9,000 |
| East Valley Water District | 26,100 | 21,400 | 25,200 | 27,000 | 27,000 | 27,000 |
| Fontana Water Company | 17,300 | 18,000 | 18,000 | 18,000 | 18,000 | 18,000 |
| Loma Linda, City of | 6,600 | 8,800 | 9,400 | 9,900 | 10,200 | 10,600 |
| Marygold Mutual WC | 0 | 0 | 1,500 | 1,500 | 1,500 | 1,500 |
| Muscoy Mutual WC | 2,100 | 2,100 | 2,100 | 2,100 | 2,100 | 2,100 |
| Redlands, City of - Water Utility | 37,500 | 39,100 | 42,000 | 45,000 | 47,000 | 50,300 |
| Rialto, City of | 11,400 | 9,300 | 9,900 | 9,900 | 9,900 | 9,900 |
| San Bernardino MWD | 49,900 | 53,900 | 61,000 | 66,900 | 72,700 | 72,700 |
| Terrace Water Co. | 800 | 900 | 900 | 900 | 900 | 900 |
| West Valley Water District | 10,900 | 12,800 | 14,800 | 17,600 | 21,100 | 30,700 |
| Other/Private ^{2,3} | 22,200 | 20,200 | 19,900 | 19,600 | 19,300 | 19,000 |
| Subtotal | 190,400 | 193,500 | 212,400 | 226,700 | 238,700 | 251,700 |
| Plaintiffs (Based on Adjusted Rights⁵) | | | | | | |
| Meeks & Daley WC | 7,800 | 7,800 | 7,800 | 7,800 | 7,800 | 7,800 |
| Riverside-Highland WC | 4,300 | 4,300 | 4,300 | 4,300 | 4,300 | 4,300 |
| Riverside Public Utilities | 52,200 | 52,200 | 52,200 | 52,200 | 52,200 | 52,200 |
| Regents of California | 500 | 500 | 500 | 500 | 500 | 500 |
| Subtotal | 64,800 | 64,800 | 64,800 | 64,800 | 64,800 | 64,800 |
| Total Groundwater and Surface Water Demand | 255,200 | 258,300 | 277,200 | 291,500 | 303,500 | 316,500 |
| Safe Yield | 232,100 | 232,100 | 232,100 | 232,100 | 232,100 | 232,100 |
| Extractions above Safe Yield | 23,200 | 26,300 | 45,200 | 59,500 | 71,500 | 84,500 |
| Return flow from Extractions above the Safe Yield⁶ | 8,400 | 9,500 | 16,300 | 21,400 | 25,700 | 30,400 |
| Replenishment Obligation⁷ | 14,800 | 16,800 | 28,900 | 38,100 | 45,800 | 54,100 |

Italic = Estimated value. Projected demands in the SBBA were not specified in UWMPs.

¹The extractions for 2005 are based on the Western-San Bernardino Watermaster 2006 Annual Report.

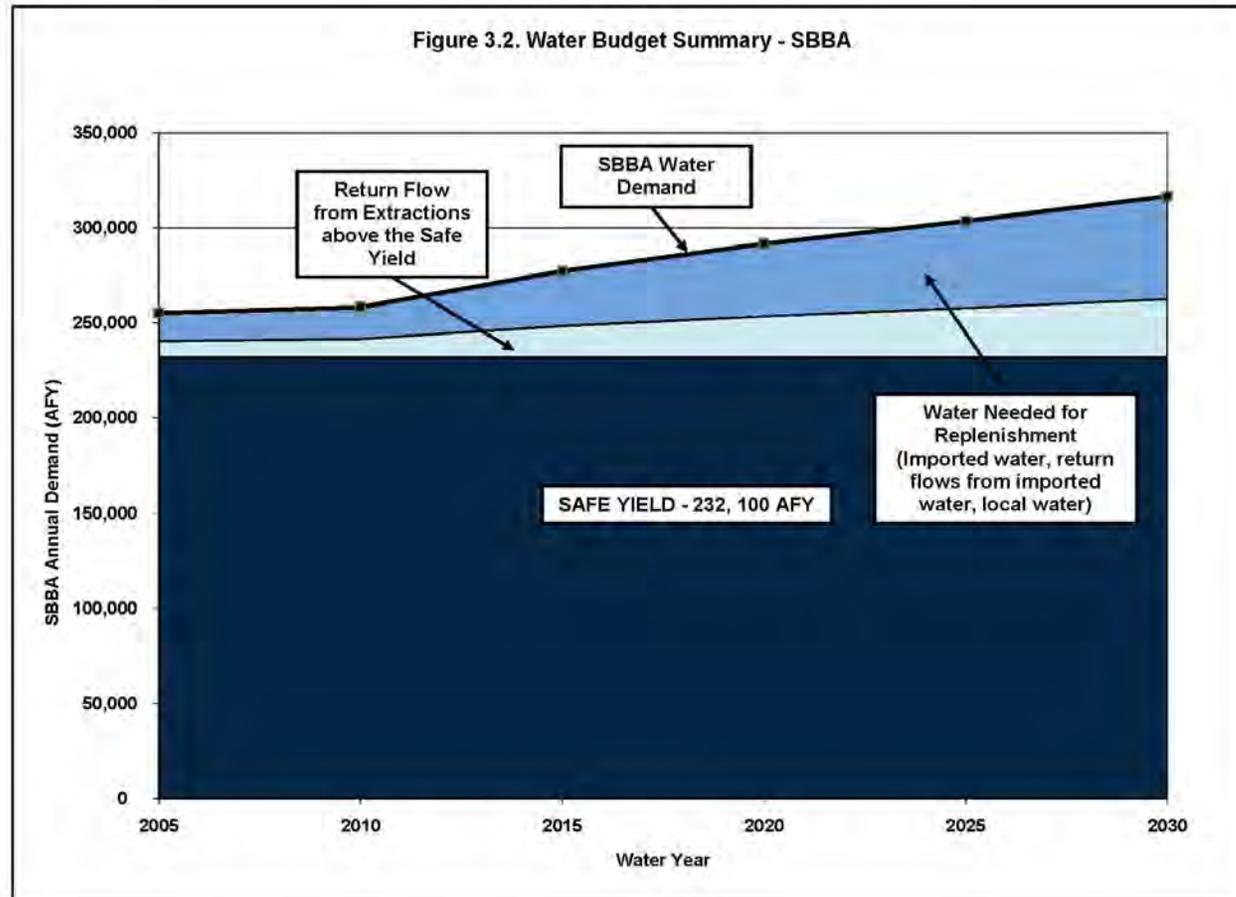
²Includes Devore WC, Crafton WC, Inland Valley Development Company, Mount Vernon WC, Pioneer Mutual WC, Pharaoh-Powell Mutual WC, Redlands WC, and Tennessee WC.

³In 2005 Other/Private includes a portion a Bear Valley Mutual Water Company (BVMWC) demands. BVMWC stock is owned by the City of Redlands and East Valley WD. After 2005 it was assumed that BVMWC are included in the City of Redlands and East Valley WD projections, as they purchase rest of the shares.

⁴Adjusted rights are based on the natural safe yield of the SBBA and were effective in 1972. Prior to 1972, extractions were limited to the "base rights," which were the average extractions during the base period from 1959 to 1963.

⁵The Western Watermaster assumes a 36 percent return flow from extractions above the safe yield.

⁶The Replenishment Obligation is the Extractions above the Safe Yield minus the Return Flow from the extractions above the Safe Yield.





Upper Santa Ana River Watershed Integrated
Regional Water Management Plan

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3.2.2.2 Colton Basin Area

The groundwater extractions in the Colton Basin Area are governed by the Rialto Basin Decree and the Western Judgment. The Western Judgment uses the terminology “Colton Basin Area”; however, this basin is also known as the Rialto-Colton Basin. Fontana Water Company (FWC), City of Rialto, City of Colton, and West Valley Water District are subject to the Rialto Basin Decree, entered on December 22, 1961, by the Superior Court for the County of San Bernardino. Entitlement extractions for any given water year (October 1 to September 30) are affected by groundwater elevations between March and May for three specific “index” wells (Duncan Well, Willow Street Well, and Boyd Well). Under specified conditions, groundwater extractions may be limited during certain months.

The Western Judgment requires Valley District to maintain the average lowest static water levels in three index wells in the Colton Basin Area and Riverside North Basins above 822.04 feet mean sea level (msl). If the water levels fall below 822.04 feet msl, Valley District is obligated to recharge the basin with imported water or reduce extractions. Extractions for use in Riverside County are limited to 3,381 acre-feet per year.

The safe yield for the Colton Basin Area was not defined by the Western Judgment or the Rialto Basin decree. Extractions during the five-year base period of the Western Judgment, 1959 to 1963, were, on average, 11,731 acre-feet per year. Extractions have averaged 17,300 acre-feet per year from 1996 to 2005. Since 1971, when the Watermaster reports began, the water levels in the three index wells have never fallen below 822.04 feet. In 2006, the average lowest static level was 878.74 feet msl for the three index wells. Projected extractions in the Colton Basin Area are found in Table 3.4.

Since the safe yield has not been determined for the Colton Basin Area, the average extraction from 1996-2005 of 17,300 acre-feet per year was used as the available supply from the Colton Basin Area in the water budget summary.

**Table 3-4
Projected Extractions in the Colton Basin Area (Acre-Feet per Year)**

| <i>Water Agencies</i> | 2005 ¹ | 2010 | 2015 | 2020 | 2025 | 2030 |
|---------------------------------------|-------------------|--------|--------|--------|--------|--------|
| Colton, City of | 4,100 | 4,100 | 4,500 | 4,900 | 5,300 | 5,300 |
| Rialto, City of | 1,600 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 |
| West Valley Water District | 2,200 | 3,500 | 4,500 | 5,900 | 8,200 | 10,000 |
| Fontana Water Company | 7,300 | 8,000 | 8,000 | 8,000 | 8,000 | 8,000 |
| Other/Private ² | 2,100 | 2,100 | 2,100 | 2,100 | 2,100 | 2,100 |
| Total | 17,300 | 17,600 | 19,000 | 20,800 | 23,500 | 25,300 |
| Historical Average (1996-2005) | 17,300 | 17,300 | 17,300 | 17,300 | 17,300 | 17,300 |

¹The extractions for 2005 are based on the 2006 Western-San Bernardino Watermaster Annual Report.

²Includes San Gabriel Valley WC and Reche Canyon Mutual WC.



3.2.2.3 Riverside North Basin

Groundwater extractions in the Riverside North Groundwater Basin (the portion of the Riverside Basin in San Bernardino County) are governed by the Western Judgment. Extractions for use in San Bernardino County are unlimited, provided that water levels at three index wells in the Rialto-Colton and Riverside North Basins stay above 822.04 feet msl. (Extractions from the Riverside North Basin for use in Riverside County are limited to 21,085 acre-feet per year.)

Total extractions during the five-year base period of the Western Judgment, 1959 to 1963, were, on average, 33,729 acre-feet per year. Historically, average static low measurements have never been below 822.04 feet and in 2006 were 878.74 feet msl. Because the safe yield of the Riverside North Basin has not been determined, the average historical extraction from 1996 to 2005 of 30,100 acre-feet per year was used as the available supply of the Riverside North Basin. Because the agencies in Riverside County are limited to 21,085 acre-feet per year, the available supply used in the water budget summary is the amount for the Non-Plaintiffs of 9,000 acre-feet per year. Table 3-5 lists the projected demands on the Riverside North Basin. If this increased production causes the water levels to drop, water agencies would have to either restrict use or Valley District would need to recharge the basin with imported water.

**Table 3-5
Projected Extractions in the Riverside North Basin (Acre-Feet per Year)**

| <i>Water Agencies</i> | 2005 ¹ | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|-------------------|---------------|---------------|---------------|---------------|---------------|
| Colton, City of | 2,100 | 2,400 | 2,700 | 2,900 | 3,100 | 3,100 |
| Rialto, City of | -0 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 |
| West Valley Water District | 1,300 | 2,900 | 3,700 | 4,800 | 5,000 | 5,000 |
| Agencies in Riverside County ² | 11,200 | 21,100 | 21,100 | 21,100 | 21,100 | 21,100 |
| SBMWD – RIX Overextraction ³ | 5,000 | 6,000 | 6,000 | 6,000 | 6,000 | 6,000 |
| Other/Private ⁴ | 5,000 | 6,000 | 6,000 | 6,000 | 6,000 | 6,000 |
| TOTAL | 29,100 | 38,400 | 39,500 | 40,800 | 41,200 | 41,200 |
| Historical Average (1996-2005) | 30,100 | 30,100 | 30,100 | 30,100 | 30,100 | 30,100 |

¹The extractions in 2005 are based on the 2006 Western-San Bernardino Watermaster Report

²Agencies in Riverside County have the adjusted right of 21,085 AF in the Riverside North basin.

³The Rapid Infiltration and Extraction (RIX) facility overlies the Riverside North Basin. In order to ensure that the secondary effluent applied to ground does not percolate to the groundwater and it is fully recovered, it is necessary that extractions exceed the amount of water applied. At present, this water is discharged from the RIX outfall into the SAR. In the long-term, the over-extractions rates will be approximately 10 percent more than that recharged (Watermaster 2003 pg. 14).

⁴Includes California Portland Cement Company, Corridor Land Company, El Rivino Country Club, and Elsinore Valley MWD.

3.2.2.4 Yucaipa Groundwater Basin

Yucaipa Valley Water District (YVWD) estimates the safe yield of the Yucaipa Groundwater Basin to be 10,000 acre-feet per year (YVWD 2005 pgs. 2-6). YVWD accounts for the majority of the demand on the Yucaipa Groundwater Basin. The City of Redlands Municipal Utilities Department and South Mesa Water Company also extract water from the Yucaipa groundwater basin to a lesser extent. YVWD demands are projected to increase from 15,700 acre-feet in 2005 to 28,600 acre-feet by 2030. In order to meet demands above the groundwater safe yield, YVWD plans to recycle water and import surface water from Mill Creek, SAR, and the SWP through transfer and exchange agreements with the City of Redlands and Valley District. YVWD’s new water treatment plant became operational in 2007. There is potential to increase spreading of water in the Wilson Creek spreading grounds and also to utilize the Oak Glen Creek stream channel for additional recharge. By maximizing the existing spreading grounds and expanding spreading acreage along Oak Glen Creek (25 to 50 acres), the capability exists to spread from 7,000 to 14,000 acre-feet of surface water annually into the Yucaipa Basin.

**Table 3-6
Projected Extractions in the Yucaipa Basin (Acre-Feet per Year)**

| <i>Water Agencies</i> | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|--|---------------|---------------|---------------|---------------|---------------|---------------|
| Redlands, City of – Municipal Utilities Department | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 |
| South Mesa Water Company | 2,500 | 2,700 | 2,000 | 2,300 | 1800 | 1,800 |
| YVWD | 12,600 | 7,800 | 7,800 | 7,800 | 7,800 | 7,800 |
| TOTAL | 16,100 | 11,500 | 10,800 | 11,100 | 10,600 | 10,600 |
| Safe Yield | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 |

3.2.2.5 Other Groundwater and Surface Water Supplies

3.2.2.5.1 *San Gorgonio Pass Area Groundwater Basins*

The supplies available in the SGPWA are based on the “2006 Report on the Water Supply Conditions in the San Gorgonio Pass Region” submitted to LAFCO by SGPWA and the San Timoteo Watershed Management Authority (STWMA). This report concluded that the retail agencies in the region will be able to supply the projected demands to 2030 as long as the agencies aggressively develop local supplies and recycled water, complete the East Branch extension, and secure additional supplies outside the SGPWA service area.

The available groundwater supplies in the San Gorgonio Pass region are found in Table 3-7. The available supplies were based on Table 7 of the 2006 LAFCO report.



**Table 3-7
Projected Extractions of Other Groundwater and Surface Water Supplies (Acre-Feet
per Year)**

| Water Agencies | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---------------|---------------|---------------|---------------|---------------|---------------|
| San Geronio Pass Area Groundwater Supplies¹ | | | | | | |
| Edgar Canyon Basin | 1,800 | 1,800 | 1,800 | 1,800 | 1,800 | 1,800 |
| Beaumont Basin | 24,700 | 24,700 | 8,700 | 8,700 | 8,700 | 8,700 |
| Banning Storage Unit | 2,500 | 2,700 | 3,000 | 3,200 | 3,500 | 3,700 |
| Banning Canyon | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 |
| Cabazon Storage Unit | 1,000 | 6,000 | 6,000 | 6,000 | 6,000 | 6,000 |
| Local Enhancements | 700 | 8,100 | 10,100 | 11,500 | 12,900 | 13,600 |
| Supplies | 35,700 | 48,300 | 34,600 | 36,200 | 37,900 | 38,800 |
| Big Bear Valley Groundwater | | | | | | |
| City of Big Bear Lake D.W.P | 2,500 | 2,800 | 2,200 | 2,500 | 2,800 | 3,100 |
| Big Bear City C.S.D | 1,300 | 1,400 | 1,500 | 1,600 | 1,600 | 1,600 |
| BBV Groundwater Subtotal | 3,800 | 4,200 | 3,700 | 4,100 | 4,400 | 4,700 |
| Big Bear Lake | | | | | | |
| Big Bear Municipal W.D. ² | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 |
| No Man's Land Groundwater | | | | | | |
| Fontana Water Company | 3,700 | 3,600 | 3,600 | 3,600 | 3,600 | 3,600 |
| Rialto, City of | 1,200 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 |
| TOTAL PROJECTED SUPPLIES | 44,400 | 57,100 | 42,900 | 44,900 | 46,900 | 48,100 |

¹The SGPA groundwater available supplies are based on Wildermuth Demand and Supply data LAFCO 2006, Table 7.

²Surface water from Big Bear Lake used for snow making

3.2.2.5.2 *Big Bear Valley Groundwater*

Big Bear Community Services District (BBCSD) supplies all its water from groundwater in Big Bear Valley. The City of Big Bear Lake Department of Water and Power (BBLDWP) also produces groundwater in Big Bear Valley. The projected extractions from Big Bear Valley groundwater are found in Table 3-7. The reduction in demand in 2015 is due to the planned additional recycled water supply becoming available after 2010.



Water from Big Bear Lake is used for snowmaking at local ski resorts. Most of the melted snow from the resorts flows back into the lake.

3.2.2.5.3 *Big Bear Lake*

Big Bear Municipal Water District has a contract with Bear Mountain/Snow Summit to sell water from Big Bear Lake for snowmaking. The contract allows the sale of up to 1,300 acre-feet per year and no more than 11,000 acre-feet for any 10-year period. Currently, the sales of water for snowmaking have not exceeded 1,000 acre-feet per year. The projected extractions from Big Bear Lake are found in Table 3-7.

3.2.2.5.4 *No Man's Land*

FWC and City of Rialto extract water from a small unadjudicated groundwater basin between the Chino Basin and the Colton Basin Area known as "No Man's Land." FWC plans to extract 3,600 acre-

feet per year from the basin. The City of Rialto plans also extract water from No Man's Land. Projected extractions from "No Man's Land" are found in Table 3-7.

3.2.2.6 *State Water Project Water*

SWP water is delivered from Northern California to Valley District. Valley District has the fifth largest SWP contract, with a maximum Table A amount of 102,600 acre-feet per year through 2035. To help assess the reliability of SWP supplies, DWR published the 2005 State Water Project Delivery Reliability Report. In this report, various hydrologic studies were conducted on the expected deliveries (expressed as percentage of entitlement) that would be available during different hydrologic years from 1922 to 1994. DWR ran two modeling studies, Study 4 and Study 5. Study 4 estimated the SWP deliveries based on 2005 demand levels with a repeat of the hydrology from 1922 to 1994. Study 4 estimated that, on average, 68 percent of the Table A SWP amounts would be delivered based on 2005 demand levels. Study 5 estimated SWP deliveries based on 2025 demand (which was assumed to be the full Table A amount). Study 5 estimated that, on average, 77 percent of the Table A SWP amounts would be delivered based on 2025 demand levels. The existing facilities and environmental constraints are the same between the two studies; the difference in reliability is the result of not limiting the deliveries to the 2005 demand levels for Study 5. (Example: in a repeat of the hydrology in 1956, Study 4 estimates the 2005 demand to be 3,639 thousand acre-feet (TAF).



Therefore, the deliveries are limited to 3,639 TAF. In 1956, with Study 5, the deliveries are not limited by the demands and the full amount of 4,133 TAF could be delivered). For this analysis, the reliability of the SWP is based on Study 5, which reflects the projected availability of SWP water not limited by 2005 demand levels. Therefore, Valley District's Table A amount of 102,600 acre-feet is estimated to be 77 percent reliable, or, on average, Valley District could receive 79,000 acre-feet per year of the Table A amount.

The water agencies in the Valley District service area forecast approximately 34,200 acre-feet per year for SWP deliveries in 2030, outlined in Table 3-8, based upon UWMP projections. Valley District is estimated to need approximately 54,100 acre-feet per year to meet the replenishment obligations in the SBBA with the projected demands in 2030 (Table 3-3). Replenishment may also be required for the Colton Basin Area and the Riverside North groundwater basins depending on the future water levels. Valley District would have 44,800 acre-feet per year of available SWP water to use for replenishment from its Table A amount after the SWP deliveries in 2030. The shortfall in 2030 may be met by the Valley District's water rights application on the SAR.

The other state water contractor in the Region is SGPWA. SGPWA has a contracted Table A amount of 17,300 acre-feet per year but is currently limited to importing 8,650 acre-feet per year until the next phase of the East Branch Extension is completed. Beaumont-Cherry Valley Water District and the City of Banning plan to purchase additional water from SGPWA and are investigating acquiring SWP water from other contractors' Table A amounts through SGPWA. The need for SWP water in the San Gorgonio Pass to meet the projected demands is higher than the current SGPWA Table A amount. Table 3-8 summarizes the forecasted demand for direct deliveries of SWP water and Table 3-9 is the available SWP supplies to the Region based on state water contractors' Table A amounts. Crestline-Lake Arrowhead Water Agency (CLAWA) is outside of the Region but provides 66 acre-feet per year water to the City of Big Bear Lake Department of Water and Power.

**Table 3-8
Projected Deliveries of State Water Project (Acre-Feet per Year)**

| <i>Water Agencies</i> | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|--|--------------|---------------|---------------|---------------|---------------|---------------|
| SBVMWD | | | | | | |
| East Valley WD | 800 | 9,000 | 9,000 | 9,000 | 9,000 | 9,000 |
| Fontana Water Company | 3,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 |
| Redlands, City of, Water Utility | 0 | 3,000 | 4,000 | 5,000 | 5,000 | 5,000 |
| San Bernardino MWD | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 |
| West Valley Water District | 1,300 | 7,000 | 7,000 | 7,000 | 7,000 | 7,000 |
| Yucaipa Valley Water District | 0 | 2,900 | 4,000 | 4,500 | 6,100 | 6,200 |
| Subtotal | 7,100 | 28,900 | 31,000 | 32,500 | 34,100 | 34,200 |
| SGPWA (Portions of the SGPWA deliveries will be delivered for recharge) | | | | | | |
| Banning, City of | 0 | 4,000 | 8,800 | 9,300 | 9,300 | 9,300 |
| Beaumont-Cherry Valley | 0 | 6,000 | 6,800 | 6,800 | 6,900 | 6,900 |
| Cabazon Water District | 0 | 0 | 2,000 | 6,000 | 10,000 | 10,000 |
| South Mesa Water Company | 0 | 0 | 1,100 | 1,100 | 1,700 | 2,200 |
| Yucaipa Valley Water District | 500 | 2,300 | 3,600 | 4,700 | 4,800 | 6,100 |
| Subtotal | 500 | 12,300 | 22,300 | 27,900 | 32,700 | 34,500 |
| CLAWA | | | | | | |
| City of Big Bear Lake DWP | 100 | 100 | 100 | 100 | 100 | 100 |
| Subtotal | 100 | 100 | 100 | 100 | 100 | 100 |
| Total Deliveries | 7,700 | 41,300 | 53,400 | 60,500 | 66,900 | 68,800 |

**Table 3-9
Available State Water Supplies Based on Table A Amounts (AFY)**

| <i>Water Agencies</i> | Table A Amount | Average Reliability (77%) | Multi-Year Drought Reliability (39%) | Single-Year Drought Reliability (21%) |
|------------------------------------|-----------------------|----------------------------------|---|--|
| Valley District | 102,400 | 79,000 | 40,000 | 21,500 |
| SGPWA¹ | 17,300 | 13,300 | 6,700 | 3,600 |
| CLAWA to BBLDWP² | 100 | 100 | 100 | 100 |
| Total | 119,800 | 92,400 | 46,800 | 25,200 |

¹SGPWA plants to acquire an additional 21,000 AF of Table A amount for City of Banning and BCVWD.

²Crestline-Lake Arrowhead Water Agency supplies 66 acre-feet per year to BBLDWP.

3.2.2.7 Recycled Water

The projected use of recycled water is summarized by water agency in Table 3-10. Recycled water use is forecasted to increase from 9,200 acre-feet per year in 2005 to 35,700 acre-feet per year in 2030. The Orange County Judgment



(Orange County Water District v. City of Chino, et al., Case No. 117628) stipulated that Valley District shall be responsible for the delivery of an average annual supply of 15,250 acre-feet of “base flow” at the Riverside Narrows. Valley District has an agreement with the City of San Bernardino that at least 16,000 acre-feet of treated wastewater effluent will continue to discharge from its sewage treatment plant into the Santa Ana River to meet Valley District’s obligation under the Orange County Judgment.

The City of Rialto delivers 85 acre feet per year of recycle water to the California Department of Transportation (Caltrans) (not shown on the table) and may increase to 2,260 acre feet in the future.

Table 3-10
Projected Use of Recycled Water (Acre-Feet per Year)

| Water Agencies | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|--|--------------|---------------|---------------|---------------|---------------|---------------|
| Banning, City of | 0 | 1,500 | 1,800 | 2,200 | 2,500 | 2,800 |
| Beaumont Cherry Valley WD | 0 | 5,800 | 7,000 | 7,100 | 7,200 | 7,200 |
| City of Big Bear Lake DWP | 0 | 0 | 1,000 | 1,000 | 1,000 | 1,000 |
| Fontana Water Company | 0 | 2,600 | 5,000 | 5,000 | 5,000 | 5,000 |
| Redlands, City of – Water Utility ⁶ | 7,000 | 7,500 | 8,000 | 8,500 | 8,500 | 9,000 |
| San Bernardino MWD | 0 | 800 | 800 | 800 | 800 | 800 |
| South Mesa Water Company | 0 | 0 | 100 | 100 | 200 | 200 |
| Yucaipa Valley WD | 1,300 | 2,500 | 3,800 | 5,000 | 5,500 | 6,000 |
| West Valley Water District | 900 | 3,700 | 3,700 | 3,700 | 3,700 | 3,700 |
| Total | 9,200 | 24,400 | 31,200 | 33,400 | 34,400 | 35,700 |

¹The recycled water by the City of Redlands would otherwise percolate into the SBBA. In the water budget summary this was not counted as a new supply. The recycled water that would otherwise discharge into surface streams and flow out of the Region was counted as new supply.

3.2.3 Water Budget Summary

The current balance between supply and applied demand for the Region is presented as the summary of the water budget in Table 3-11 to 3-15 and Figure 3-3. Based on this analysis, the water supplies within the Valley District and San Bernardino Mountains area are adequate to meet the demands through 2025. This is assuming the SWP reliability published in the 2005 State Water Project Delivery Reliability Report and the Valley District/Western Municipal Water District water rights applications for the SAR are approved. Additional water from the water rights applications is denoted as Seven Oaks Supply in Table 3-11. The amount available from the water rights application may be higher or lower and depends on the conditions placed on the applications by the State Water Resources Control Board. Additional conservation of 8,400 acre-feet will be needed to ensure supply reliability for 2030.

**Table 3-11
Water Budget Summary for Valley District and San Bernardino Mountains (Acre-Feet per Year) for an Average Year**

| | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|--|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| SBBA Surface Water | 39,000 | 39,000 | 39,000 | 39,000 | 39,000 | 39,000 |
| Big Bear Surface Water | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 |
| Seven Oaks Supply | 0 | 0 | 10,800 | 10,800 | 10,800 | 10,800 |
| Surface Water | 40,000 | 40,000 | 50,800 | 50,800 | 50,800 | 50,800 |
| SBBA Groundwater | 193,100 | 193,100 | 193,100 | 193,100 | 193,100 | 193,100 |
| SBBA Return Flows from Extractions above safe yield ² | 8,400 | 9,500 | 16,300 | 21,400 | 25,700 | 27,000 |
| SBBA return flow from SWP deliveries ³ | 1,000 | 5,000 | 5,400 | 5,800 | 5,800 | 5,800 |
| Rialto-Colton Groundwater | 17,300 | 17,300 | 17,300 | 17,300 | 17,300 | 17,300 |
| Riverside North Groundwater | 9,000 | 9,000 | 9,000 | 9,000 | 9,000 | 9,000 |
| Yucaipa Groundwater | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 |
| Other Groundwater | 8,700 | 8,800 | 8,300 | 8,700 | 9,000 | 9,300 |
| Groundwater | 247,500 | 252,700 | 259,400 | 265,300 | 269,900 | 271,500 |
| Imported Water⁴ | 34,600 | 48,400 | 52,800 | 65,400 | 77,300 | 79,100 |
| Recycled Water⁵ | 3,500 | 12,100 | 18,100 | 20,500 | 21,500 | 22,500 |
| Additional Conservation⁶ | 0 | 0 | 0 | 0 | 0 | 8,400 |
| Total Supplies | 325,600 | 353,200 | 381,100 | 402,000 | 419,500 | 435,700 |
| Total Demands | -325,600 | -353,200 | -381,100 | -402,000 | -419,500 | -435,700 |
| Shortfall | 0 | 0 | 0 | 0 | 0 | 0 |

¹Water rights applications are pending. The supplies of the project depend on conditions placed on the applications by the State Water Resources Control Board. The 15,000 acre-feet are estimated based on the agreements in the Seven Oaks Accord and the Conservation District Settlement and are only preliminary estimates until the applications are approved. The Water Rights EIR estimates the average annual diversions could range from 10,000 to 27,000 acre-feet per year. The Plaintiffs portion is 27.95% and the Non-Plaintiffs portion is 72.05% or 10,800 acre-feet per year.

²The watermaster estimates 36% return flows from extractions above the safe yield of the SBBA. This is estimated in Table 3-3.

³The Watermaster estimates a 36% return from the direct deliveries of SWP in the SBBA. Only the direct deliveries to East Valley Water District and the City of Redlands were used in the calculations, as the other agencies that project to receive SWP water do not overly the SBBA.

⁴The amount of SWP water used in the given year is the minimum between (a) the difference between the applied demand and the surface water, groundwater, recycled water, and future Seven Oaks Supply and (b) the available Table water found in Table 3-10.

⁵The recycled water supply does not include recycled water from the City of Redlands, because it would otherwise percolate into the basin. The recycled water included would otherwise be discharged into surface streams and out of the Region, and therefore can be counted as new supply.

⁶Additional conservation was limited to five percent of the total demand.



Table 3-12
Water Budget Summary for San Geronio Pass Water Agency Area

| | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|--|----------------|----------------|----------------|----------------|----------------|----------------|
| Groundwater | 22,700 | 25,500 | 24,500 | 24,700 | 25,000 | 25,200 |
| Imported Water | 200 | 6,000 | 13,300 | 13,300 | 13,300 | 13,300 |
| Recycled Water | 0 | 7,300 | 8,900 | 9,400 | 9,900 | 10,200 |
| Local Enhancement Projects | 700 | 8,100 | 10,100 | 11,500 | 12,900 | 13,600 |
| Additional Conservation¹ | 0 | 0 | 3,000 | 3,500 | 3,900 | 4,200 |
| Total Supplies | 23,600 | 46,900 | 59,800 | 62,400 | 65,000 | 66,500 |
| Total Demands | -23,600 | -46,900 | -60,700 | -70,500 | -78,600 | -84,000 |
| Shortfall | 0 | 0 | -900 | -8,100 | -13,600 | -17,500 |

¹Additional conservation was limited to five percent of the total demand.

Table 3-13
Region-Wide Water Budget Summary for Average Year (Acre-Feet per Year)

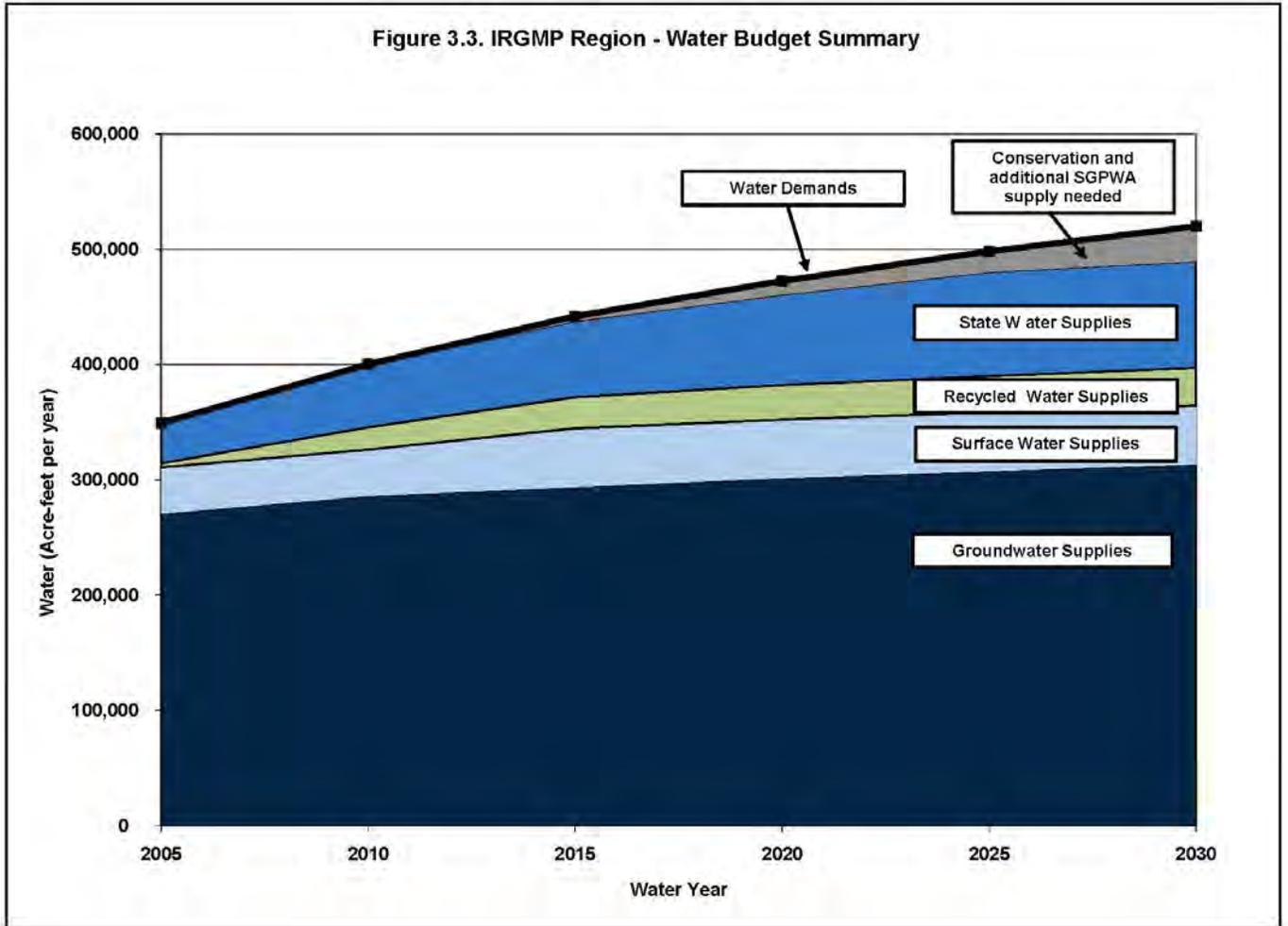
| | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|--------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Surface Water | 40,000 | 40,000 | 50,800 | 50,800 | 50,800 | 50,800 |
| Groundwater | 270,900 | 286,300 | 294,000 | 301,500 | 307,800 | 313,700 |
| Imported Water | 34,800 | 54,400 | 66,100 | 78,700 | 90,600 | 92,400 |
| Recycled Water | 3,500 | 19,400 | 27,000 | 29,900 | 31,400 | 32,700 |
| Additional Conservation | 0 | 0 | 3,000 | 3,500 | 3,900 | 12,600 |
| Total Supplies | 349,200 | 400,100 | 440,900 | 464,400 | 484,500 | 502,200 |
| Total Demands | -349,200 | -400,100 | -441,800 | -472,500 | -498,100 | -519,700 |
| Shortfall | 0 | 0 | -900 | -8,100 | -13,600 | -17,500 |

Table 3-14
Region-Wide Water Budget Summary for Multi-Year Drought (Acre-Feet per Year)

| | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|--------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Surface Water | 30,000 | 30,000 | 30,000 | 30,000 | 30,000 | 30,000 |
| Groundwater | 289,700 | 304,000 | 335,100 | 362,400 | 371,000 | 372,200 |
| Imported Water | 26,000 | 46,700 | 46,700 | 46,700 | 46,700 | 46,700 |
| Recycled Water | 3,500 | 19,400 | 27,000 | 29,900 | 31,400 | 32,700 |
| Additional Conservation | 0 | 0 | 3,000 | 3,500 | 3,900 | 12,600 |
| Total Supplies | 349,200 | 400,100 | 438,800 | 469,000 | 479,100 | 481,600 |
| Total Demands | -349,200 | -400,100 | -441,800 | -472,500 | -498,100 | -519,700 |
| Shortfall | 0 | 0 | -3,000 | -3,500 | -19,000 | -38,100 |

Table 3-15
Region-Wide Water Budget Summary for a Single-Dry Year (Acre-Feet per Year)

| | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|-------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Surface Water | 20,000 | 20,000 | 20,000 | 20,000 | 20,000 | 20,000 |
| Groundwater | 300,600 | 335,600 | 366,700 | 378,000 | 380,000 | 381,200 |
| Imported Water | 25,100 | 25,100 | 25,100 | 25,100 | 25,100 | 25,100 |
| Recycled Water | 3,500 | 19,400 | 27,000 | 29,900 | 31,400 | 32,700 |
| Additional Conservation | 0 | 0 | 3,000 | 3,500 | 3,900 | 12,600 |
| Total Supplies | 349,200 | 400,100 | 438,800 | 453,000 | 456,500 | 459,000 |
| Total Demands | -349,200 | -400,100 | -441,800 | -472,500 | -498,100 | -519,700 |
| Shortfall | 0 | 0 | -3,000 | -19,500 | -41,600 | -60,700 |



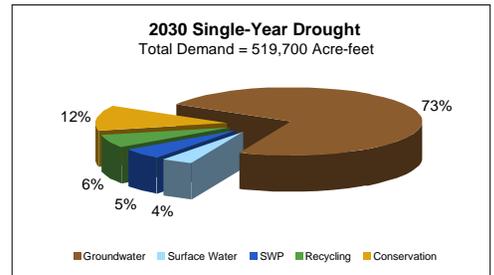
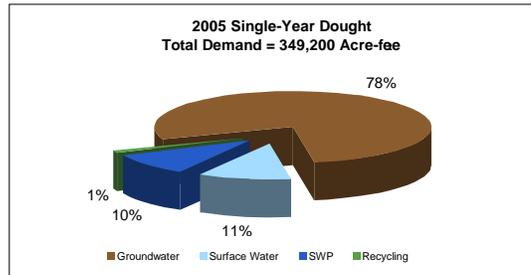
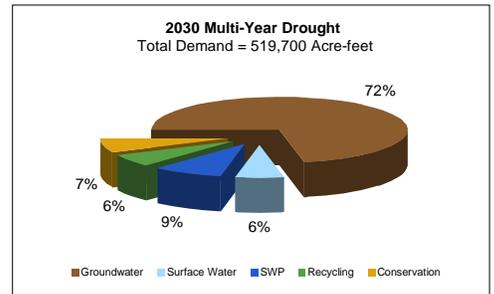
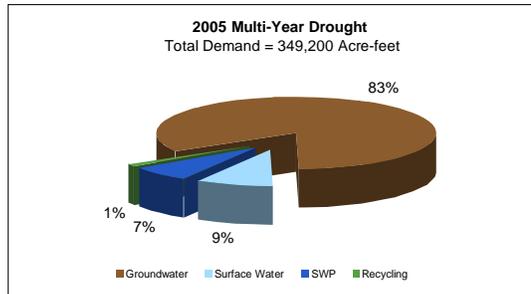
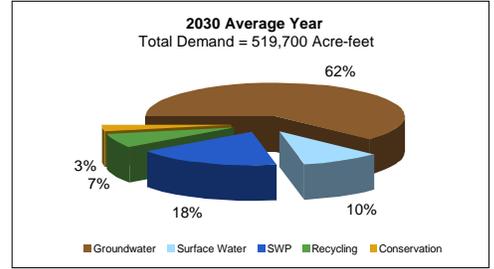
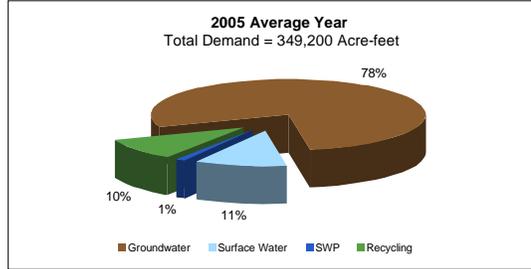


Most of the shortage after 2015 shown in the overall water budget in Table 3-13 is within the SGPWA. In Table 3-13, the supply and demands for the SGPWA area are broken out separately. SGPWA is attempting to purchase supplemental water to meet their projected shortage in supply. By 2030, it is estimated that demands may outpace the current supplies by about 21,700 acre-feet per year.

During multi-year and single-year droughts, the Region is more reliant upon the groundwater. Based on groundwater modeling of the SBBA (described in Chapter 4), during a dry period, agencies typically increase their groundwater extractions to overcome any deficiency in local surface water and imported water supplies. Computer modeling suggests that groundwater extractions in the SBBA can increase by 40 percent (190,000 to 280,000 acre-feet) to meet the demands in drought years if imported water is captured and stored when it is available in “wet years.”

Figure 3-4 below shows the percentage of supply used to meet the demand in an average year, single-year drought, and multiple-year drought for the entire region. The breakdown of the amount of supplies by category is found in Tables 3-13 to 3-15.

**Figure 3-4
Water Supply Summary**



4 Develop Integrated Regional Water Management Plan

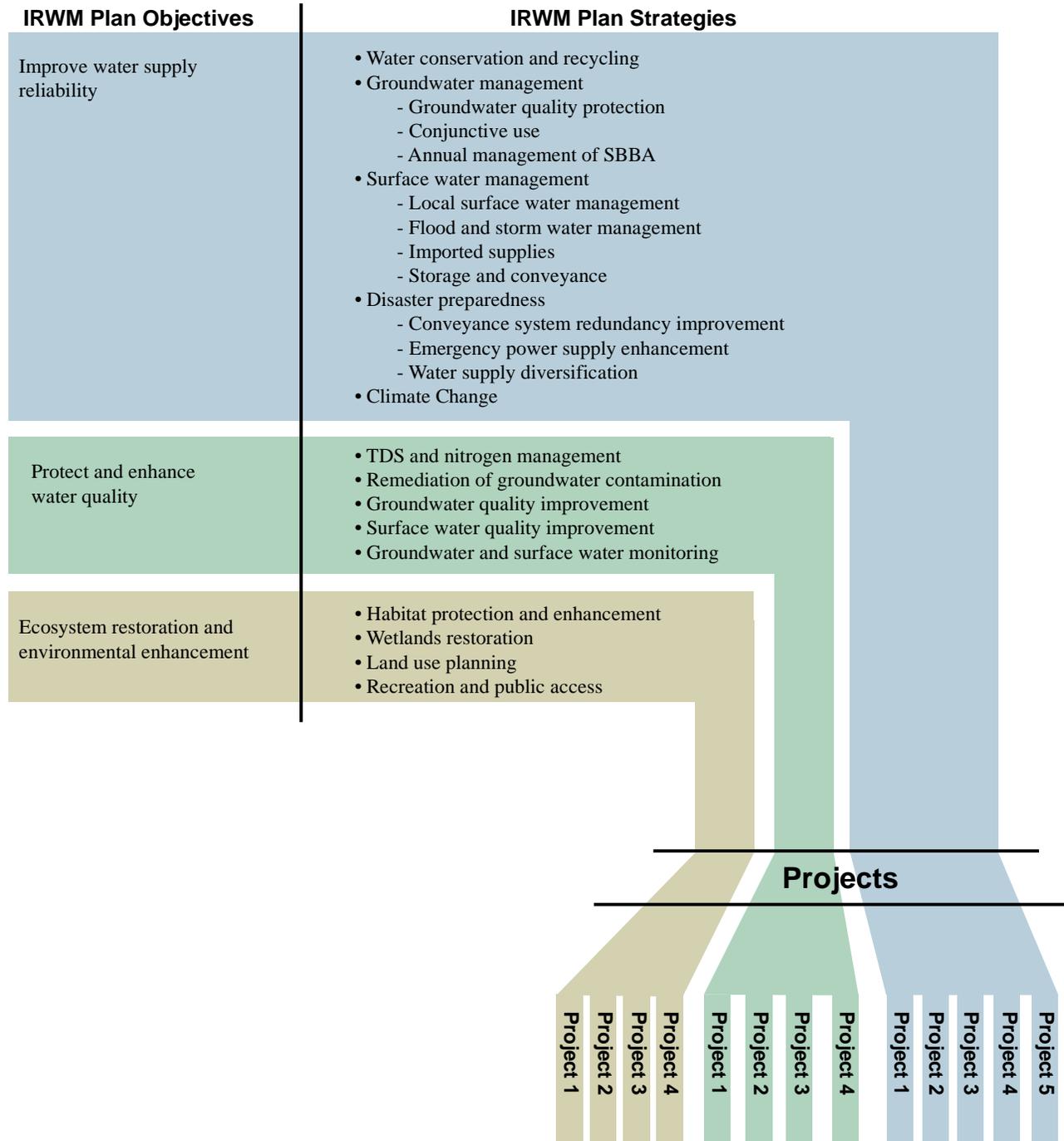
4.1 Introduction

This chapter provides the planning framework for water management activities in the Upper Santa Ana River (SAR) watershed region. The Integrated Regional Water Management Plan (IRWM Plan) is a roadmap for the management of water resources to ensure long-term, reliable water supply availability for the region. The first step in developing this roadmap is the formulation of water management objectives. The water management objectives are the overarching statements that define water management goals for the region. The objectives define the desired outcome from implementation of the plan. Specific objectives for management of water resources have been developed and will be discussed in this chapter.

Upon formulation of the objectives, specific water management strategies are examined and evaluated in support of the objectives. Water management strategies are the action plans and the ways of achieving the stated objectives. Evaluation of various water management strategies results in formulation of related feasible projects that would be implemented in the region to achieve the region's water management objectives. Figure 4-1 illustrates the process. This figure also summarizes water management objectives and strategies considered in this IRWM Plan. For the IRWM Plan, water management strategies and specific projects will be further optimized to eliminate undesired effects from implementing the projects on water resources of the region. It should be mentioned that some of the water management strategies listed by the California Department of Water Resources (DWR) under IRWM Plan Guidelines are considered as not being applicable in the region and have not been discussed in the plan. This includes the sea water desalting strategy. The following sections describe this planning process in more detail.



**Figure 4-1
Objectives and Strategies**



4.2 Water Management Objectives, Strategies, and Projects (California Water Code §§ 79562.5 and 79564)

The water management objectives are broad statements that drive the water management planning in the region. As stated earlier, water management in the study area is currently governed by a complex set of constraints, court decisions, judgments, and agreements. However, the IRWM Plan process facilitated a cooperative environment in which the existing institutional constraints do not limit the water managers from implementing decisions that optimize the use of available resources. In other words, the water management objectives for the study area must be consistent with the objectives stated in these historic documents, while meeting the vision of the water leaders in the region for managing their water resources. Other



Groundwater is a major source of water supply for the Upper Santa Ana Region.

considerations in formulating the water management objectives for the region include California Water Code, Section 7956.2.5(b), which requires an Integrated Water

Management Plan to address the objectives and conflicts of the region covered by the plan.

Because groundwater is a major source of water supply and plays a significant role in meeting water needs of the region, groundwater management has been blended into the IRWM Plan to ensure a balanced approach to management of the water resources of the region, while seeking solutions that benefit all stakeholders. Consistent with the Groundwater Management Planning Act, Basin Management Objectives (BMOs) have been formulated for the groundwater basins and for the San Bernardino Basin Area (SBBA).

The consulting team and the Technical Advisory Group (TAG) have reviewed various court judgments and water management agreements currently in place within the region to formulate objectives that are consistent with the existing water management framework. The TAG evaluated a broad range of objectives over several bi-weekly meetings to ensure consistency with the existing objectives of the agencies that have a vested interest in the water resources of the Upper Santa Ana River watershed. The comprehensive list of objectives was categorized into the broader set of objectives that are intended to be as follows:

- Consistent with the governing laws, judgments, and agreements that govern the water management in the region. These laws, agreements, and judgments were discussed in Chapter 2.



- In harmony with the vision of water leaders for management of the region's water resources.
- Consistent with local agencies' water management objectives.
- Fulfilling the planning standards of the California Water Code.

Two sets of objectives have been identified and discussed by the TAG and other water leaders in the region. These objectives are as follows:

- A set of broad water management objectives to guide a wide range of water management activities of the region. Formulation of these objectives is also required by the Integrated Regional Water Management Planning Act.
 1. **Water Supply Reliability Improvement.** Because surface water management and groundwater resources management of the region are critical and inseparable components of water supply reliability, **surface water management and groundwater management** are considered a subset of the broader water supply reliability objective,
 2. **Water Quality Protection.**
 3. **Ecosystem Restoration and Environmental Improvement.**
- A set of **BMOs** for management of the groundwater basins and, particularly, for the SBBA. Establishment of the BMOs for groundwater basins is one of the requirements of the Groundwater Management Planning Act. These BMOs include **reducing the risk of liquefaction** in the pressure Zone and **avoiding impacts to and from the contaminant plumes**.

The objectives, water management strategies, and associated programs and projects to achieve the above objectives are described in detail in this chapter. It should be noted that most of the strategies and projects discussed below serve more than one objective and provide multiple benefits. For the purpose of organizing these strategies, however, they are categorized under one specific objective.

4.2.1 Improve Water Supply Reliability

Improving water supply reliability is the primary objective of the IRWM Plan. This objective is formulated to ensure that a reliable water supply is available for the region through 2030. As mentioned earlier, an important subset of this

objective is surface water and groundwater management. Given the variability of the State Water Project (SWP) supplies, another of the region's water supply reliability goals is to optimize the use of SWP supplies to be able to reduce its reliance on the SWP during drought periods. Various water management strategies and projects are identified and evaluated to achieve water supply reliability objectives.

To evaluate the performance of the water management strategies (as they are implemented) in achieving the water supply reliability goal of the region, the TAG considered the "performance criteria" for water supply reliability as established in the Urban Water Management Plan (UWMP) Act. These criteria include evaluation of the following:

- Reliable water supply for a minimum of a 25-year period,
- Meeting average year water demands through 2030,
- Meeting single-year drought water demands,
- Meeting multi-year drought water demands,
- Preparing a water shortage (up to 50 percent loss) contingency plan, and
- Preparing for catastrophic interruption in water supplies.

The Upper SAR watershed has adequate water resources to accommodate most hydrologic events and water agencies have substantially invested in facilities and institutions to protect those resources. Local agencies have been planning and implementing facilities needed to improve water supply reliability by improving management of water resources of the region as demonstrated by the ongoing implementation of the San Bernardino Valley Municipal Water District (Valley District) Regional Water Facilities Master Plan and Santa Ana Watershed Project Authority's (SAWPA's) IRWM Plan for the watershed. That said, those resources are subject to a number of challenges, including drought, contamination, climate change, and aging infrastructure. Furthermore, substantial residential and commercial growth in the region is increasing the demands placed on available water, requiring careful planning and management of the region's water resources.

The following sections will describe water management strategies for meeting the region's water supply reliability objective.



4.2.1.1 Water Conservation Strategies and Projects

Over the past 30 years, water conservation and water demand management has grown to be a significant sector of California's water supply picture. Indeed, new technology and application of other proven technologies have "produced" substantial real water savings for both the agricultural and urban sectors. In many communities in Southern California, per capita water use has decreased, allowing the same water supply to serve more people and industries.

Today, many water conservation measures are cost-effective for agencies, especially those that depend on imported water supplies. Furthermore, when one considers energy usage and the current incentives to save energy through water-energy conservation partnerships, even more water saving efforts become cost-effective.

4.2.1.1.1 *Irrecoverable vs. Recoverable Water Savings*

Depending upon the water conservation measure and its relative location, a water conservation measure can actually reduce real water use. Real water is saved when discharges are reduced to a salt sink or ocean, or actual water consumption is reduced (i.e., through reduction of evapotranspiration) by managing landscape irrigation or changing irrigated lawn with more water-saving plants. In this case, the real water savings would be made through reduction of an irrecoverable loss (evapotranspiration).

On the other hand, in a system where excess water and treated wastewater are discharged to a river and potentially used again by downstream municipal, agricultural, or industrial users, there may not be significant system-wide water savings from water conservation. In such situations, the overall water demand may not be significantly reduced. Replacing older or less efficient toilets with more efficient ones and reducing the effluent discharge to the river where it would have been reused is a good example. Saving recoverable water, however, has a number of benefits. Improving water supply reliability for local purveyors, implementing the conservation project, saving energy on transportation, reducing the cost of water treatment, and improving water quality are all substantial benefits of water conservation in a recoverable system.

4.2.1.1.2 *Best Management Practices*

In 1991, nearly 100 urban water agencies and environmental groups signed a Memorandum of Understanding (MOU), pledging to develop and implement a series of Best Management Practices (BMPs) for water conservation. The California Urban Water Conservation Council (CUWCC) was thus created to increase efficient water use statewide through partnerships among urban water agencies, public interest organizations, and private industry. There are now 384 members and signers to the MOU (www.cuwcc.com). CUWCC members

voluntarily pledge to implement a series of BMPs within a reasonable time frame and coverage. Members must periodically report the status of their BMP work to the CUWCC for verification. Only those BMPs that are cost-effective for the water retailer or wholesaler need to be implemented. Members have tools to estimate and show that a measure would not be as cost-effective and can receive a pass on that particular BMP. Thus, successful implementation of all BMPs and credit for actively participating in the CUWCC process need not be a “complete” implementation of all BMPs.

The table in Figure 4-2 shows the 14 BMPs that the CUWCC currently endorses. The CUWCC is constantly reviewing new technologies and strategies to improve water conservation. New BMPs are added for new water saving methods and existing BMP requirements are adjusted for effectiveness. This active BMP review and adoption process has kept this list the state-of-the-art in proven water saving measures.

The CUWCC maintains a self-reporting database on the status of BMP implementation by water agency member. This information includes recorded use and results of each BMP, the money invested in each BMP, and the estimated or calculated water savings for each of those measures by water purveyor. This information is then summarized and aggregated to present a total water conservation picture for the collective membership on an annual basis. The CUWCC database can be accessed at <http://bmp.cuwcc.org>.

Not all BMPs are such that their benefits are quantifiable or measurable. For example, BMP #12 requires the water agency to designate a staff member to manage the agency’s water conservation programs (water conservation coordinator). BMPs #1, #2, #5, #6, #9, #9A, and #14 are generally considered to have measurable benefits. (BMP #9A is the installation of ultra-low-flush toilets within the Commercial, Industrial, and Institutional sectors).

Figure 4-3, data compiled by CUWCC, estimates the statewide current net annual water savings from those BMPs that can be quantified. These values have also accounted for plumbing code changes. Since the MOU only requires participation when water conservation measures are cost-effective, the resultant water savings shown in Figure 4-3 represents substantial savings that is within the economic reach.



**Figure 4-2
Best Management Practices**

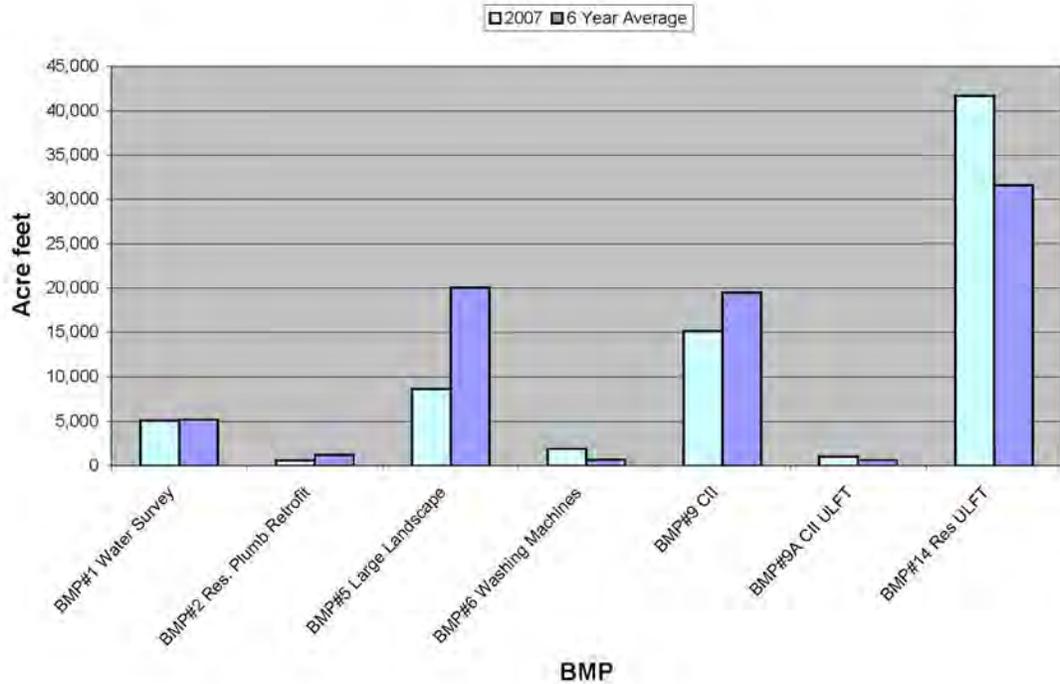
*California Urban Water Conservation Council
Annual Report Year 2005*

Table 1: Council MOU Urban Water Conservation Best Management Practices

| # | BMP | Requirements |
|----|--|---|
| 1 | Water Survey Programs for Single and Multi Family Residential Customers | Survey 15% of residential single-family and 15% of multi-family customers within 10 years. |
| 2 | Residential Plumbing Retrofit | Retrofit 50% of residential housing constructed prior to 1992 with low-flow showerheads, toilet displacement devices, toilet flappers and aerators; or achieve 75% saturation of the water agency service area and be able to prove it statistically. |
| 3 | System Water Audits, Leak Detection and Repair | Audit the water utility distribution system regularly and repair any identified leaks; check yearly to see that water loss is less than 10%. |
| 4 | Metering with Commodity Rates for All New Connections and Retrofit of Existing Connections | Install meters in 100% of existing unmetered accounts within 10 years; bill by volume of water use; assess feasibility of installing dedicated landscape meters. |
| 5 | Large Landscape Conservation Programs and Incentives | Prepare water budgets for 90% of commercial and industrial accounts with dedicated landscape meters; provide irrigation surveys to 15% of mixed-metered customers. |
| 6 | High-Efficiency Washing Machine Rebate Programs | Provide cost-effective customer incentives, such as rebates, to encourage purchase of machines that use 40% less water per load. Number of clothes washers required is based on the total dwelling units x .048; up to a third fewer machines required if all of them are super high-efficiency (6.0 or less water factor). |
| 7 | Public Information Programs | Water utilities to provide active public information programs to promote and educate customers about water conservation. |
| 8 | School Education Programs | Provide active school education programs to educate students about water conservation and efficient water uses. |
| 9 | Conservation Programs for Commercial, Industrial, and Institutional Accounts | Provide a water survey of 10% of these customers within 10 years and identify retrofitting options; OR reduce water use by an amount equal to 10% of the baseline use within 10 years. |
| 10 | Wholesale Agency Assistance Programs | Provide financial incentives to water agencies and cities to encourage implementation of water conservation programs |
| 11 | Conservation Pricing | Eliminate non-conserving pricing policies and adopt pricing structure such as uniform rates or inclining block rates, incentives to customers to reduce average or peak use, and surcharges to encourage conservation. |
| 12 | Conservation Coordinator | Designate a water agency staff member to have the responsibility to manage the water conservation programs. |
| 13 | Water Waste Prohibition | Adopt water waste ordinances to prohibit gutter flooding, single-pass cooling systems, non-recirculating systems in all new car wash and commercial laundry systems, and non-recycling decorative water fountains. |
| 14 | Residential Ultra-Low-Flush Toilet Replacement Programs | Replace older toilets for residential customers at a rate equal to that of an ordinance requiring retrofit upon resale. |

Source: California Urban Water Conservation Council

Figure 4-3
Statewide Annual Water Savings from Implementation of Selected BMPs



Source: California Urban Water Conservation Council

4.2.1.1.3 Urban Water Management Plans

In 1983, the California legislature enacted the Urban Water Management Planning Act (Water Code Sections 10610-10658). It states that every retail water supplier providing 3,000 acre-feet of water annually or supplying water to 3,000 customers or more must file a UWMP with DWR. The requirement is designed to ensure thoughtful planning for future water reliability. Water purveyors must submit an updated plan and have that plan deemed complete by DWR every five years. The statute requires quite a detailed assessment, including an analysis of Demand Management Measures (DMMs). DMMs are the **same actions** as BMPs under the CUWCC MOU. UWMP reporting under the Act is actually simplified for CUWCC members reporting their progress in implementation of BMPs.

4.2.1.1.4 Potential Water Conservation Strategies for Upper Santa Ana River

Table 4-1 summarizes the general implementation of DMMs for the water purveyors in the Upper SAR watershed, and thus, which water conservation measures are, at least at some level, being used within each agency. The data for this table have been compiled from agency UWMPs. The table does not show the magnitude of the investment or the level of effort involved in the measure.

**Table 4-1
Upper Santa Ana River Water Agencies Implementation of BMPs**

| Water Agency | 2005 UWMP | Demand Management Measure Implementation | | | | | | | | | | | | | |
|-----------------------------------|-----------|--|--------------------------------|--|-------------------------|--------------------------------------|--|----------------------------|--------------------------|-------------------------------------|--------------------------|----------------------|--------------------------------|-------------------------|--|
| | | Residential Water Surveys | Residential Plumbing Retrofits | System Water Audits Leak Detection and Repair ⁽²⁾ | Metering ⁽²⁾ | Large Landscape Conservation Program | High Efficiency Washing Machine Rebate Program | Public Information Program | School Education Program | Conservation Program ⁽³⁾ | Wholesale Agency Program | Conservation Pricing | Water Conservation Coordinator | Water Waste Prohibition | Residential Ultra-low flush Toilet Replacement |
| East Valley Water District | X | N | N | Y | Y | N | N | Y | Y | Y | N | N | N | Y | N |
| Fontana Water Company | X | Y | Y | Y | Y | Y | Y | Y | Y | Y | N | N | Y | Y | Y |
| Loma Linda, City of | 2002 UWMP | N | Y | Y | Y | N | N | Y | Y | N | N | Y | N | Y | N |
| Redlands, City of - Water Utility | X | Y | Y | Y | Y | Y | N | Y | Y | Y | N | Y | Y | Y | Y |
| Rialto, City of | X | N | Y | Y | Y | Y | N | Y | Y | Y | Y | Y | N | Y | Y |
| San Bernardino MWD | X | Y | N | Y | Y | N | N | Y | Y | N | N | N | N | Y | N |
| West Valley Water District | X | N | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Yucaipa Valley Water District | X | N | N | Y | Y | N | N | Y | N | N | N | Y | Y | Y | N |
| Riverside Public Utilities | X | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Beaumont Cherry Valley W.D. | X | N | N | Y | Y | Y | N | Y | Y | Y | N | Y | N | N | N |
| Big Bear City C.S.D. | 2000 UWMP | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| City of Big Bear Lake D.P.W. | X | Y | Y | Y | Y | Y | N | Y | Y | Y | N | Y | Y | Y | Y |
| Crestline-Lake Arrowhead W.A. | X | N | N | Y | Y | N | N | Y | Y | Y | N | Y | Y | Y | N |
| Rubidoux C.S.D. | X | Y | Y | Y | Y | Y | N | Y | Y | Y | Y | Y | Y | Y | Y |

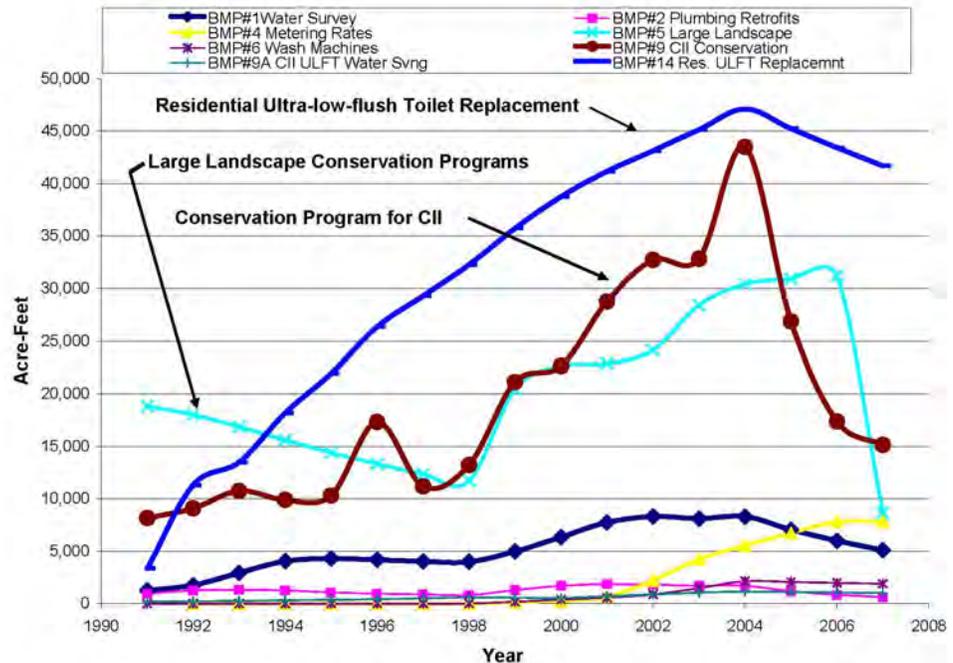
Each agency is implementing some of the measures, but some agencies are implementing most of the measures. There is potential to further enhance water savings efforts within the Upper SAR watershed communities and improve water supply reliability within the region.

Two factors are important in evaluating the feasibility of water use efficiency measures: the quantity of the potential water savings and the cost-effectiveness of the water saving measures. Both factors must be considered to determine when a particular BMP is cost-effective for implementation.

Figure 4-4 shows the annual water savings for quantifiable or measurable BMPs from 1991 through 2007 using the CUWCC data.

While the magnitude of the water savings would clearly be a function of the effort or investment in the particular BMP, the graph indicates three or four BMPs have produced some significant water over the past several years: BMP #14 – Residential Ultra-Low-Flush Toilet Replacement, BMP #9 – Conservation Programs for Commercial Industrial and Institutional Accounts, BMP #5 – Large Landscape Conservation Programs, and BMP #1 – Water Survey Programs. For areas with less aggressive water conservation efforts, further review may suggest that investment in these BMPs could have potential for significant conservation.

Figure 4-4
Annual Estimated Water Savings from BMPs



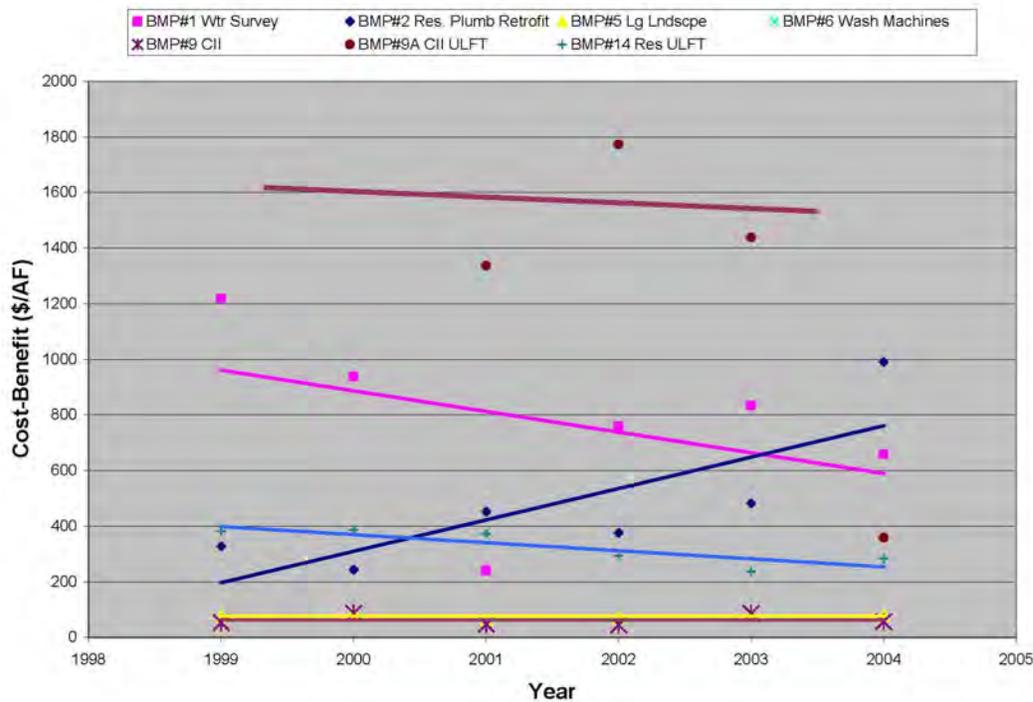
Source: California Urban Water Conservation Council



One should note that BMP #14, Ultra-Low-Flush Toilet Replacement, may be even more efficient by the recent trend during the past few years in using High-Efficiency Toilets (HETs), those that require 1.3 gallons per flush instead of 1.6 gallons. This change in technology would make the general process of toilet and/or water fixture replacement more efficient but not necessarily alter the methodology of the BMP.

To examine which water conservation measures would be most cost-effective to implement, one can compare the CUWCC data summaries on total expenditures for a particular BMP with the total estimated water savings from that BMP. Figure 4-5 shows the ratio of total dollar investment (cost) over the total annual estimated water savings for the measurable BMPs for the period 1999 through 2004.

**Figure 4-5
BMP Cost per Acre-Foot**



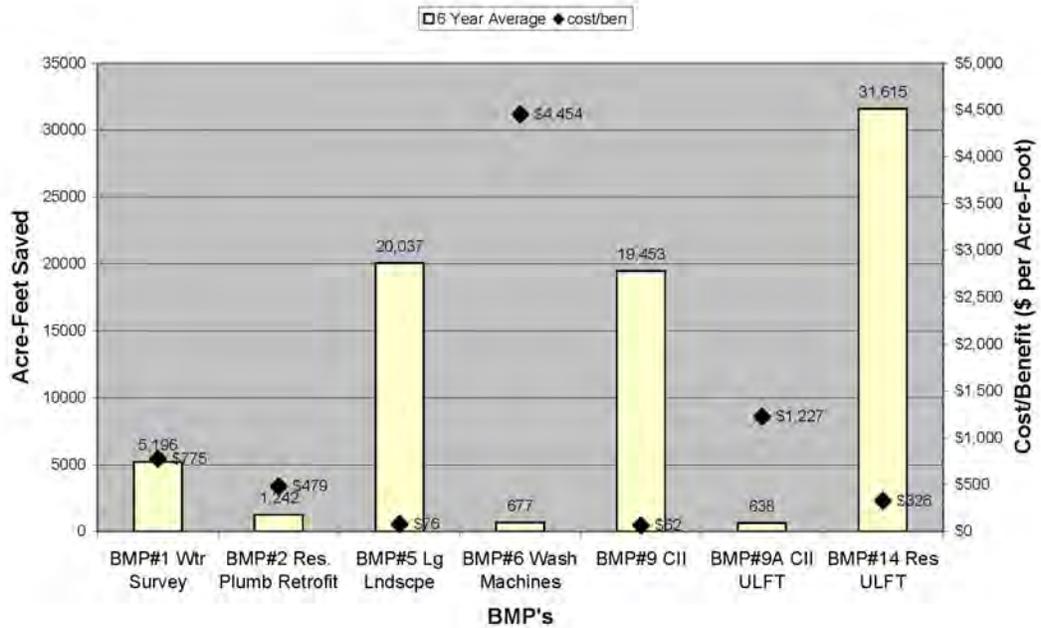
Source: California Urban Water Conservation Council

The lower lines on the graph suggest the more cost-effective water saving measures. The higher points on the graph show measures that are comparably more expensive to implement. BMPs #5 – Large Landscape Conservation Programs, #9 – Conservation Programs for Commercial, Industrial, and Institutional Accounts, #14 – Residential Ultra-Low-Flush Toilet Replacement

Program, and #2 – Residential Plumbing Retrofit, appear to be the most cost-effective measures based on the aggregated CUWCC data.

Figure 4-6 combines both quantity and cost-effectiveness (the information from Figures 4-4 and 4-5) on one graph. Clearly, the past investments in BMPs #5, #9, and #14 seem to carry the best rewards both in quantity of water and cost.

Figure 4-6
BMP Benefit and Cost/Benefit



Source: California Urban Water Conservation Council

4.2.1.1.5 Examples of Successful Water Conservation Programs

Evidence about which program would be beneficial is often best characterized by the case study experiences of other water purveyors. Water conservation programs for The Metropolitan Water District of Southern California (Metropolitan) have been reviewed to examine its current water conservation program activities.



Metropolitan Water District of Southern California – Metropolitan is a water wholesaler for a majority of the Southern California area. Metropolitan submits an annual report of its activities, including water conservation programs and accomplishments, to the State Legislature. From its February 2007 report, Metropolitan offers the following current water conservation programs:

- **High-Efficiency Toilets** – Metropolitan offers a \$165 incentive for HETs, which use even less water than Ultra-Low-Flow Toilets (ULFTs). It has provided incentives for about 14,000 HETs to date. (Related to BMP #14.)
- **High-Efficiency Clothes Washers** – Metropolitan retrofitted more than 175,000 residential clothes washers since the incentive program began in 1995. As a direct result of grant funding and an increased incentive, high-efficiency clothes washers are currently being installed at a rate of about 30,000 retrofits per year. (BMP #6.)
- **“Smart” Irrigation Controller Rebate** – This year Metropolitan also had a concerted effort to reach residential customers with water-saving technology tips. “Smart” irrigation controllers, many of which use a combination of weather and historical data to automatically adjust irrigation schedules, have been a particular focus. Nearly 5,000 residential controllers have been retrofitted since the inception of the program. (This irrigation efficiency measure relates to BMP #5.)
- **Synthetic Turf Program** – Metropolitan continues to seek turf alternatives to conventional warm season grasses through a pilot program for large landscape areas. (This also relates to BMP # 5.)
- **Commercial/Industrial/Institutional Program** – To address this niche of water saving opportunities, Metropolitan developed its current CII program, which includes two components (BMP #9):
 - **Rebates** -- fixed rebates for common fixture retrofits or installations.
 - **Process Improvements** – customized financial incentives for water-use process improvements on a pay-for-performance basis, which is typically applied to manufacturing and industrial applications.
- **California Friendly Landscape Program** encourages native and drought-resistant plants within landscapes to reduce water consumption. (BMP #5.)

4.2.1.1.6 Conclusions and Recommendations

The following conclusions and recommendations have been formulated based on the water conservation data gathered by CUWCC and other agencies' experiences.

Water Conservation projects have significant water and energy saving benefits, both in recoverable and non-recoverable water systems.

BMPs #5, #9, and #14 appear to be the most attractive to water agencies because of potential significant water saving measures and high benefit-cost ratio. Current programs of other water agencies generally support activities in BMPs #5, #9, and #14.

Other BMPs with non-measurable water savings should be considered on a case-by-case basis if they could support other tangible benefits, including a balanced water conservation approach.

Water purveyors in the Upper SAR Region should consider developing a program for evaluation and implementation of feasible water conservation strategies. Initial program steps should focus on large-scale implementation of BMPs #5, #9, and #14.

Water purveyors in Upper Santa Ana should consider obtaining a water use efficiency grant for a feasibility study of regional water conservation programs.

These conservation strategies are essential for better stewardship of our resources and would improve water supply reliability, reduce energy use and cost, and provide a means for dealing with potential climate changes.

4.2.1.1.7 Planned Water Conservation Projects in Upper Santa Ana Region

As discussed above the following BMPs may have the greatest conservation potential in the region:

- BMP #5 - Large Landscape Conservation Programs
- BMP #9 - Conservation programs for Commercial, Industrial, and Institutional
- BMP #14 - Residential Ultra-Low Flush Toilet replacement

The degree of effectiveness of the conservation programs varies by communities. It is therefore recommended that the following conservation projects be undertaken in the region to better scope the scale and size of potential conservation projects:



- **Regional Water Conservation Feasibility Study** to document the feasibility of implementation of various BMPs in the region and to develop conservation programs for implementation. It is suggested that Valley District take a lead role on this project.
- **Water Conservation Demonstration Garden** to educate and encourage citizens in low water use California Friendly landscape. This is a cooperative program between Valley District and the Water Resources Institute - California State University, San Bernardino (WRI-CSUSB).
- **Smart Irrigation Controller Program** currently being developed by Valley District.
- **Model institutional water conservation makeover** to demonstrate water conservation in various institutions in the region. This is a cooperative program between Valley District and the WRI-CSUSB.

4.2.1.2 Water Recycling Strategies and Projects

Water recycling projects improve water supply reliability and can contribute to improvement of water quality of the streams. To the extent that treated wastewater from the water treatment facilities in the Upper SAR watershed is currently released to the SAR and used by downstream water users, water recycling may not add to the overall water supplies of the SAR watershed. Tangible local water supply reliability and water quality benefits could be realized, however, through implementation of water recycling strategies. These benefits include the following:

- Recycled water is available throughout the year and is independent of hydrologic cycles. Improved water supply reliability will be achieved at the local level by the agency that is implementing the project by substituting potable water used for non-potable purposes with recycled water.
- Water recycling reduces the release of treated wastewater (and generally warmer water) to the streams and therefore reduces the nutrient load of the receiving water. This contributes to improvement of water quality and water temperature in the stream.
- Depending on the purveyor's source water, water recycling may reduce energy use for conveyance (i.e., conveyance of SWP or Colorado River water) and water treatment. This may also reduce the water delivery system's cost to the customers.

Costs associated with water recycling include additional treatment and separate conveyance and distribution systems. Water purveyors generally conduct a feasibility study to evaluate the costs and benefits of water recycling projects prior to commitment of funding and design of the facilities for water recycling projects.

A number of water purveyors in the Upper SAR watershed are planning to expand or construct new water recycling facilities. Summaries of the planning efforts for water recycling programs are presented below.

4.2.1.2.1 Beaumont-Cherry Valley Water District

The City of Beaumont treats all its wastewater to meet Title 22 regulations for recycled use. As of 2005, about two million gallons per day (mgd) (all flows) were discharged to Cooper Creek, which is a tributary to San Timoteo Creek. In partnership with the Beaumont-Cherry Valley Water District (BCVWD), Beaumont is upgrading its wastewater treatment plant (WWTP) capacity to four mgd and installing a recycled water pumping station and recycled water



pipelines. Also as of 2005, about 18 to 20 miles of recycled water pipeline were “in the ground.” These lines serve irrigation systems in parks and common areas in Pardee Sundance, Three Rings Ranch, Oak Valley Greens, Pardee Tournament Hills, and elsewhere. Pipelines also extend to the Oak Valley and the two PGA West golf courses. The district is in a unique position, as there is more demand for recycled water than available supply.

BCVWD intends to serve recycled water, to the extent possible, for non-potable uses and as permitted by law. This would make potable water, now used for irrigation, available for new development. As new development occurs, the new projects would include appropriate piping systems to permit the use of recycled water for irrigation of street medians, greenbelts, schools, parks, and common areas. In the future, the recycled water system could be expanded to irrigate cherry and other fruit orchards. This concept then envisions limiting the use of quality potable water to potable water purposes to the extent practical. Surplus recycled water will be available during certain times of the year when normal irrigation demands are reduced. During these times, the surplus will be piped to spreading basins for surface spreading of recycled water for groundwater recharge.

4.2.1.2.2 City of Big Bear Lake Department of Water and Power and Big Bear Community Services District

Currently, neither City of Big Bear Lake Department of Water and Power (BBLDWP) nor Big Bear Community Services District (BBCSD) use recycled water within their service areas; however, this is slated to change. In 2004 and 2005, the Big Bear Area Regional Wastewater Agency (BBARWA), working along with BBLDWP and BBCSD, cooperated in the preparation of a Draft Recycled Water Master Plan for the Big Bear Valley. The Master Plan, whose implementation will result in benefits to all three agencies, includes reduction of the valley’s dependence on limited groundwater supplies, extension of available water resources, and provision of valuable economic and environmental benefits to the valley’s communities.

The objective of the Recycled Water Master Plan is to investigate the feasibility of using recycled water throughout Big Bear Valley. It provides a comprehensive planning document that outlines a phased road map for incremental implementation of facilities to achieve the listed benefits. The recycled water supply implementation is divided into four improvement phases at the WWTP, each phase in 500 acre-foot increments. The plan has identified numerous opportunities for recycled water use, with emphasis placed on groundwater recharge. It is anticipated that this plan will be implemented such that completion of the first phase and deliveries of recycled water will occur in 2011.

4.2.1.2.3 Fontana Water Company

Currently, Fontana Water Company (FWC) is working cooperatively with the City of Fontana for FWC to design and construct the first phase of a recycled water program. Once recycled water becomes available and the necessary infrastructure is constructed, FWC will be the purveyor of recycled water to those customers within its service area who can make use of such water. In the first phase of the recycled water program, FWC will provide approximately 1,700 acre-feet of recycled water to schools, parks, commercial customers, and Community Facilities Districts' landscape irrigation locations in the southern portion of the City of Fontana within FWC's service area. Ultimate build-out in FWC's service area will enable FWC to provide approximately 5,000 acre-feet of recycled water. FWC supports the use of recycled water where its use is appropriate and where recycled water is available.

Recycled water will be supplied by the Inland Empire Utilities Agency's (IEUA) RP-4 regional WWTP. This plant produces disinfected and filtered tertiary-treated recycled water suitable for outdoor irrigation, industrial uses, and groundwater recharge. RP-4 has a current capacity of 7 mgd and is being expanded to 14 mgd (scheduled for completion in mid-2007). Not all of the plant's production will be available for purchase by FWC because other users are also served by the WWTP.

4.2.1.2.4 City of Redlands Municipal Utilities Department

Beginning in 2005, most effluent from the City of Redland's WWTP has met Title 22 standards for recycled water. In 2005, approximately 60 percent of the recycled water was used for industrial purposes, with the remainder used for groundwater recharge. The City of Redlands requires some new commercial development to provide dual plumbing for irrigation systems and to accommodate the use of recycled water as it becomes available. Through the use of financial incentives, the city expects industrial recycled water use to reach 6000 acre-feet per year by 2010.

4.2.1.2.5 City of Rialto and West Valley Water District

The City of Rialto is investigating the expansion of its existing tertiary treatment plant and reclaimed water system as a way to supplement the city's water supply. The existing tertiary treatment plant wastewater flows are approximately 7.5 mgd (9,000 acre-feet per year). The city currently discharges the majority of its flows to the SAR, but is under no obligation to continue this practice.

The City of Rialto has constructed a hydropneumatic booster station and approximately 7,000 feet of 10-inch-diameter transmission water line to provide the California Department of Transportation (Caltrans) with recycled water for 42,000 feet of landscape irrigation for Interstate-10. Caltrans has been using 1.0



mgd of recycled water during the summer months and 0.5 mgd during the winter for an annual total of 850 acre-feet. Currently, there are no other users of the recycled water.

Rialto recently prepared a Wastewater Master Plan that investigated recycled water systems as a way to supplement the city's water supply and reduce the need to purchase water. The plan analyzed the feasibility of converting a currently unused water main that extends several miles up Riverside Avenue and identified potential landscape irrigation customers (San Bernardino Park, Convalescent Hospital, the Senior Center, a baseball field, and a recreation center). A Proposition 50 grant funded the construction of recycled water lines that tie into the unused water main. The city is also investigating the use of package plants in the north end of the city and has identified potential users of recycled water that could result in approximately 2,250 acre-feet of annual demand.

All of the wastewater collection and treatment within the West Valley Water District (West Valley) is handled by the City of Rialto. West Valley utilizes non-potable raw SWP water and decanted backwash water from the Oliver P. Roemer Water Filtration Facility to supply the El Rancho Verde Golf Course. Records show that the golf course consumed 1,357 acre-feet in 2003. West Valley identified other additional potential users of recycled water that could result in approximately 3,700 acre-feet of annual demand. Most of these new users are currently supplied with potable water.

4.2.1.2.6 City of Riverside

The City of Riverside Public Works Department operates and maintains the Riverside Regional Water Quality Control Plant (RRWQCP). The daily average wastewater inflow to the RRWQCP is 33 mgd. The plant capacity is 40 mgd, with the ultimate planned capacity of 60 mgd. The service area of the RRWQCP extends beyond the Riverside Public Utilities (RPU) service area to include the areas served by Jurupa, Rubidoux, and Edgemont Community Services District. Tertiary-treated effluent (recycled water) is discharged into the SAR and the Hidden Valley Wetlands (the wetlands provide additional nitrogen removal.) RRWQCP is required to discharge 15,250 acre-feet per year, adjusted for quality, to meet downstream obligations to Orange County Water District (OCWD). Some recycled water is used for landscape irrigation and commercial purposes.

RPU petitioned the State Water Resources Control Board (SWRCB) for a wastewater change to reduce permitted discharge to the SAR by 11,000 acre-feet per year in connection with the citywide recycled water program. The envisaged recycled water program includes landscape irrigation, agriculture irrigation, and other commercial and industrial purposes. Under its proposed Recycled Agricultural Water Program, RPU would design and construct a distribution

system to serve existing agricultural operations, wholesale users, and other agencies.

4.2.1.2.7 San Bernardino Municipal Water Department

The San Bernardino Municipal Water Department (SBMWD) operates the San Bernardino Water Reclamation Plant serving the cities of San Bernardino, Highland, and Loma Linda, property that was formerly Norton Air Force Base, East Valley, Patton State Hospital, and portions of the unincorporated areas of San Bernardino County. All the wastewater at the San Bernardino Water Reclamation Plant is treated to the secondary level. The secondary-treated effluent is sent to the Rapid Infiltration Extraction (RIX) Facility and treated to tertiary levels, then released into the SAR. In mid-2006, the San Bernardino Water Reclamation Plant re-activated its tertiary treatment facility and diverts approximately 0.75 mgd or 840 acre-feet per year of water from the influent stream to RIX for treatment to Title 22 standards for landscaping applications at the City of San Bernardino Municipal Golf Course and Caltrans located adjacent to Interstate 215. SBMWD estimates that in the future the reclamation plant's service area will be able to potentially recycle an additional 2.25 mgd or 2,519 acre-feet per year of water for use within its service area (SBMWD 2005). Valley District and SBMWD are initiating a master plan study to evaluate the treatment of more secondary effluent at the existing water reclamation plant, reducing flows to the RIX. For additional planned recycling by San Bernardino, see the RIX Facility section below.

4.2.1.2.8 Yucaipa Valley Water District

Yucaipa Valley Water District (YVWD) treats recycled water meeting Title 22 requirements through its Henry N. Wochholz Wastewater Treatment Facility. The facility has a rated capacity of 4.5 mgd and is undergoing an expansion and upgrade to a capacity of 6.7 mgd. Currently, treated effluent is conveyed through a land outfall and discharged to San Timoteo Creek. Three customers along the existing land outfall are receiving recycled water for irrigation purposes. Dual plumbing is being installed in new developments. Delivery amounts are expected to grow to about 6,700 acre-feet by 2020 or about 24 percent of total agency water demands. Ultimately, YVWD expects to deliver about 8,000 acre-feet per year of recycled water (YVWD 2005).

In addition, a new water reclamation plant (WRP) is planned to serve the Oak Valley development. This WRP will provide both wastewater treatment and a source of recycled water for the Oak Valley area. The Yucaipa Wastewater Master Plan identifies the capacity of the new WRP at 4 mgd required to serve the needs of Oak Valley and other areas of the district from where wastewater could flow by gravity to the new WRP. Based on the projected capacities



contained in the Yucaipa Wastewater Master Plan for both treatment plants, there are approximately 11 mgd of wastewater available for recycling (YVWD 2005).

4.2.1.2.9 Rapid-Infiltration Extraction Facility

The RIX facility treats secondary-treated wastewater from the Colton and San Bernardino plants. The RIX facility treats the wastewater to tertiary levels for release into the SAR. The RIX facility was designed as a 40-mgd plant, but as of 2005, operates at 27 mgd. The RIX facility releases 16,000 acre-feet per year in agreement with Valley District to meet the downstream obligations to Orange County. In 2003, SBMWD released a Programmatic Environmental Impact Report evaluating the sale of up to 18,000 acre-feet per year of excess effluent to potential buyers downstream. SBMWD has previously determined that the use of recycled water from the RIX facility to offset water demands within its service area is not feasible at this time. The RIX facility is located at an elevation and distance from SBMWD's service area that makes it economically impractical to utilize recycled water (SBMWD 2005). This could change if the water is not sent to the RIX facility.

Table 4-2 summarizes the proposed water recycling projects of the region.

**Table 4-2
Upper Santa Ana River Water Agencies Recycling Water Programs**

| Water Agency | Recycling Plant | Recycled Water Production Capacity | Description |
|--|--|---|---|
| Beaumont Cherry Valley WD | City of Beaumont WWTP | 2 MGD | Current expansion will upgrade production to 4 mgd. |
| City of Big Bear Lake DWP & Big Bear City CSD | Big Bear Area Regional Wastewater Agency Plant | 1.63 MGD | Future construction plans aim to produce 500AFY by 2011, and 1000AFY by 2015. |
| Fontana Water Company | IEUA Regional treatment Plant 4 | 7 MGD | FWC needs additional infrastructure to deliver recycled water in its service area. |
| City of Redlands Municipal Utilities Department | City of Redlands WWTP | 6 MGD | Recycled water used for basin recharge and industrial purposes. |
| Rialto, City of & West Valley WD | City of Rialto Water Treatment Plant | 12.0 MGD | Recycled water used for landscape irrigation on the I-10. City plans to expand use of recycled water. |
| Riverside Public Utilities | Riverside Regional Water Quality Control Plant | 40 MGD | Applied for a change in permit to recycle up to 41,400 ac-ft/yr. |
| San Bernardino MWD | San Bernardino Water Reclamation Plant | 0.75 MGD | Construction of a tertiary plant at the existing San Bernardino Water Reclamation Plant to recycle water for landscape irrigation. |
| Yucaipa Valley Water District | Henry N. Wochholz WWTP | 6.7 MGD | New plant at Oak Valley will increase total recycled water availability to 12,000 ac-ft/yr. |
| San Bernardino MWD, City of Colton, City of Loma Linda, County of San Bernardino, and East Valley Water District | Rapid Infiltration and Extraction | 40 MGD | All the water from the RIX is currently released into the Santa Ana River. The City of San Bernardino is exploring selling part of its portion of the recycled water. |

4.2.1.3 Groundwater Management Strategies and Projects

Improving groundwater management will significantly contribute to the sustainability of water resources in the region. The IRWM Plan is intended to provide strategies to improve management of the groundwater resources of the Upper SAR watershed. Management of groundwater resources includes conjunctive use of surface water and groundwater resources as well as management of groundwater levels and water quality. Three BMOs have been considered for management of groundwater basins as described below.

Maximize Conjunctive Use and Increase Ability to Collect and Recharge Storm and Flood Water

Integration of flood and stormwater management strategies with recharge and conjunctive use opportunities contributes to water supply reliability in the region. The San Bernardino Valley area has been significantly urbanized over the past several decades and the area continues to grow with numerous in-fill development projects. As the amount of impervious surface increases with urbanization, the runoff, and, therefore, storm and flood flows are also increasing. Without adequate flood control systems to capture and contain these surface waters for recharge, the opportunities for water supply, water quality, and environmental improvement are greatly lessened or lost. Therefore, formulating strategies to capture storm runoff and use it for recharge of the groundwater basins will provide both flood management and water supply benefits to the region.

Some of the water-related judgments and agreements in the region, including the Western Judgment (Western Municipal Water District of Riverside County v. East San Bernardino County Water District, Case No. 78426), Orange County Judgment (April 17, 1969 Orange County Superior Court Judgment), and the Rialto Decree focus on ensuring the reliability of the water supply by controlling and carefully monitoring annual groundwater extractions. If a certain “threshold” is exceeded, some of these judgments and agreements require that the groundwater basin(s) be recharged from an “outside” source such as the SWP. A key to increasing future water supply reliability will be to increase conjunctive management of the surface water and groundwater resources of the region.

Reduce the Risk of Liquefaction

The most significant considerations in groundwater management in the SBBA are reducing the risk of liquefaction in the Pressure Zone due to high groundwater levels and avoiding impacts to and from the various groundwater contaminant plumes. Those two considerations are recognized as BMOs for the basin. All management strategies must satisfy these two constraints.

A significant portion of the SBBA—generally, the downtown and southern portions of the City of San Bernardino—is an area of historically high groundwater. This high groundwater combined with the thick layer of sand in the aquifer may create a risk of liquefaction in an earthquake. Liquefaction occurs only during an earthquake in areas of water-saturated, sandy soil. Given the large extent of sandy soils under the City of San Bernardino, the most practical way to reduce this risk is to reduce groundwater levels through basin management. Many of the facilities in the San Bernardino Valley Municipal Water District’s (Valley District) Master Plan (CDM 1995) and some of the Santa Ana watershed Project Authority (SAWPA) proposed facilities are intended to assist in managing groundwater levels in this liquefaction-susceptible area. Due to the public safety threats associated with liquefaction, reducing the risk of liquefaction has been recognized within the BMOs for the SBBA. The objective of managing groundwater levels to reduce the risk of liquefaction is consistent with the Groundwater Management Planning Act and the California Water Code requirement that BMOs should be developed to manage water levels in the basin.



The Cuttle Weir is a concrete and rock diversion structure owned by the San Bernardino Valley Water Conservation District and is used to divert water from the Santa Ana River to the Conservation District’s Santa Ana River Spreading Grounds for artificial recharge of the SBBA. The Seven Oaks Dam can be seen in the background. The good quality Santa Ana River water is used to recharge SBBA, hence improving water supply reliability and improving SBBA groundwater quality.

To meet this objective, strategies were identified and evaluated during the planning process. Most of these strategies serve multiple objectives and contribute to groundwater management, water quality objectives, and water supply reliability for the region. The region generally relies on local surface water, groundwater, recycled water, and the SWP for its water supplies.

Groundwater basins, in general, and the SBBA, in particular, are the primary sources of water supply for most of the water purveyors in the region. It is noteworthy to mention that the local agencies in the region have limited surface storage facilities for carryover storage and they rely on groundwater storage for seasonal as well as year-to-year water storage and regulation. Therefore, management of surface water, groundwater, groundwater quality improvement, and imported water are intrinsically interrelated and interconnected. It was recognized early in the planning process that water supply reliability, groundwater management, and the water quality objectives



of the plan can be met by performing a comprehensive evaluation and developing conjunctive water management.

Protect Groundwater Quality

The goal of this BMO is to protect the quality of the region's groundwater resources. Groundwater management is currently influenced by the presence of contamination plumes. Most of these plumes resulted from historic military and industrial operations in the region. The following plumes have been identified:

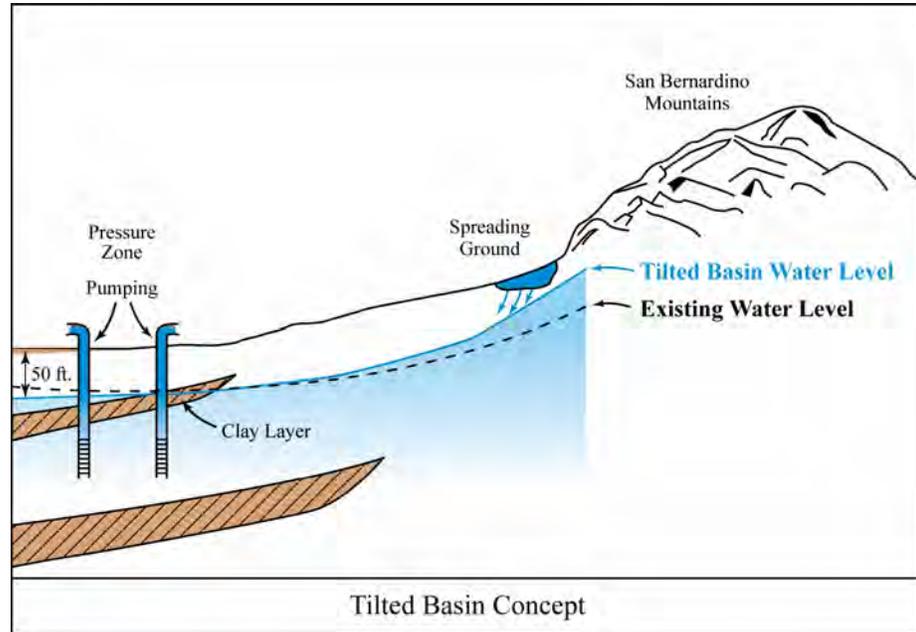
1. Newmark-Muscoy Superfund (trichloroethylene [TCE])
2. Redlands-Crafton (TCE, Perchlorate)
3. Santa Fe Plume (TCE)
4. Former Norton Air Force Base (TCE)
5. Rialto-Colton Subbasin (PCE, TCE, 1,1-DCE, cis-1,2-DCE, perchlorate)
6. No-Mans Land (PCE)

Management strategies are developed to not only avoid any adverse impacts that would cause these plumes to spread further but also to develop projects that will accelerate the cleanup of these plumes. These strategies are evaluated using computer models. Avoiding any impacts to and from the plumes, and their removal when possible, is considered a BMO for the region. This BMO is also consistent with the Groundwater Management Planning Act requiring BMOs to be formulated to address groundwater quality issues of the basin.

4.2.1.3.1 Groundwater Management Strategies

The region currently relies primarily on groundwater to meet its water needs and will continue to do so in the future. The SBBA is by far the largest source of groundwater for the region. When the basin is too full, high groundwater conditions occur in the Pressure Zone. The high groundwater levels are a concern because they increase the risk of liquefaction. High groundwater conditions also limit opportunities for recharge and/or groundwater banking in the basin. A "tilted basin" concept (see Figure 4-7) was suggested by some of the water leaders in the region as a way to maximize groundwater banking and manage the water levels in the SBBA.

**Figure 4-7
Tilted Basin**



Management of groundwater levels under the tilted basin concept consists of recharging the basin at the “rim spreading grounds” and shifting the pumping, to the degree possible, to the Pressure Zone. The rim spreading grounds are located at the base of the San Bernardino Mountains and have high permeability soil. The “travel time” for the water to move from the rim recharge basins to the Pressure Zone is long enough to allow for seasonal regulations as well as conjunctive management of the basin. Under the tilted basin concept, groundwater levels could be generally higher in areas outside the Pressure Zone, while the water levels may be lower within the Pressure Zone. Considerable technical activities were undertaken during the planning process to:

- Develop analytic tools for basin management such as groundwater and surface water models. These models are discussed in Appendix C.
- Assess “baseline” conditions.
- Develop operational strategies for management of the groundwater basins, including groundwater levels and quality considerations.
- Develop groundwater production and artificial recharge strategies.
- Develop a process for management of the SBBA. This process is discussed in detail in this chapter.



- Develop a groundwater monitoring plan for collection, storage, and use of groundwater level and quality data, as well as assessment of the groundwater management strategies and their impacts on groundwater levels.

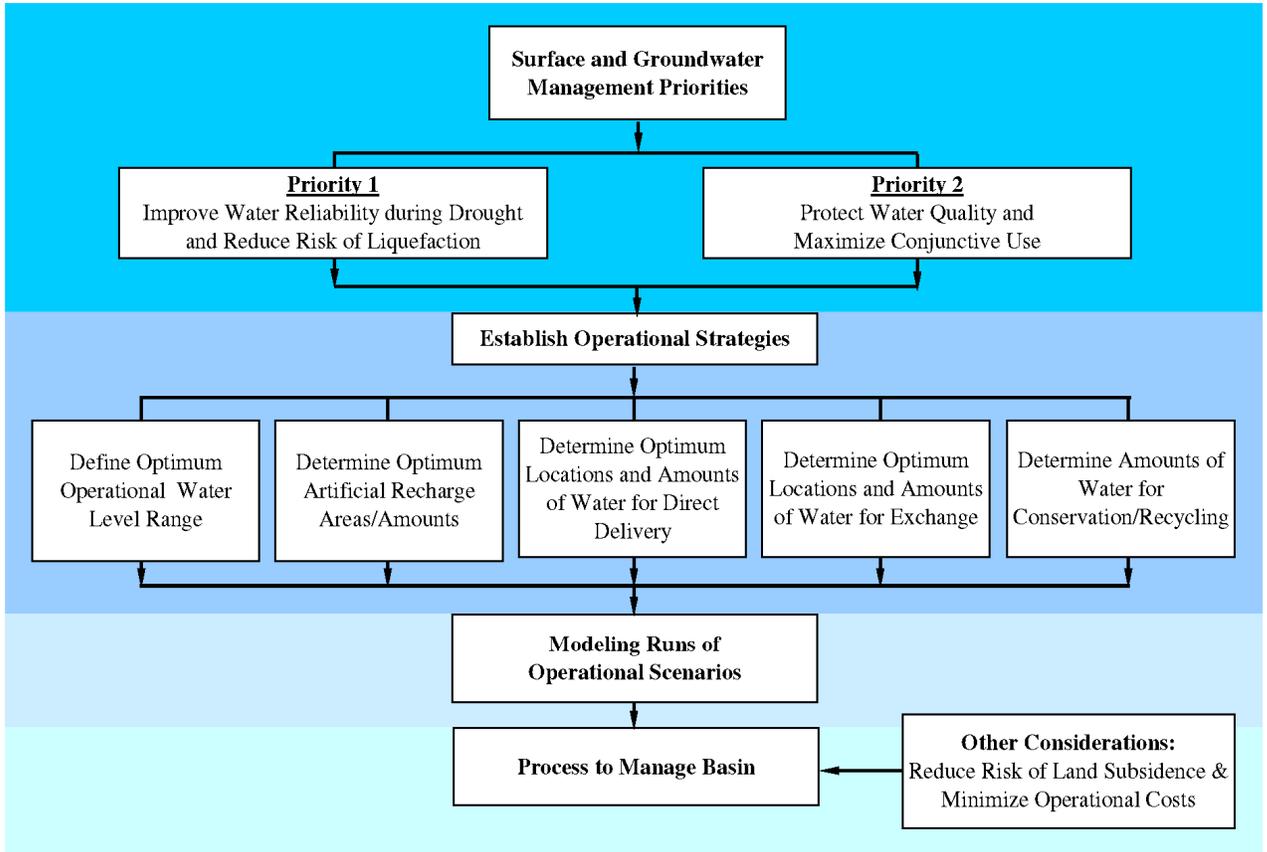
As stated earlier, management of the groundwater levels to reduce the risk of liquefaction and protect groundwater quality are key BMOs. Figure 4-8 shows operation strategies for managing groundwater resources of the SBBA. As shown, operational strategies are established during the planning process to ensure established BMOs (listed as Priority 1 and Priority 2) are met and that planned projects and programs are consistent with the goals of the BMOs and will contribute to attainment of the objectives. Considerable resources were used to develop tools for understanding and management of this basin. A groundwater model has been developed and further refined to simulate the behavior of the aquifers under different operational scenarios. A detailed discussion of groundwater modeling efforts is presented in Appendix C.

The key model outputs include groundwater levels and resulting groundwater directions. The model is used to design appropriate levels of groundwater conjunctive management strategies while meeting stated BMOs. The model runs were to identify the range (“book-ends”) and provide information such as the following:

- Suitable places for managed groundwater recharge;
- Amount of water to be recharged in each managed recharge area;
- Key groundwater monitoring locations;
- Groundwater pumping, including location and number of the production wells; and
- Programs and projects to facilitate pumping, treatment, and the use of contaminated groundwater.

Development of the water management strategies and associated projects to meet the BMOs requires a clear understanding of the SBBA hydrogeology and groundwater flows and directions under various operational scenarios. Groundwater modeling studies are performed and water level contours are prepared for operation of the basin assuming a range of conjunctive use operations. Operations of existing and future recharge facilities and production wells can be further refined through these modeling studies. Using modeling study results, additional facilities are formulated to implement the conjunctive use strategies.

**Figure 4-8
Developing Groundwater Management Operational Strategies**



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Two specific BMOs mentioned earlier must be met as the IRWM Plan is being implemented. These BMOs are specifically designed for management of the water level and water quality in the Bunker Hill and Lytle Creek Basins.

To achieve the objective of reducing the risk of liquefaction, the groundwater level(s) in the Pressure Zone would be reasonably managed to maintain at least 50 feet below ground surface (bgs). This objective will be implemented through optimization of groundwater recharge and groundwater production activities and monitoring of key “index wells” throughout the year. Implementation strategies may include increasing production in the Pressure Zone and reducing recharge in the areas that may contribute to the speedy rise of the water level in the Pressure Zone.



4.2.1.3.2 *Groundwater Quality Protection Strategies*

A key water quality objective in the Bunker Hill Basin is minimizing adverse impacts from and to groundwater contaminant plumes. The IRWM Plan recommends specific strategies that would facilitate and expedite clean up while meeting the above water quality objective. These strategies consist of (1) formulating and implementing a program to increase groundwater pumping and cleanup in the plume areas, and (2) designing conjunctive use strategies that ensure avoidance of impacts to and from the contaminant plumes.

Bunker Hill Basin Regional Water Supply Program

In the mid-1990s, Valley District completed a Regional Water Facilities Master Plan for its service area that identified a regional transmission system to deliver high groundwater from the Bunker Hill Basin Pressure Zone to the surrounding communities. Since then, Valley District has constructed some of these facilities. Facilities within the City of San Bernardino have been incorporated into the SBMWD's Lower Zone distribution system. The SBMWD may then operate Valley District's facilities as a part of the city's Lower Zone.

The proposed Bunker Hill Regional Water Supply Program consists of design and construction of facilities for regional production, treatment, and distribution of treated water in the basin. Groundwater from the Newmark plume would be conveyed to treatment facilities and distributed to interested agencies within and outside the Valley District's service area. This program will provide water supply reliability by accelerating the cleanup of groundwater plumes, and improve the management of the groundwater levels in the Pressure Zone.

Facilities needed to implement this program include:

- Groundwater production wells and collection system;
- Regional wellhead treatment facilities; and
- Potable water storage, transmission, and pumping facilities.

Additional detailed discussion of this program and associated facilities can be found in Appendix E.

4.2.1.3.3 *Conjunctive Use Strategies*

As mentioned previously, the design of conjunctive use programs should ensure avoidance of impacts to and from the contaminant plumes and minimize the increased risk of liquefaction. With this criterion and the "tilted basin" concept in mind, four conjunctive use scenarios have been evaluated for this plan. The first scenario is the base level conjunctive use. The baseline level conjunctive

use is intended to demonstrate how conjunctive management of the region’s surface and groundwater resources (groundwater, local, and imported surface water supplies) will help the region meet its water demand through 2030. The next three scenarios are designed to examine the response of the basin when an additional 40 thousand acre-feet (TAF), 90 TAF, and 140 TAF conjunctive use programs are implemented. The intent of these studies is to characterize the book-ends for water banking in the SBBA under the “tilted basin” concept. The model runs were prepared with consideration of the following:

- Hydrologic base period is from 1962 through 2000.
- Basin storage must be maintained to comply with existing adjudications, i.e., no long-term storage depletion—basin storage at the end of the modeling run period would be “equivalent” to the storage at the start of the modeling period.
- Water levels within the Pressure Zone would be within acceptable ranges.
- Water levels outside the Pressure Zone may be higher.
- Avoiding impacts to and from known groundwater contaminant plumes.

Conjunctive use operation of the SBBA should also comply with numerous other agreements and MOUs. Compliance with these documents will be verified during real-time operation of the SBBA and are discussed in more detail in Section 4.2.1.3.5.

Modeling studies were conducted for the four scenarios and are described below. A summary of the assumptions of the four modeling studies is presented in Figure 4-9.

The groundwater model developed as part of this planning effort does not include the terms and conditions set forth in the Seven Oaks Accord and the Riverside Agreement. The modeling runs developed for the IRWM Plan provide valuable information, however, on how to manage the groundwater basins within the framework of all existing legal constraints. Future proposed conjunctive use projects will be analyzed using a groundwater model to ensure their compliance with the terms and conditions of the various legal agreements in the basin.

Baseline Scenario – The baseline scenario assumes compliance with the existing adjudication constraints and includes the diversion rights of Senior Water Right Claimants, Valley District’s Replenishment Obligations, and SBVWCD. Future water demand within

**Figure 4-9
Groundwater Modeling Assumptions**

| Scenario | Hydrologic Base Period | Model Assumptions | | | | | | | |
|------------|---------------------------|----------------------------------|---|-------------------------------|---|---|--------------------------|-------------------|--------------------|
| | | Groundwater Pumping ¹ | Valley District's Replenishment Obligation ² | SBVWCD Diversion ³ | Diversion by Senior Water Rights Claimants ⁴ | SAR Water Right Applications ⁵ | Maximum Additional Yield | | |
| | | | | | | | 40,000 acre-ft/yr | 90,000 acre-ft/yr | 140,000 acre-ft/yr |
| Baseline 1 | 1962-2000 (wet, avg, dry) | x | x | x | x | x | | | |
| A | | x | x | x | x | x | x | | |
| B | | x | x | x | x | x | | x | |
| C | | x | x | x | x | x | | | x |

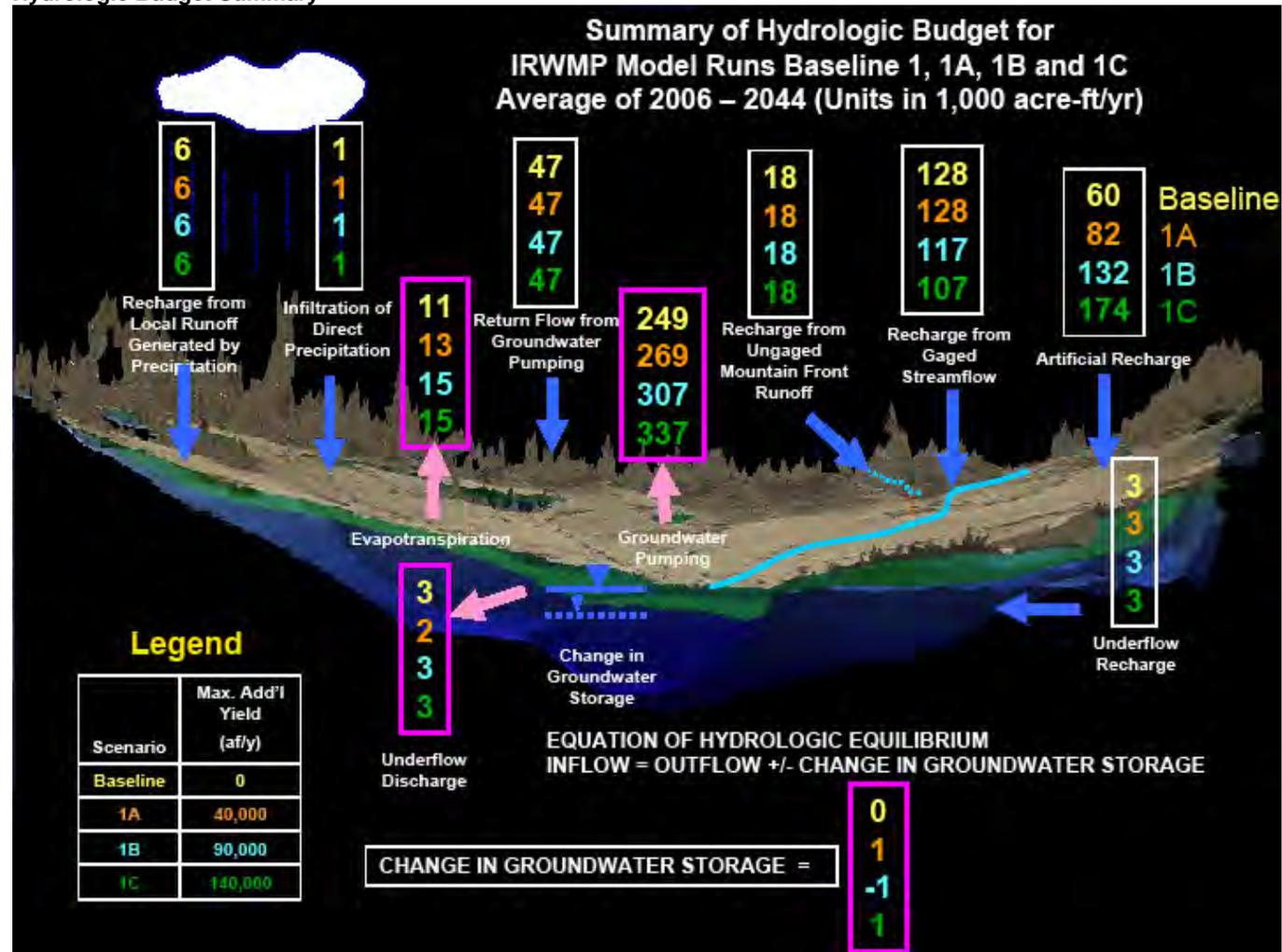
1 Based on 2005 Urban Water Management Plans pumping data
 2 Replenishment obligation is based on Western Judgment and is safe yield minus annual production
 3 SBVWCD diversions are based on Valley District/SBVWCD settlement agreement
 4 Limited to 88 cfs, see Seven Oaks Accord
 5 Assumes SAR water rights applications are approved by SWRCB

the region is estimated using data presented in UWMPs prepared by the water purveyors as presented in Chapter 3. To meet the water demand, it is assumed that Valley District will use newly conserved SAR water, as is defined in water right applications, and its SWP Table A allotment, as available, for recharge and direct delivery to the treatment plants.

The modeling studies have been conducted to document the performance of the basin when local surface water and SWP supplies are used to replenish the basin by Valley District as required by the adjudication. Modeling studies are designed to cover a 39-year period (1962-2000), which includes the wet years such as 1969 and 1980 and the driest period of 1987 through 1992. This modeling scenario is intended to show how the base conjunctive use project can be used to meet future water needs of the region. This scenario was used in preparation of the water budget (Chapter 3).

The results of the base scenario suggest that the region can meet its water needs through 2030, while achieving the BMOs. The results also indicate that the available surface water for recharge and the SWP supplies, assuming a 77 percent allocation, are adequate to offset the pumping demand on SBBA, and that at the end of the 39-year modeling run the basin storage is the same as the beginning of the period (see Figures 4-9 and 4-10). The IRWM Plan consulting team has evaluated any potential impact of conjunctive use operation upstream of the SBBA (U.S. Forest Service (USFS) land) to ensure the operation will not impact the groundwater level and associated ecosystem of the USFS land. Facilities needed to implement the base conjunctive use scenario include those that are necessary to bring SAR water to the treatment facilities and spreading grounds and are discussed in the Local Surface Water Management section.

Figure 4-10
Hydrologic Budget Summary



Scenario A – This scenario is intended to show the performance of a project with potential 40 TAF additional conjunctive use per year. The level of conjunctive use presented with this scenario is intended to evaluate the feasibility of a 40 TAF conjunctive use project. The other modeling run assumptions used for this scenario were similar to the base scenario.

The modeling studies indicate that this level of conjunctive use operation is feasible and the stated BMOs are also met. The facilities needed to implement this level of conjunctive use include:

- A well field consisting of 20 production wells and connecting pipeline,
- Treatment facilities,
- Pipeline to connect the well field to the treatment and distribution facilities, and
- Improvement in existing groundwater managed recharge basins.

Scenario B – This scenario is for an additional 50 TAF per year conjunctive use opportunity (for a total of 90 TAF per year over the Base Scenario). Additional facilities needed to implement this level of conjunctive use include:

- A well field consisting of 30 additional production wells (50 total),
- Treatment facilities for production wells pumping from the plumes, and
- Conveyance facilities.

Scenario C – This scenario is for an additional 50 TAF per year of conjunctive management over Scenario B for the total conjunctive use of 140 TAF per year. Additional facilities needed to implement this incremental level of conjunctive use include:

- A well field consisting of 30 additional production wells (80 total),
- Treatment facilities for production wells pumping from the plumes,
- Conveyance facilities, and
- Additional spreading grounds.

4.2.1.3.4 Yield of Conjunctive Use Strategies

The yield of conjunctive use strategies listed above is calculated using the groundwater model based on water demands for the basin. Model runs A, B, and



C represent the conjunctive use scenarios discussed in the previous section. Table 4-3 below shows the yield of three conjunctive use scenarios for a single drought year and a three-year drought period (1990 year type is used for Upper SAR watershed as the driest single year and 1988 to 1990 is used as the three-year drought period).

**Table 4-3
Summary of Potential Additional Yield for the SBBA**

| Terms | Period | Baseline Run [acre-ft] | Run A [acre-ft] | Run B [acre-ft] | Run C [acre-ft] |
|----------------------------------|--------------------------------------|------------------------|-----------------|-----------------|-----------------|
| Groundwater Pumping | 2032 | 271,987 | 301,987 | 381,987 | 421,987 |
| | 2033 | 277,330 | 307,330 | 367,330 | 387,330 |
| | 2034 | 289,105 | 329,105 | 409,105 | 449,105 |
| | Total | 838,422 | 938,422 | 1,158,422 | 1,258,422 |
| Conjunctive use Additional Yield | Single Year Drought 2034 (1990) | N/A | 40,000 | 120,000 | 160,000 |
| | 3-Year Drought 2032-2034 (1088-1990) | N/A | 100,000 | 320,000 | 420,000 |

Single-year drought 2034 (hydrologic year 1990)

Three-year drought 2032-2034 (hydrologic years 1988-1990)

As shown in the above table, for the single drought year, the additional yield for the conjunctive use would be 40,000 acre-feet, 120,000 acre-feet, and 160,000 acre-feet for Model Runs A, B, and C, respectively. The yield during a three-year drought would be 100,000 acre-feet (or 33 TAF per year), 320,000 acre-feet (or 106 TAF per year), and 420,000 acre-feet (or 140 TAF per year) for Model Runs A, B, and C, respectively.

Specific facilities needed to implement the conjunctive use program discussed above are summarized in Table 4-4.

**Table 4-4
Facilities Needed to Implement Various Conjunctive Use Program Scenarios**

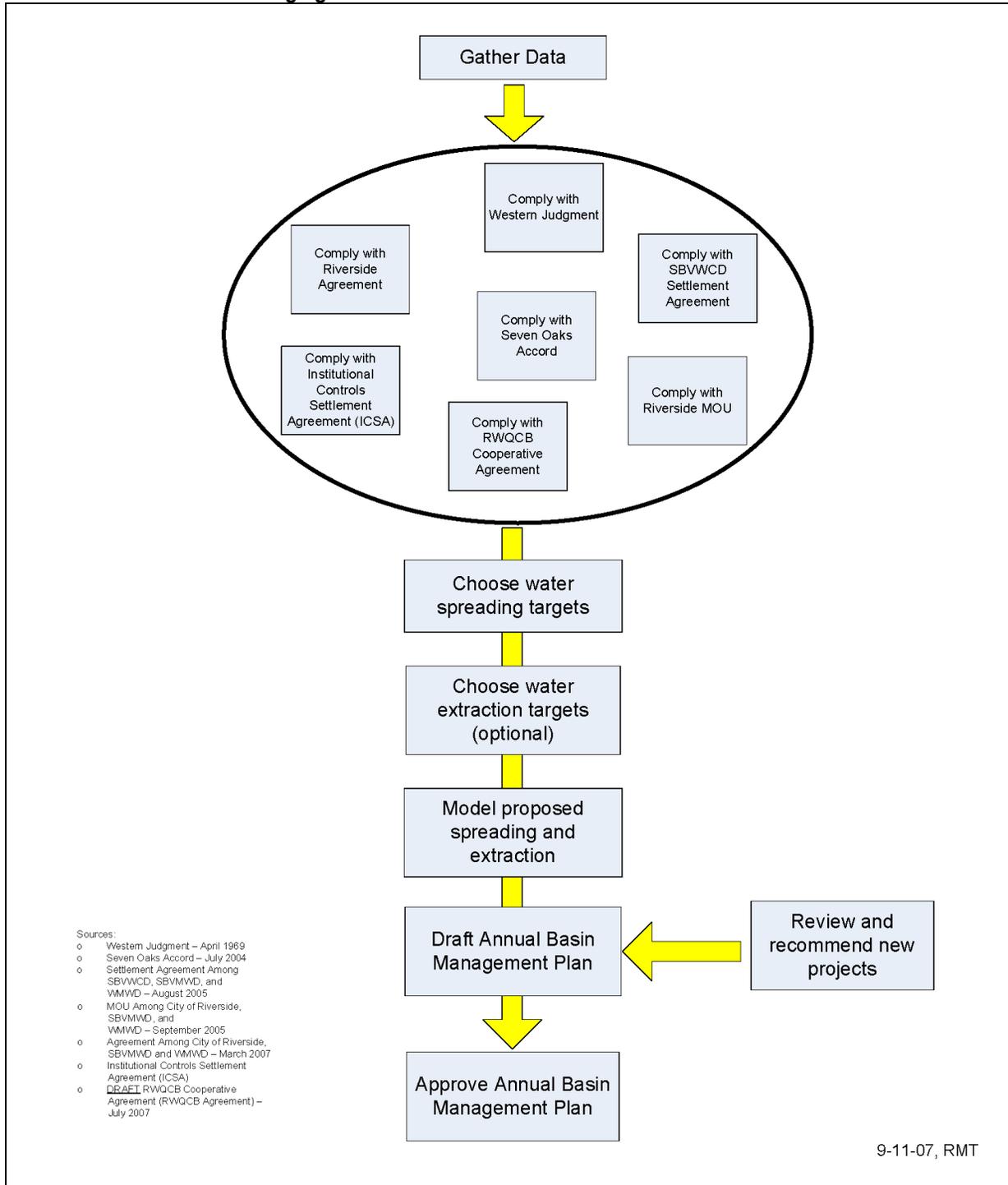
| Conjunctive Use Scenario | Facilities Needed |
|---------------------------------|--|
| Baseline | Facilities to divert SAR water per water rights application |
| 1A | 20 new extraction wells and conveyance facilities |
| 1B | 30 additional extraction wells (in addition to 1A) and conveyance facilities |
| 1C | 30 additional extraction wells (in addition to 1B) and conveyance facilities |

4.2.1.3.5 Process for Managing the SBBA

Implementation of the conjunctive use operation in the SBBA must meet the requirements of various judgments, agreements, and MOUs developed and agreed upon by water entities in the region. To effectively manage the SBBA in real time, the TAG drafted a basin management process for a coordinated and comprehensive management plan of the SBBA. This process will be submitted to the Board of Directors of Valley District and Western Municipal Water District (Western) for review and approval. The process is outlined in Figure 4-11.



Figure 4-11
Overview of Process for Managing the San Bernardino Basin Area



Governance

The Western Judgment identifies regional representative agencies to be responsible, on behalf of the numerous parties bound thereby, for implementing the replenishment obligations and other requirements of the judgment. The representative entities for the Western Judgment are Valley District and Western. Valley District is solely responsible for providing replenishment of the SBBA if extractions exceed the safe yield of the basin. The court-appointed Watermaster includes representatives from Valley District and Western. The proposed basin management process could be under the authority of the Valley District and Western Boards of Directors with inputs from other significant producers. (See Figure 4-12.)

Basin Technical Advisory Committee

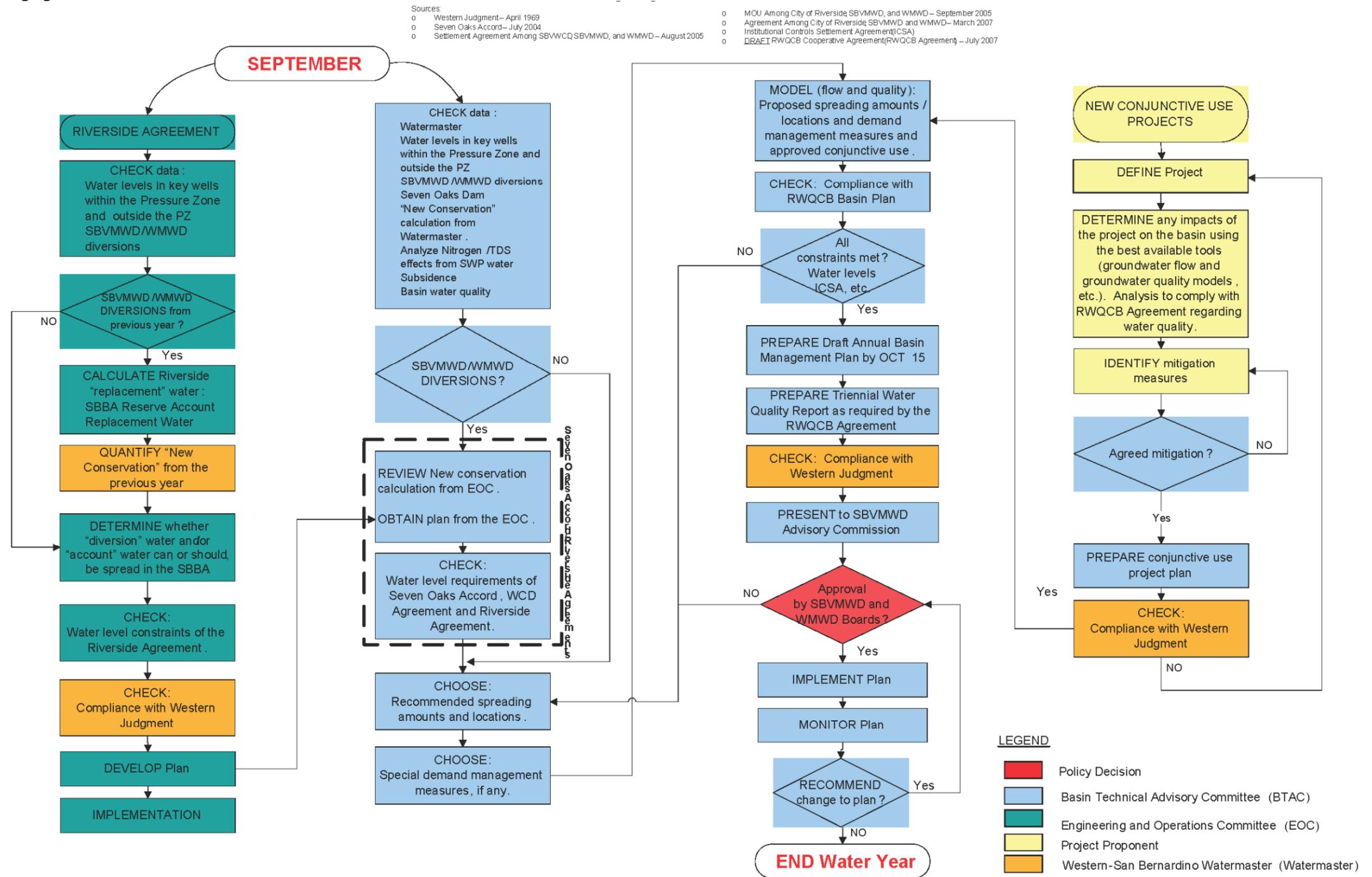
The annual basin management plan for any given year will be formulated by a Basin Technical Advisory Committee (BTAC) and forwarded onto the Valley District and Western Boards of Directors for review and approval. The BTAC will be comprised of staff representatives from plaintiffs and non-plaintiffs of the Western Judgment, as listed below:

BTAC Membership

- i) Western
- ii) City of Riverside
- iii) Valley District
- iv) Bear Valley Mutual Water Company (Bear Valley Mutual)
- v) East Valley Water District (East Valley)
- vi) City of Loma Linda
- vii) City of Redlands
- viii) San Bernardino Municipal Water Department
- ix) SBVWCD
- x) West Valley Water District (West Valley)

The BTAC will meet as needed to effectively operate the SBBA on a real-time basis and to address technical issues related to basin management. The BTAC members will cooperatively work together and will strive to make decisions by consensus.

Figure 4-12
Process for Managing the San Bernardino Basin Area



Overall Basin Management Strategy

The BMOs formulated for the SBBA are the driving force in developing strategies for the basin management plan. The BMOs are as follows:

- Improve water supply reliability during droughts,
- Protect water quality,
- Reduce risk of liquefaction, and
- Avoid impact from and to the contaminant plumes.

To ensure adequate reliable water supply for the communities in the Upper SAR watershed during a prolonged drought, the overall basin management strategy will be to operate the basin under the “Tilted Basin Concept” such that the basin would begin a drought period in “as full as possible” condition. Keeping the basin relatively full and operating a conjunctive management program according to the “Tilted Basin Concept” also provides the added flexibility to reduce imports from the SWP when water quality is less desirable. This overarching management strategy will be followed by the BTAC as they draft the basin management plan. Some of the specific management strategies that could contribute to improving water supply reliability during a drought are as follows:

- Retailers could take direct deliveries of SWP water when available instead of producing water from their wells. This reduces the amount of water withdrawn from the groundwater basin, which is equivalent to recharging the basin. This strategy will require participation by the water agencies and may require the construction of new water treatment plants or upgrades to existing plants.
- Recharge as much SWP water as possible when available. This will likely result in spreading water in wet years, which has not occurred as much in the past. It may also require upgrading the existing spreading grounds.
- Prepare, to the extent possible, for the high groundwater condition that may be created by maintaining a “full basin” when a wet year arrives.
 - Implement an agreement(s) with groundwater producers within the Pressure Zone to maximize production from the Pressure Zone as much as practicable during unacceptably high groundwater level conditions.



- Construct additional facilities to pump and convey large quantities of water from the Pressure Zone for use outside the Pressure Zone.

The San Bernardino Basin Area Management Plan will be developed in consideration of this overall management strategy and the BMOs.

Basin Management Requirements

The annual basin management plan for the SBBA will meet the requirements identified in the following legal documents:

1. Western Judgment – April 1969
2. Seven Oaks Accord – July 2004
3. Settlement Agreement between SBVWCD, Valley District, and Western – August 2005
4. MOU between City of Riverside, Valley District, and Western – September 2005
5. Agreement between City of Riverside, Valley District, and Western – March 2007
6. Institutional Controls and Settlement Agreement (ICSA) Agreement and its subsequent amendments

A summary of the pertinent basin management information from each of these documents is provided below.

1) Western Judgment

- a) **Natural Safe Yield** - established at 232,100 acre-feet per year. The Plaintiffs' (Western entities) rights are capped at 27.95 percent of the natural safe yield, or 64,862 acre-feet, notwithstanding any Additional Extraction Agreements or “new conservation,” as defined in the judgment. The Non-Plaintiffs' (Valley District entities) rights are unlimited provided that an equal amount of basin replenishment occurs to offset any amount that the Non-Plaintiff production exceeds—72.05 percent of the natural safe yield, or 167,238 acre-feet. An annual report, entitled *Annual Report of the Western-San Bernardino Watermaster*, provides an “accounting” of basin extractions.
- b) **Replenishment** – Valley District is responsible for replenishing the SBBA for that amount of Non-Plaintiff extractions exceeding 167,238 acre-feet. The replenishment obligation may be met by any of the following means:
 - i) Return flow from excess extractions;

- ii) Replenishment provided in excess of that required;
 - iii) Amounts extracted without replenishment obligations (i.e., Additional Production Agreement);
 - iv) That amount of water extracted below the natural safe yield; and
 - v) Return flow from imported water.
- c) **New Conservation** is defined in the 1969 Judgment as “any increase in replenishment from natural precipitation which results from operation of works and facilities not now in existence.” The judgment contemplated that the parties would develop facilities that would result in the capture of more natural runoff. Construction of the Seven Oaks Dam within the SAR has provided such an opportunity, and Valley District and Western are seeking to obtain a water right from the SWRCB and to construct the facilities necessary to capture SAR water that was not historically captured. The parties under the Western Judgment will have their adjusted extraction rights increased to include a proportionate share of any New Conservation, provided that each Plaintiff party pays its proportionate share of the costs to develop said New Conservation.

2) Seven Oaks Accord

- a) **Groundwater Spreading/Management Program (GMP)** – Requires Valley District and Western to develop and manage a groundwater spreading program in cooperation with other parties, “That is intended to maintain groundwater levels at the specified wells at relatively constant levels, in spite of the inevitable fluctuations due to hydrologic variation.” Specific requirements of the Seven Oaks Accord are as follows:
- i) GMP shall identify target water-level ranges in the specified “index wells” subject to the requirement that such spreading will not worsen high groundwater levels in the Pressure Zone.
 - ii) Thresholds of significance in terms of SAR water diverted by Valley District and Western and spreading by all parties should be observed (see sidebar). See Appendix I of the Accord.
 - iii) The determination as to whether a certain groundwater management action will “worsen” high groundwater levels in the Pressure Zone is made through the use of the integrated surface and groundwater models.
 - iv) GMP must be “adopted” within five years of the date the SWRCB grants a permit to Valley District/Western. To date, Valley District and Western have not received the permit.



- v) Redlands, East Valley, and Bear Valley Mutual agree to limit spreading to conform to the annual GMP.

3) San Bernardino Valley Water Conservation District Settlement Agreement

- a) Annual Groundwater Management Plan – Valley District and Western will consult with SBVWCD in the development of the GMP.
- b) An interim GMP could be developed prior to the completion of the model being developed for the San Bernardino Basin Area.
- c) GMP objectives to be achieved simultaneously include:
 - i) Maximize the quantity of water spread in the SAR spreading grounds.
 - ii) Establish and maintain a shallowest target of 50 feet depth to water within the Pressure Zone.
 - iii) Maintain groundwater levels in the Forebay Area within 10 feet of the levels that would have occurred in the absence of SAR diversions by Valley District and Western. Quantifying the difference between diversions and no diversions will be accomplished using the groundwater flow model developed for the SBBA.
 - iv) Otherwise avoid significant impacts on the environment.
- d) Set as a goal to coordinate the San Bernardino Consent Decree management plan with the GMP.
- e) No spreading will take place without authorization by the GMP.

4) Riverside MOU

- a) Basin Management Account – Established with funds and future revenues from the SBVWCD “to fund recharge efforts in the basin.”
- b) Valley District and Western are required to exercise SBVWCD water rights in a manner that:

Thresholds of Significance and Mitigation Measures to be Included in Applicants’ EIR

1. Threshold of Significance: Reduction in Groundwater Levels at Index Wells Outside the Pressure Zone

A reduction in groundwater levels outside the Pressure Zone is significant if the analysis in this EIR, using the integrated surface water and groundwater model developed by the project proponents, predicts that the project would reduce static groundwater levels at one or more index wells, on average, by more than 10 feet during a repetition of the 39-year base period hydrology, as compared to static water levels in the absence of the project.

2. Threshold of Significance: Increase in Groundwater Levels at Index Wells Within the Pressure Zone

An increase in groundwater levels in the Pressure Zone is significant if the analysis in this EIR, using the integrated surface water and groundwater model developed by the project proponents, predicts that the project would increase static groundwater levels at one or more index wells in the Pressure Zone, on average, by more than 10 feet during a repetition of the 39-year base period hydrology, as compared to static water levels in the absence of the project.

3. Mitigation Measure: Targeted Spreading to Maintain Groundwater Levels

To avoid a significant effect on groundwater levels at one or more index wells located outside the Pressure Zone, the project proponents shall spread sufficient water to maintain static groundwater levels at the affected index wells to reduce this project impact to a less-than-significant level.

4. Mitigation Measure: Limitation on Spreading to Prevent High Groundwater Levels

To avoid a significant effect on groundwater levels in the Pressure Zone, the project proponents shall curtail their spreading or direct other parties engaged in the spreading of water to replenish the San Bernardino Basin to curtail their spreading to reduce this project impact to a less-than-significant level.

- i) Maintains groundwater levels for the benefit of the production wells in the geographic area historically served by the SBVWCD at relatively constant levels.
- ii) Maximizes the use of native water supplies to replenish the SBBA without causing high groundwater problems in the artesian zone and without causing the migration of contaminant plumes that would result in significant degradation of the water quality in any domestic well.
- c) Valley District will spread sufficient water to ensure that groundwater supplies necessary to support the safe yield of the SBBA are maintained pursuant to the Western Judgment.

5) Riverside Agreement

- a) This agreement establishes the Seven Oaks Dam Water Diversions Engineering and Operations Committee (EOC) to develop and implement procedures to:
 - i) Maintain the groundwater levels in the Index Wells at relatively constant levels, in spite of fluctuations due to hydrologic variation.
 - ii) Minimize such fluctuations (reduce highs and lows).
 - iii) Provide water “accounts” to Riverside to offset the loss of recharge to the SBBA and/or Riverside North due to Western/Valley District SAR water diversions.
 - (1) “Reserve Account” is initially established as 38 percent of the total volume of water diverted from the SAR by Valley District and Western pursuant to the SWRCB water right permit. To be recharged in the SBBA either directly or through an exchange.
 - (2) “Replacement water” varies from 0 to 6 percent of the flow at the E Street Bridge. Water to be recharged into the Riverside North basin.
 - iv) Develop recommendations to the Western Judgment Watermaster regarding the classification of diverted SAR water as either New Conservation or existing safe yield of the SBBA.
- b) EOC will meet no later than six months after the SWRCB grants permits to Valley District and Western to develop the initial procedures. Ongoing, the EOC will meet no later than October 1 of each year. The EOC shall meet on a regular basis to effectively operate, on a real-time basis, a program to achieve the objectives listed above. EOC decisions will be implemented once approved by the EOC and will be provided to the BTAC for inclusion in the Annual San Bernardino Basin Area Management Plan. The tasks of the EOC could be covered at the BTAC



meetings, realizing that most of the members of the BTAC have no standing in this agreement and the decisions of the EOC are not subject to review by BTAC or any of the BTAC members.

- c) Water levels at the index wells outside the Pressure Zone must be maintained at no lower than 10 feet, on average, during a repeat of the 39-year base period. Valley District will commence spreading to maintain these levels.
- d) If the 12-month rolling averages of the Backyard Well ports D4, D5, and D6 are 50 feet bgs or greater, Valley District and Western will recharge water from the Reserve Account.

6) Consent Decree, City of San Bernardino March 23, 2005

- a) The City of San Bernardino Municipal Water Department (SBMWD) is a party to a consent decree lodged with the United States District Court, Central District of California, Western Division (Court), on August 18, 2004. The Consent Decree obligates the SBMWD to operate and maintain a system of wells and treatment plants known as the Newmark Groundwater Contamination Superfund Site (Newmark Site). The Newmark Site specifically treats groundwater contaminated with TCE and perchloroethylene (PCE).
- b) The SBMWD is required by the terms of the Consent Decree, entered on March 23, 2005, to enact institutional controls and implement an ordinance providing for the protection and management of the Interim Remedy set forth in the Record of Decisions and Explanation of Significant Differences prepared by the Environmental Protection Agency (EPA).

7) City of San Bernardino Ordinance No. MC-1221 and Institutional Controls Settlement Agreement (ICSA)

- a) Ordinance No. MC-1221 – This ordinance establishes the management zone boundaries within the City of San Bernardino for water spreading and water extraction activities.
 - i) The Consent Decree requires that the City of San Bernardino adopt and enforce an ordinance to ensure that activities occurring in the management zone, including, but not limited to, development, digging, drilling, boring or reconstruction of wells, extraction of groundwater from wells, and spreading of recharge water, do not interfere or cause pass-through of contaminants from the Newmark and Muscoy Operable Units. The ordinance was approved on March 20, 2006, by the Mayor and City Council.
 - ii) The Interim Remedy requires the extraction of contaminated groundwater from the Bunker Hill Groundwater Basin and within the

Newmark and Muscoy Operable Units, and treatment of the groundwater to meet all State of California (State) and federal permits and requirements for drinking water.

- iii) Unless a permit issued by the SBMWD pursuant to the provisions outlined in the ordinance is first obtained, it shall be unlawful for any person, as principal, agent, or employee to spread (artificial recharge) or extract (well pumping) within the Management Zones as defined in the ordinance.
- b) Institutional Controls Settlement Agreement (ICSA)
 - i) An agreement (ICSA) has been executed to develop and adopt a successor agreement, titled Institutional Controls Groundwater Management Program (ICGMP), between the following parties:
 - (1) City of San Bernardino Municipal Water Department
 - (2) San Bernardino Valley Municipal Water District
 - (3) Western Municipal Water District
 - (4) City of Riverside
 - (5) West Valley Water District
 - (6) East Valley Water District
 - (7) City of Colton
 - (8) Riverside Highland Water Company
 - ii) The parties identified above will not be subject to the provisions of City of San Bernardino Ordinance No. MC-1221 as long as each is a party to the ICSA and, subsequently, the ICGMP Agreement.

Development of Annual San Bernardino Basin Area Management Plan

Considering the provisions of the above judgments and agreements, the following process is suggested for the preparation of an Annual SBBA Management Plan. This process is intended to be flexible and changed as needed. The main purpose in suggesting a process is to ensure that the SBBA Management Plan is in compliance with the provisions of the applicable judgment and agreements and to provide a cooperative forum among the water agencies to engage in developing solutions.

As part of the first annual SBBA Management Plan, BTAC will work toward defining the term “conjunctive use” and draft a conjunctive use policy that may be used for the basin. The policy will define issues such as (1) imported water, (2) imported water delivery, (3) the groundwater recharge system, (4) usable groundwater storage capacity, (5) “water loss factor,” (6) expiration date for the



imported water, (7) groundwater recovery rights, (8) groundwater extraction capacity, and (9) recovered water delivery.

A. **Prepare** Annual SBBA Management Plan. The plan will be prepared considering the following:

a. **Review** the Watermaster data:

- i. Recharge
- ii. Extractions
- iii. Credits

The BTAC may have to rely on preliminary production information compiled by the Watermaster because the Watermaster reports typically lag the calendar year.

b. **Analyze** nitrogen and TDS effects from imported water. Prepare conjunctive use operation criteria to ensure the use of SWP water for recharge will not cause water quality degradation in Bunker Hill Basin.

c. **Quantify** “new conservation.”

- i. Develop recommendations to the Western Judgment Watermaster regarding the classification of diverted SAR water as either New Conservation or existing safe yield of the SBBA.

d. **Check** Valley District/Western/Riverside SAR diversions from the previous year.

e. **Check** Seven Oaks Dam operations data.

- i. Debris pool.
- ii. Current elevation.

f. **Check** water levels.

- i. Check water levels in the Pressure Zone (establish and maintain 50 feet to water level in the Pressure Zone).
- ii. Check water levels outside the Pressure Zone. Ensure water levels at the index wells outside the Pressure Zone are maintained at no lower than 10 feet, on average, during a repeat of the 39-year base period.

g. **Review** the amount of “replacement” water agreed to by the EOC to be “deposited” into the Riverside “accounts” based upon the Valley District/Western/Riverside diversions from the previous year.

- i. SBBA Reserve Account: 38 percent of the total volume of water diverted from the SAR by Valley District and Western pursuant to a SWRCB permit or license. To be recharged in the SBBA either directly or through an exchange.
 - ii. Replacement water volume calculation: Replacement water is the lost recharge opportunities in Riverside North Basin due to diversion of New Conservation water from SAR. This replacement water is estimated to vary, depending on SAR hydrology, from 0 to 6 percent of the flow at the E Street Bridge. Replacement water to be recharged into the Riverside North Basin.
- h. **Determine** whether water will be spread from the SBBA Reserve Account in the coming year.
- i. Calculate the 12-month rolling averages of the Backyard Well ports D4, D5, and D6. If it is 50 feet bgs or deeper, Valley District/Western will recharge water from the Riverside Reserve Account in the coming year.
- i. **Review** constraints of various agreements on Valley District/Western/Riverside diversions. If SAR diversions were made in the previous year, check the following:
- i. Maintain groundwater levels in the forebay area (use wells from Seven Oaks Accord and Riverside Agreement, “Index Wells”) within 10 feet of the levels that would have occurred in the absence of SAR diversions by Valley District/Western.
 - ii. Maintain groundwater levels in the Seven Oaks Accord, Valley District, and Riverside Agreement wells at relatively constant levels, in spite of the inevitable fluctuations due to hydrologic variation.
 - 1. Identify target water level ranges for the Seven Oaks Accord index wells subject to the requirement that such spreading will not worsen high groundwater levels in the Pressure Zone.
 - 2. Review Seven Oaks Accord thresholds of significance.
 - 3. Maintain water levels in the Riverside Agreement wells outside the Pressure Zone at no lower than 10 feet, on average, during a repeat of the 39-year base period.
 - 4. Minimize fluctuations (highs and lows).



- j. **Review** spreading amounts and locations chosen by the EOC and choose other spreading amounts and locations based upon the following:
 - i. Maximize the quantity of water spread in the SAR spreading grounds.
 - ii. Water spread for conjunctive use projects, if any.
 - 1. Water banking.
 - 2. Exchange.
 - 3. Establish “accounts” in the basin.
 - a. Expiration?
 - b. Define assumed losses due to evaporation and evapotranspiration.
 - iii. Riverside Reserve Account (see 2 and 3 above).
 - k. **Choose** special demand management measures (if any).
 - i. Extra pumping to dewater a particular area.
 - ii. Extra pumping to dewater due to a wet year.
 - iii. Suggest conservation measures.
 - 1. **Check compliance with the Regional Water Quality Control Board (RWQCB) Agreement**
- B. **Model:** The groundwater models for the SBBA can be used to model the proposed SBBA Management Plan developed above to ensure that all of the constraints are met.
- a. Maintain 50 feet to water level in the Pressure Zone.
 - b. Check target water level ranges in the Seven Oaks Accord index wells.
 - c. Check water level requirements from Riverside Agreement.
 - d. Check water level requirements from SBVWCD Agreement.
 - e. Determine any impacts on the environment.
 - f. Prepare groundwater flow map to determine any impacts on the Consent Decree.
 - g. Determine any impacts on any other contamination cleanup projects.



**Suggested Calendar for Preparation and Implementation of the Annual
Basin Management Plan (water year)**

| MONTH | ACTION ITEM(S) |
|-----------------|--|
| OCT | 1) Collect water levels from the Forebay Area, the Seven Oaks Accord wells, and the Riverside Agreement wells. 2) <u>BTAC MEETING</u> <ul style="list-style-type: none"> ○ Develop recommendation regarding the classification of diverted SAR water as either New Conservation or existing safe yield of the SBBA. ○ Review Watermaster data. ○ Check water levels in the Pressure Zone. ○ Calculate Riverside Reserve Account. ○ Determine whether water will be spread from Reserve Account in the coming year. ○ Check groundwater levels in the Forebay Area. ○ Check water levels in the Seven Oaks Accord wells. ○ Check water levels in the Riverside Agreement wells. ○ Review Valley District Change in Storage Calculation. ○ Review SBVWCD Change in Storage Calculation. ○ Review hydrologic index (SBVWCD Engineering Investigation). ○ Choose spreading amounts and locations. ○ Choose demand management measures. ○ Model spreading amounts for the year. |
| NOV | 1) Collect water levels from the Forebay Area, the Seven Oaks Accord wells, and the Riverside Agreement wells. 2) <u>BTAC MEETING</u> <ul style="list-style-type: none"> ○ Finalize/Implement Groundwater Management Plan. ○ Present to Valley District and Western Boards of Directors. |
| DEC | Collect water levels from the Forebay Area, the Seven Oaks Accord wells, and the Riverside Agreement wells. |
| JAN | Collect water levels from the Forebay Area, the Seven Oaks Accord wells, and the Riverside Agreement wells. |
| FEB | Collect water levels from the Forebay Area, the Seven Oaks Accord wells, and the Riverside Agreement wells. |
| MAR | 1) Collect water levels from the Forebay Area, the Seven Oaks Accord wells, and the Riverside Agreement wells. 2) <u>BTAC MEETING</u> <ul style="list-style-type: none"> ○ Review water levels and plan. ○ Review Valley District Change in Storage Calculation. |
| APRIL- SEPT. | Collect water levels from the Forebay Area, the Seven Oaks Accord wells, and the Riverside Agreement wells. |

4.2.1.3.6 The Potential Impact of the Agreement on Cooperating Agencies' Ability to Beneficially Use SWP Water for Groundwater Recharge

Background

The Santa Ana Regional Water Quality Control Board (SARWQCB) is charged by statute with adopting water quality objectives as may be required to protect the beneficial uses of water within the region. In particular, the long-term conjunctive use of groundwater requires that the quality of water in groundwater basins be managed to meet the water quality objectives for nitrogen and total dissolved solids (TDS) [collectively, the “Salinity Objectives” adopted by the SARWQCB in the 1995 Water Quality Control Plan for the Santa Ana River Basin as amended in 2004 by R8 2004-0001 (Basin Plan)].

In June 2007, water entities in the Upper SAR watershed (cooperating agencies) and the SARWQCB entered into the Cooperative Agreement to “Protect Water Quality and Encourage the Conjunctive Uses of Imported Water in the Santa Ana River Basins.” This Agreement is intended to allow the water entities to monitor and improve water quality within the Santa Ana region in a manner that is consistent with both adopted water quality objectives and the needs of the inhabitants of the region for a reliable supply of water. Specifically, the Agreement addresses the use of imported water for groundwater recharge and compliance with Basin Plan Salinity Objectives for individual groundwater management zones.

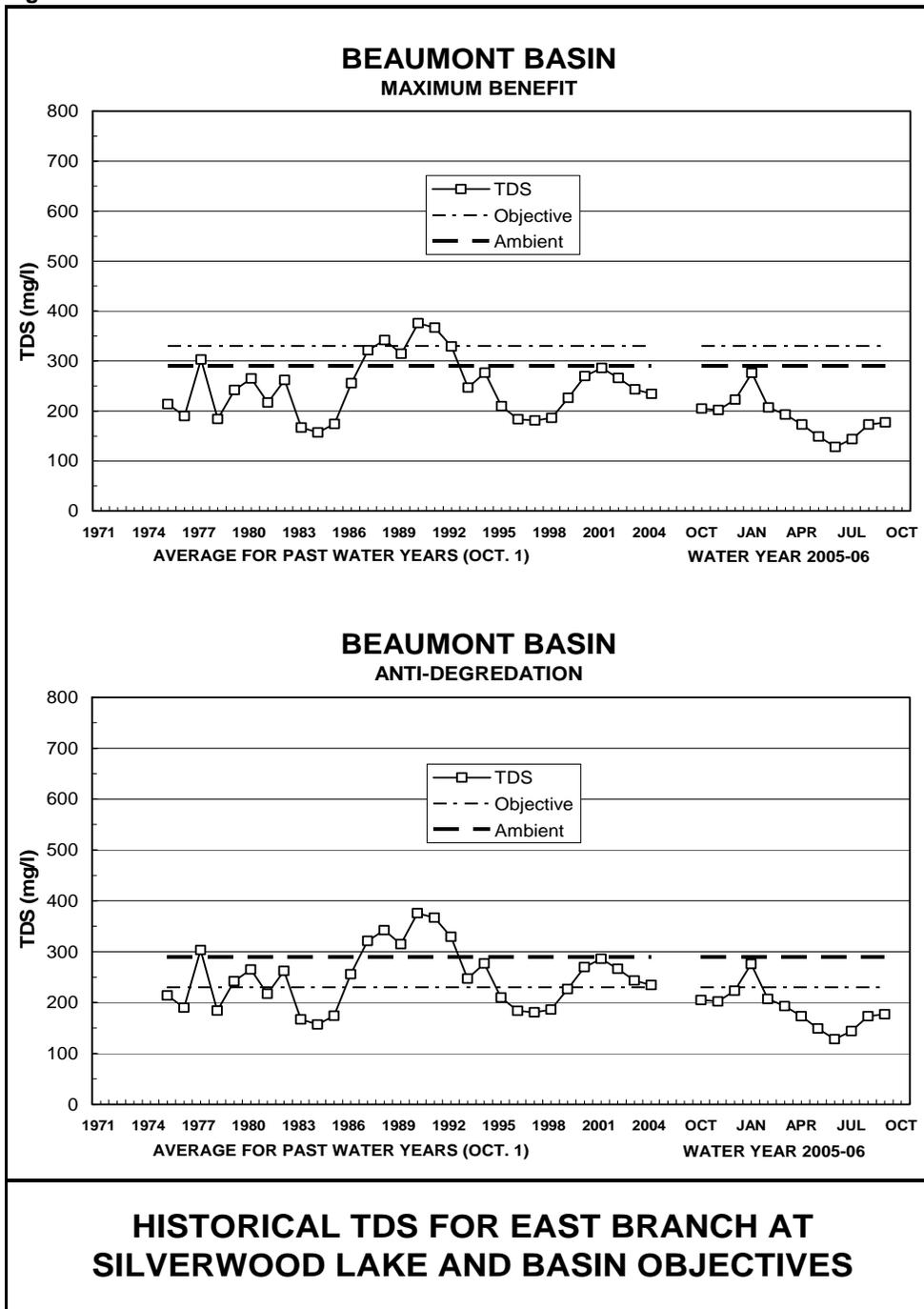
Implementation of the Agreement could prevent the groundwater recharge of SWP water in some groundwater basins when TDS of imported water is too high. The purpose of this section is to evaluate the potential impact of this draft Agreement on cooperating agencies' ability to beneficially use SWP water for groundwater recharge. The analysis below qualitatively estimates potential impacts. Actual conjunctive use operations and potential impact of the Agreement will be based on annual monitoring and preparation of the Triennial Water Quality Report as required by the Agreement.

Potential Impact

To estimate the potential impact of the Agreement on use of SWP for recharge, TDS and nitrate of SWP water is compared with the TDS and nitrate of the groundwater management zones. Figures 4-13 through 4-16 compare Basin Plan Salinity Objectives to SWP annual TDS levels. For this analysis, it is assumed that SWP water can be utilized for recharging groundwater basins when the level of TDS or nitrate nitrogen of SWP water is equal to or less than the ambient level of a specific groundwater management zone. In other words, this analysis enables us to understand when and to what extent SWP water can be used for groundwater recharge without treatment in any of the six groundwater management zones with the limited available data.



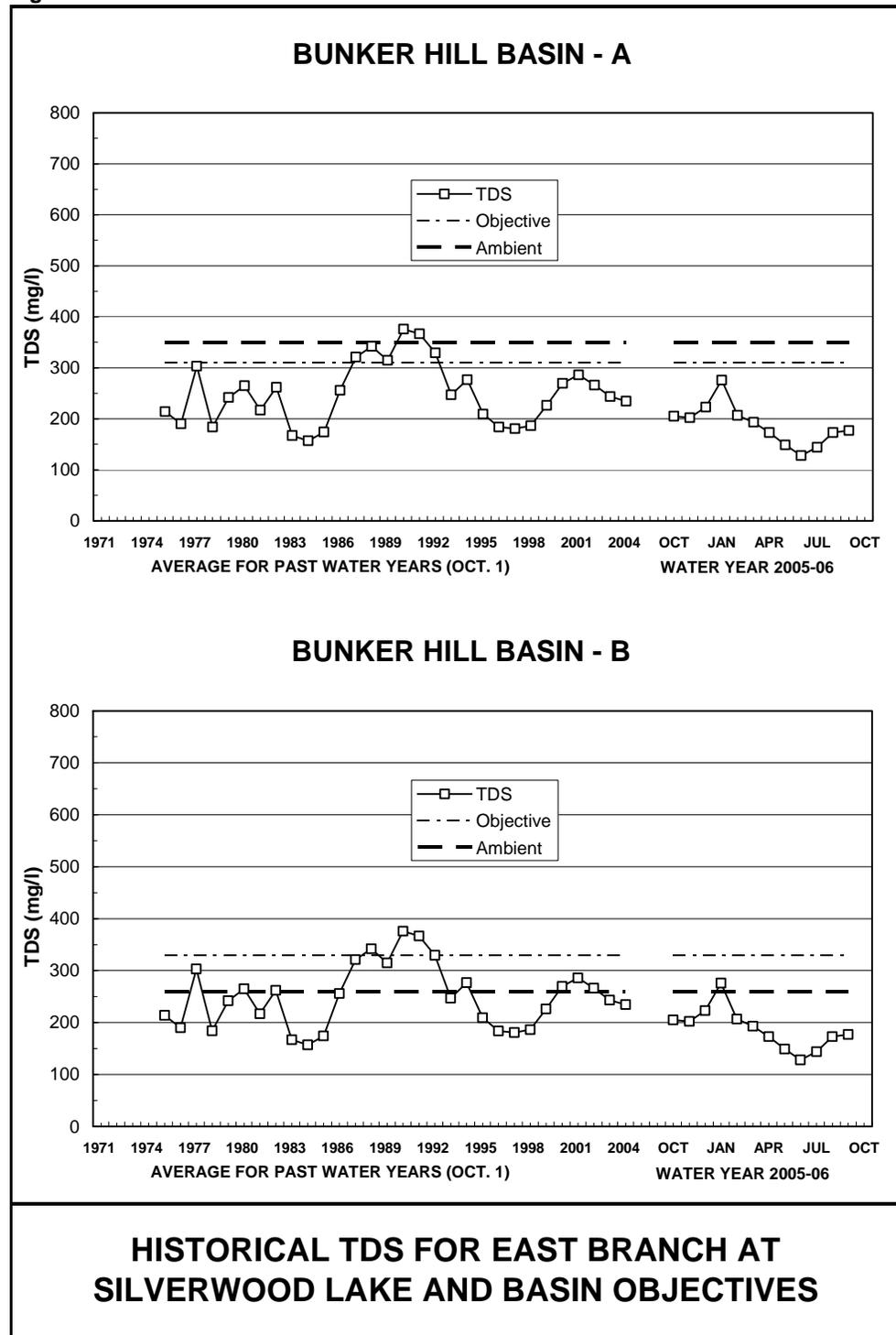
Figure 4-13



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Figure 4-14



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Figure 4-15

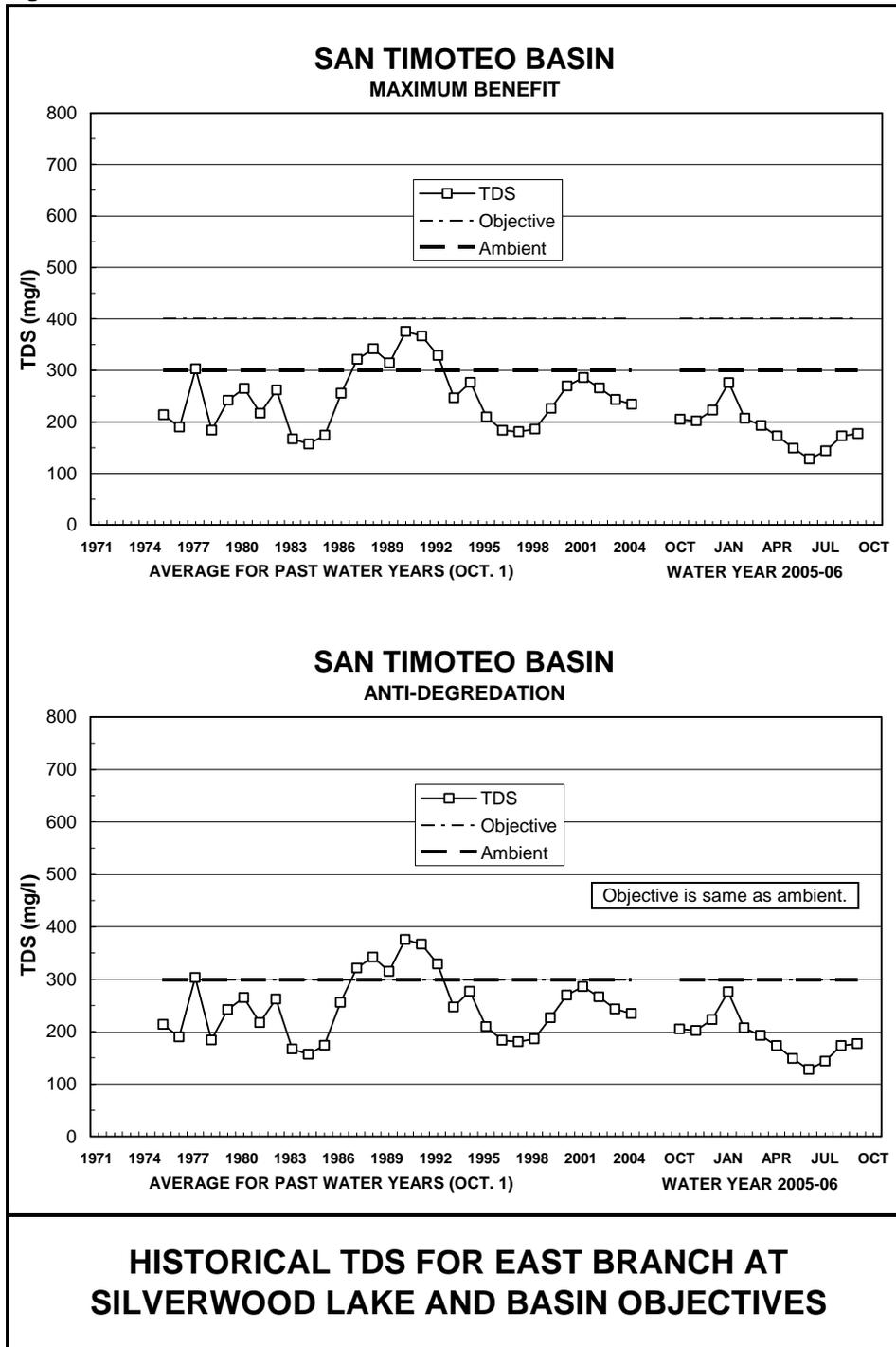
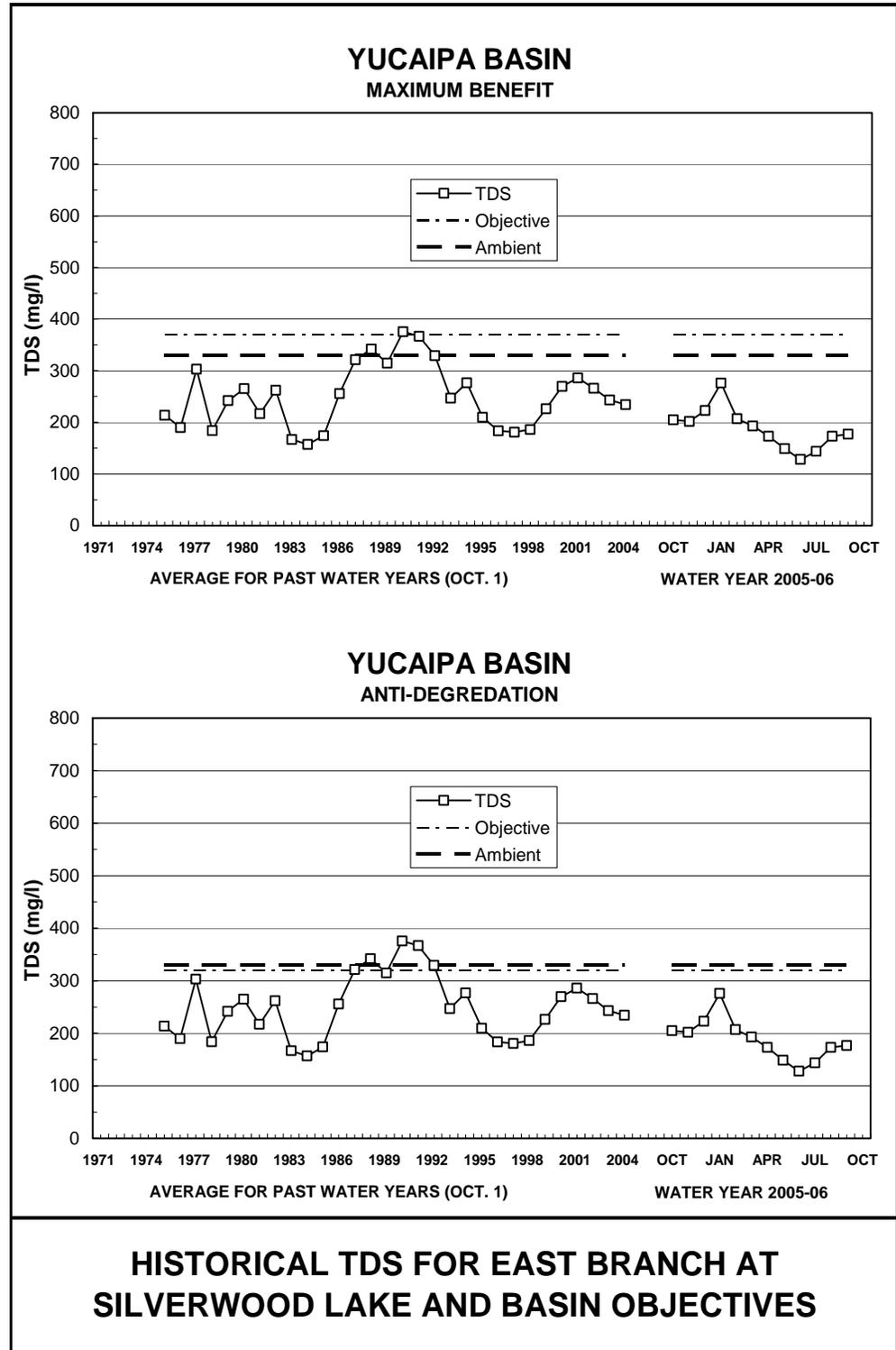


Figure 4-16





The Basin Plan delineates six groundwater management zones in the San Bernardino Valley and Yucaipa/Beaumont Plains: Bunker Hill – A, Bunker Hill – B, Lytle, San Timoteo, Yucaipa, and Beaumont. For each groundwater management zone, TDS and nitrogen nitrate Water Quality Objectives, ambient water quality, and estimated assimilative capacities are defined. [Basin Plan (Tables 5-3 and 5-4)].

Untreated SWP East Branch water quality data (TDS and nitrogen nitrate) are available from 1975 through 2005. The data are collected by Metropolitan at the Devil Canyon Afterbay Turnout. Ambient TDS and nitrogen nitrate data are available for the six groundwater management zones.

A review of historic yearly and monthly SWP water quality information indicates that the level of nitrogen-nitrate found in SWP water does not limit or otherwise control the ability to use SWP water to recharge any of the six groundwater management zones since the highest recorded nitrogen level found in SWP water is less than the lowest ambient level found in all six groundwater management zones. The Beaumont Groundwater Management Zone has the *lowest* measured ambient nitrogen nitrate level at 2.6 mg/L. This is substantially higher than the highest recorded nitrogen nitrate level of 0.7mg/L measured in SWP water.

Although nitrogen nitrate is not expected to impact the ability to use SWP water, the level of TDS in SWP water could limit the use of the water for groundwater recharge.

Figures 4-13 through 4-16 compare yearly SWP water TDS levels (for the period 1975 through October 2006) with 2004 ambient basin conditions. The analysis of yearly data reveals that during some dry-year and multiple dry-year periods, all basins, to varying degrees, would exceed the TDS limits set by the RWQCB. Likewise, the analysis of monthly data reveals that all basins, to varying degrees, could exceed the TDS limits during summer and fall months. The two basins that could exceed the limits the most are the Bunker Hill Basin – B and Lytle Basin. Bunker Hill Basin - A would exceed the TDS limits only in limited conditions such as a period similar to 1990 to 1992.

4.2.1.3.7 Findings and Recommendations

Findings

Review of Figures 4-13 through 4-16 indicates the following:

- The basins exceed the TDS limits during dry, or drought, periods. During the 1975 to 2004 period, SWP water TDS exceeded the ambient TDS in 1977 and during the 1987 to 1992 drought period or about 23 percent of the study period. These are the dry years when SWP

deliveries typically are substantially cut. Computer modeling indicates that the SWP can deliver only four percent of its Table A amount in a drought year such as 1977. In a drought period such as 1987 to 1992, the SWP reliability is about 46 percent. Assuming that the limited amount of SWP water available during drought periods could be used by direct delivery, there may be little impact to groundwater recharge operations.

- During the late summer and fall months of some years, TDS of the SWP water may exceed the TDS limits.

Recommendations

1. Since, historically, the TDS of SWP water rarely exceeds the TDS limits, the region may want to consider suggesting that the RWQCB allow the region to maintain a “salt account” for the basins. When the TDS of SWP water is lower than the limit, a credit would be given. When the TDS of SWP water is higher than the limit, a debit would be taken. As long as the balance of the account is greater than, or equal to, zero, no mitigation would be required. If the account were to fall below zero, the region would have to implement some sort of mitigation measures to get the account back to a positive balance.
2. The SWP contractors in the region could attempt to use the SWP water for recharge in the winter, spring, and early summer months when the TDS is its lowest and try to maximize direct deliveries in late summer and fall when TDS is the highest.

The above recommendation strategies will considerably limit the impacts of implementation of the cooperative agreement on conjunctive use and groundwater recharge in the region. The above strategies will be implemented and their effectiveness will be examined periodically. There may be times in the future that SWP supplies must be used for groundwater recharge with the likelihood of significant degradation from TDS, and there may also be impacts to wastewater treatment plants. In such cases, other strategies such as desalting plants should be evaluated.

4.2.1.3.8 Facilities Needed for Dewatering the Pressure Zone

This evaluation was conducted to determine if additional pumping and conveyance facilities are needed to dewater the SBBA Pressure Zone in extreme wet years to avoid risk of liquefaction in the area. Liquefaction typically occurs in recent (Holocene to late Pleistocene) deposits of silt, sand, and gravel. Most liquefaction occurs where the depth to groundwater is less than 50 feet; this depth is traditionally considered adequate for most investigations of liquefaction potential (Martin and Lew 1999). For purposes of this investigation, areas with



depth to groundwater of less than 50 feet in the Pressure Zone were evaluated. Groundwater model runs were conducted for this evaluation.

Areas where depth to groundwater was less than or equal to 50 feet below the land surface were delineated using the groundwater model results from Baseline Run 1. Annual potential liquefaction area as a percentage of the Pressure Zone area ranges from zero in a dry year (hydrologic year 1992) to 6.0 percent in a wet year (hydrologic year 1986), with an annual average of 2.3 percent. The area with potential for liquefaction in a wet year such as 1986 (year with the greatest potential liquefaction area) was mapped. This area is located in the eastern portion of the Pressure Zone near the Santa Ana River and City Creek areas, and is away from the City of San Bernardino. Therefore, potential liquefaction, even in the extreme wet years, is considered minimal.

During the model simulation period from 2006 through 2044, groundwater pumping from the Pressure Zone area was assumed to be 117,434 acre-feet in year 2010 to 149,717 acre-feet in 2044, with an annual average of 133,959 acre-feet per year. The greatest historical pumping from the Pressure Zone was 141,892 acre-feet in year 2000. A review of existing operational production wells and apparatus in the Pressure Zone indicates that the sum of the instantaneous pumping rate in the Pressure Zone is 180,526 gallons per minute (gpm). Assuming these wells can pump 70 percent of their instantaneous pumping rates, they would yield 184,000 acre-feet per year. This amount is significantly higher than the historic pumping and the pumping assumed for Baseline Run 1. Therefore, it can be concluded that there are enough existing wells and apparatus in the Pressure Zone to control the water levels given the conditions assumed for Baseline Run 1.

4.2.1.4 Surface Water Management Strategies and Projects

Improving surface water management will significantly contribute to the sustainability of water resources in the region. Management of surface water resources includes strategies such as use of SAR conservation water, use of water from the local streams, and flood and stormwater management. Integration of flood and stormwater management strategies with recharge and conjunctive use opportunities contributes to surface water and groundwater management as well as water supply reliability in the region as discussed below.

4.2.1.4.1 *Local Surface Water Management*

This strategy outlines the use of local surface water from the SAR and tributaries such as Mill Creek. Completion of the Seven Oaks Dam on the SAR provided the opportunity for Valley District and Western to jointly file two applications with the SWRCB to appropriate water from the SAR. The applications seek the right to divert up to 200,000 acre-feet per year of local water to help improve the water supply reliability of the region. In support of water right applications and associated facilities, Valley District and Western have prepared and completed an environmental documentation for the project. Seven Oaks Dam is a flood control structure with limited carryover storage. Because the SAR hydrology is highly variable, the available water will vary in any year from zero to 200,000 acre-feet. Therefore, efficient use of SAR water will require conjunctive management and groundwater banking in the region. Other possible uses of the SAR water include direct delivery and exchange with outside agencies. The use of seasonal storage at the Seven Oaks Dam will not affect flood protection provided by the facilities to downstream communities.

Valley District, Western, and City of Riverside financed the costs of feasibility studies, design, and construction of improvements to the Seven Oaks Dam to allow conservation storage. Implementation of conservation storage projects, which include modification of the intake structure and relocation of the access road, would require compliance with the National Environmental Policy Act in order to evaluate any potential impact of proposed conservation pool on the USFS lands.

To implement this strategy, existing facilities would be used, to the extent possible, to divert and convey newly appropriated water from the SAR. However, additional facilities are needed to connect existing facilities to diversion facilities and recharge areas so that supplemental water supplies can efficiently be used in the region. New project-related facilities will be constructed in four construction areas, as described below.

The SAR. Water diverted from the SAR should be conveyed to areas of use. Additional facilities will be needed to connect diversion points to the existing



facilities. Most of the water diverted from the SAR would be conveyed through the proposed Plunge Pool Pipeline, Low Flow Connector Pipeline, or the Morton Canyon Connector II Pipeline. The Plunge Pool Pipeline will connect the SAR to Valley District's Foothill Pipeline and then to the Metropolitan's Inland Feeder Pipeline in the next phases of the project.

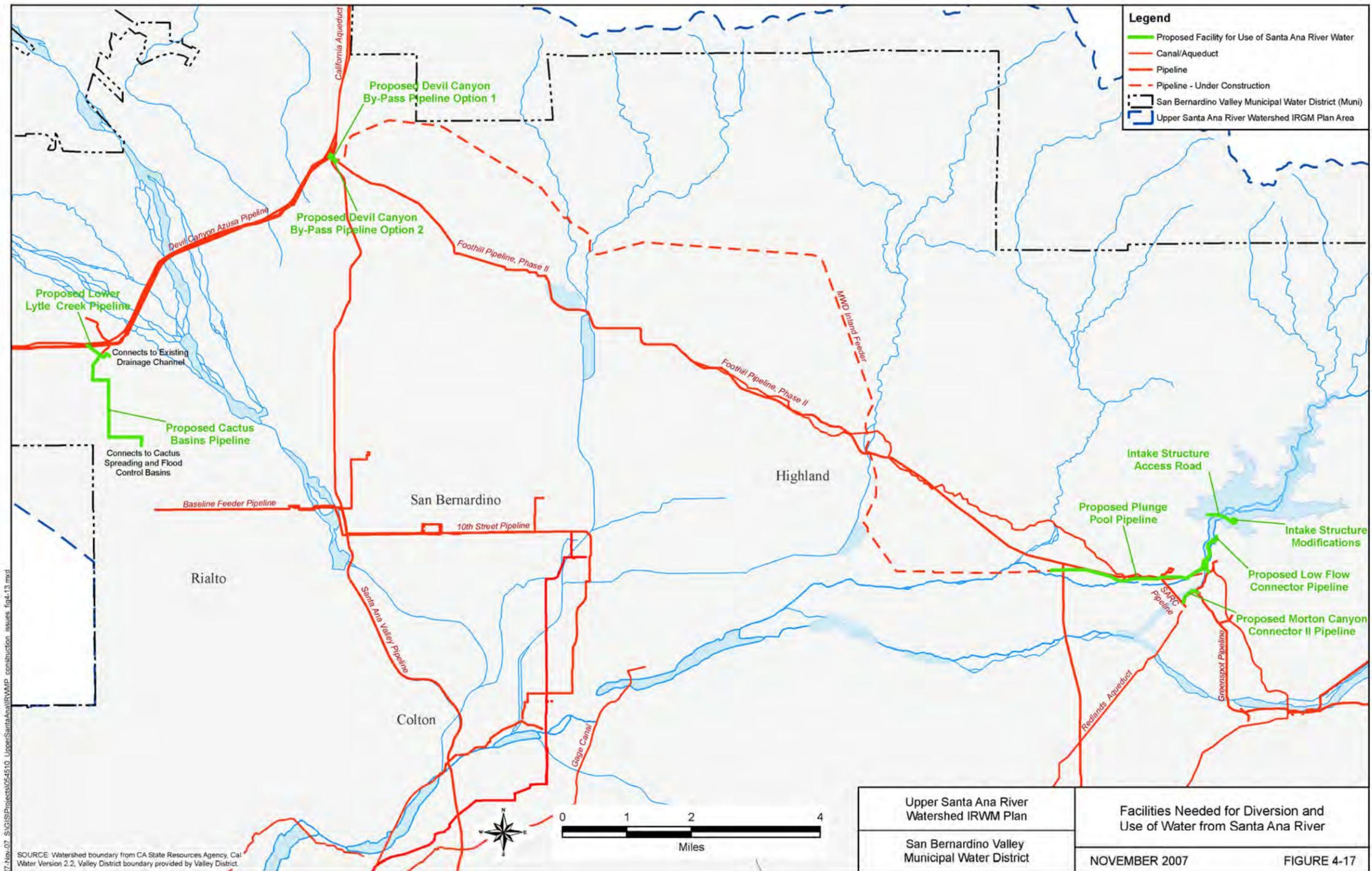
The Devil Canyon. The SAR water conveyed by Valley District's Foothill Pipeline will enter the Devil Canyon Bypass Pipeline. This pipeline will connect to both the Lytle Pipeline and the California Aqueduct.

The Lytle Creek. The SAR water conveyed through the Lytle Pipeline will reach Lytle Creek basins. The water could also be conveyed to West Valley and FWC water treatment facilities, as well as to the Cactus Spreading and Flood Control Basins through the Cactus Basin Pipeline.

The Seven Oaks Dam and Reservoir. The specific facilities in this area include modification of the intake structure of the Seven Oaks Dam and relocation of the access road serving the intake structure. Modification of the intake structure is needed to allow for proper regulation of the flood flows. A Technical Feasibility Study for these facilities is underway. It appears that the above modifications can marginally increase the yield of the SAR. The feasibility study is intended to show the benefit-cost ratio of these facilities.

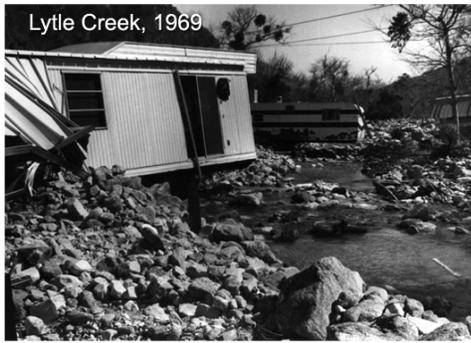
The facilities listed above will make possible conveyance of water from the Seven Oaks Dam to groundwater spreading grounds and the water treatment facilities in the region. Figure 4-17 shows the location of the construction areas and the proposed facilities for the use of native water in the region. Detailed descriptions of the facilities can be found in Appendix E.

Figure 4-17
Proposed Facilities for the Use of Santa Ana River Water





Upper Santa Ana River Watershed Integrated
Regional Water Management Plan



It is critical to explore strategies to improve flood protection and manage stormwater. (Photos courtesy of the San Bernardino County Museum.)

4.2.1.4.2 Flood and Stormwater Management Strategies

Historically, the SAR Wash was a natural floodplain and alluvial fan that provided a place to convey frequent devastating flood waters and to deposit sediment. The alluvial deposit provided excellent conditions for establishing settling basins for percolating surface water to the groundwater basin, providing a significant source of water supply for the Upper SAR watershed. Substantial new commercial and residential development has occurred in the region and significant additional development is forecasted for the Upper SAR watershed. In anticipation of this development and the potential loss of open space and increase in impervious surfaces such as roads and buildings that accompany such development, it is critical to explore strategies to improve flood protection and manage stormwater. Flood and stormwater management strategies are designed to:

- Reduce peak flood flow in the streams,
- Improve groundwater recharge within the channel,
- Provide additional recharge through improvement of the detention basins, and
- Increase channel capacities of stormwater management facilities to safely convey stormwater.

The stormwater strategies can reduce flood damage, increase groundwater recharge and water supply, and improve water quality of the streams by reducing discharge of debris, sediment, and urban pollutants to the streams. The San Bernardino County Flood Control District (SBCFCD) operates and maintains a system of channels and detention basins to manage stormwater throughout the region. SBCFCD’s objective is to provide 100-year flood protection for the communities in the region. Significant improvements to the regional facilities are needed to ensure the flood control system can provide 100-year protection today and in the future as additional development occurs in the area.

Two types of strategies have been formulated to address the flood and stormwater management issues of the Upper SAR watershed.

Strategies to Reduce Flood Flows in the SAR and Tributaries

Construction of the Seven Oaks Dam contributes significantly to management and control of flood flows in the SAR. Additional facilities are planned for



diversion and conveyance of the flows to spreading grounds. Construction of these facilities and improvement of the spreading grounds to accept additional flood flows are considered the next step for reducing flood flows downstream. The facilities required to implement this strategy are described in Section 4.2.1.5.1.

Strategies for Management of Stormwater

Stormwater management strategies consist of programs to improve and expand the detention basins and improve the flood control channels.

SBCFCD plans and designs the improvements needed for flood detention facilities. These improvements include excavation and removal of the sediment from the existing basins, expansion of the existing basins, and design and construction of new retention basins. The objective is to increase the holding capacity of the basins in order to increase recharge and reduce peak flood flows downstream. Projects to achieve this objective include Randall Basin Project; Cactus Basins 3, 4, and 5; and Cable Creek Debris Basin.

SBCFCD plans to improve flood control channels to increase channel capacity, increase opportunities for recharge, and maintain the integrity of the system. These improvements include channel enlargement, channel works, and channel lining. Projects formulated under this strategy include Sand/Warm Confluence and Upper Warm Channel. Other channel improvement projects are planned in the Upper SAR watershed area, but they do not have the multiple benefits expected from the Sand/Warm Confluence and Upper Warm Creek project since they would be concrete-lined conveyance systems.

SBCFCD is also developing plans to certify and potentially improve flood control levees in order to maintain the integrity of the system. These improvements include hard lining, rebuilding, lengthening, and repairing levee facilities. Projects are currently being formulated in conjunction with the Federal Emergency Management Agency (FEMA) certification effort.

A detailed description of the stormwater management projects is presented in Appendix E.



State Water Project water is treated and distributed to some urban areas in the Upper Santa Ana Region.

4.2.1.5 Imported Supplies

Imported supplies to the region include the SWP supply. Imported water is delivered directly or through Metropolitan. Western receives SWP supplies through Metropolitan. San Geronio Pass Water Agency (SGPWA) has a “Table A” allotment of 17,300 acre-feet, and Valley District has a SWP “Table A” allotment of 102,600 acre-feet per year. Reliability of the SWP supplies varies considerably from about 5 percent to 100 percent depending on the water-year type. To evaluate the SWP water supply reliability, the SWP Delivery Reliability Report (Public Review Draft, November 15, 2005) was reviewed. The report presents the results of five operational studies that simulate the SWP operations under 2003 and 2025 water demand

scenarios. For the purpose of this water supply reliability discussion, the updated study with 2025 level of demand is used (Study 5). These studies were conducted specifically to document the SWP delivery reliability. SWP water supply available to Valley District for direct delivery and recharge for each year was calculated based on reliability values presented in Study 5. On average, SWP water supply reliability is presented as 77 percent of the Table A allotment to as low as 4 percent. However, SWP delivery may vary from full Table A allotment. For example, the Valley District Table A delivery capability may vary from 102,600 acre-feet in wet years to 5,100 acre-feet in dry years, such as 1997.

As mentioned earlier, to improve water supply reliability, Valley District is planning for conjunctive management of groundwater as well as banking of SWP supplies when available. Strategies for the use of Valley District’s SWP supplies include direct delivery of SWP water to water treatment facilities and use of water for groundwater recharge.

A key to improving long-term water supply reliability is for all SWP contractors in the region to fully utilize their SWP supplies when available and store or bank to build reserves for drought periods. Facilities required for the use of SWP water include additional conveyance to water treatment facilities in the region.

As a component of the water supply reliability study, Valley District is also conducting sensitivity analyses for SWP and local surface water supply reliability. The analyses include:



- SWP reliability of 60 percent and 50 percent of Table A allotment (instead of 77 percent).
- SAR flows of 90 percent of long-term average flows.

Modeling studies were conducted to document the potential impacts of reduced SWP and local supply reliability on groundwater levels. The purpose of the sensitivity analyses was to provide general information to water managers as to the potential impacts of hydrologic (climate change) and operational changes in water supply facilities on the region's water supply reliability.

4.2.1.5.1 Conveyance, Storage, and Emergency Interties

Conveyance, storage, and interties are essential elements of water supply reliability. Conveyance strategies are needed to convey the water supply to the place of use. Storage feasibilities provide operational flexibility for daily and seasonal operation of the water system. Interties

are essential to providing for system redundancy and emergency operations. The elements of conveyance, storage, and intertie strategies include the following:

- **Regional conveyance facilities** are major pipelines, pump stations and turnouts, and associated facilities critical to water supply reliability of water purveyors in the region. A number of additional conveyance facilities are planned for the region, including Central Feeder Pipeline Phase 2, City Creek Crossing, Riverside Corona Feeder, associated pumping stations, and Waterman Pump Station.
- **Interties** are planned to improve supply reliability through integration of water supply and distribution systems and to have conveyance redundancy for water supply during major catastrophic failure of a conveyance system. Planned interties include Raub Emergency Supply Intertie and Waterman-Gage Intertie.

Storage facilities are planned for seasonal and operational storage and system flexibility and to provide water during emergencies and major disasters. Planned storage projects include:



Major regional conveyance facilities connect purveyors' water supply systems.



Storage reservoirs regulate water production and distribution while providing emergency storage for the communities.

- San Bernardino Reservoir
- Citrus Reservoir (Mentone Reservoir)
- Sunrise Ranch Emergency Reservoir
- Zanja Emergency Storage
- Redlands Reservoir



4.2.1.6 Performance Evaluation of Water Supply Reliability Strategies

This section evaluates the performance of the water supply reliability strategies (when implemented) in improving the region's water supply reliability. In evaluating performance of the water supply reliability strategies, criteria established for development of the UWMP have been considered. These criteria, listed below, are intended to be used to examine the performance of water supply reliability strategies and to ensure water supply needs of the region are met:

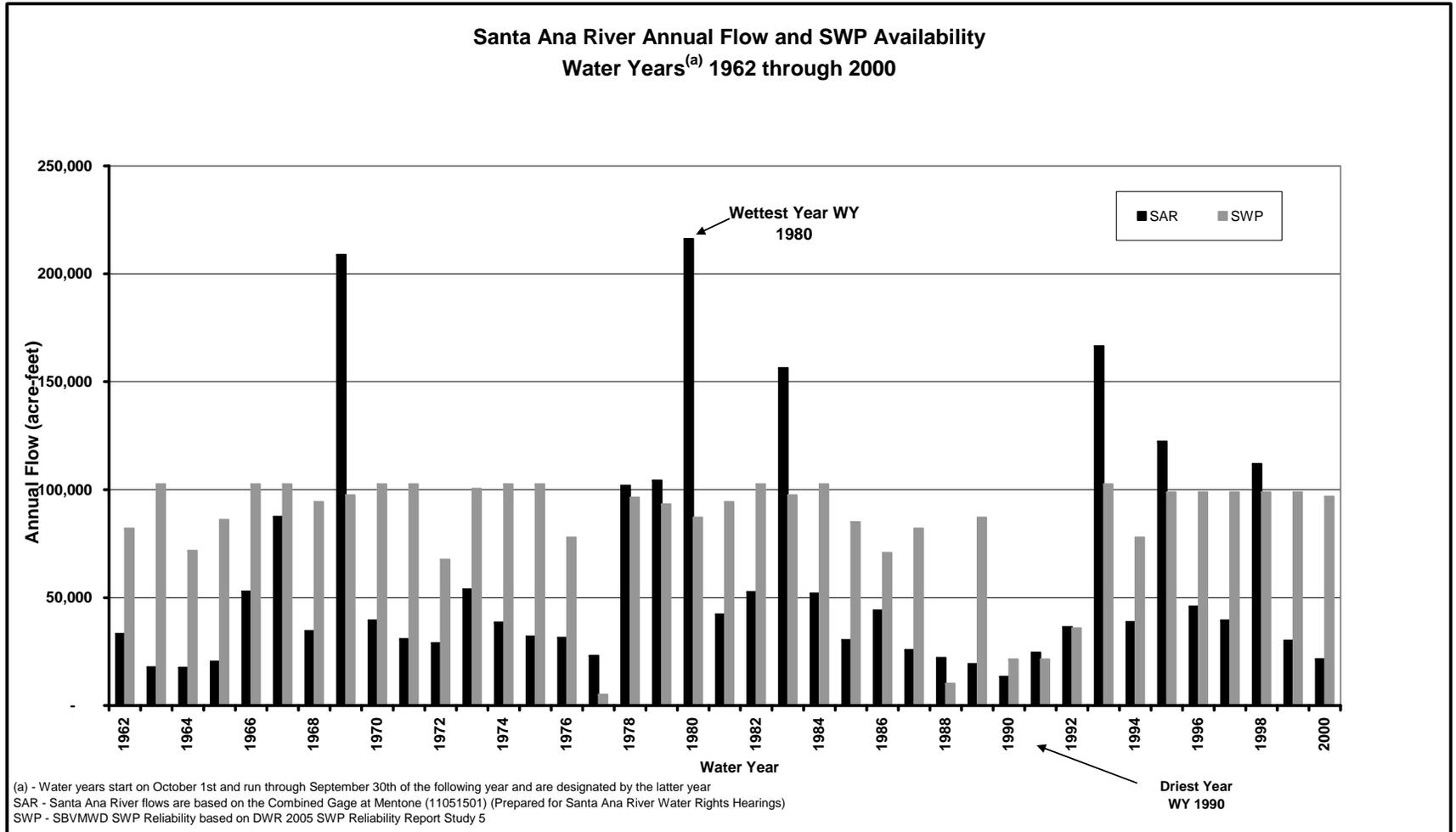
- Meeting average water year for the next 25 years,
- Meeting water needs during a single-year drought,
- Meeting water needs during a multi-year drought,
- Water shortage (up to 50 percent loss) contingency plan, and
- Catastrophic interruption in water supplies.

In addition to the above criteria, meeting peak demand water needs of the local purveyors within the Valley District service area may also be evaluated. Valley District initiated a study to review and evaluate how the above requirements can be met within the region. Below is a summary discussion to demonstrate how the region will meet its water needs as characterized above during the next 25 years.

As stated earlier, SAR flows are highly variable. Figure 4-18 shows the annual flows of the river from 1962 through 2000 and its range from over 200,000 acre-feet per year in 1980 to less than 15,000 acre-feet per year in 1992. The Seven Oaks Dam is operated as a flood control facility. Therefore, timely capture and use of SAR flows for recharge of the groundwater basin would provide significant water supply reliability benefits.

Chapter 3 presents the water budget for the region through 2030. The water budget assumed that SAR and SWP water will be used conjunctively with existing supplies used by the purveyors. Modeling studies were conducted for the water budget (base scenario) to examine how the water demand can be met using the SBBA as a reservoir to store, bank, and regulate the water resources of the region. The results of the modeling indicate the following:

Figure 4-18
Santa Ana River Annual Flow and SWP Availability

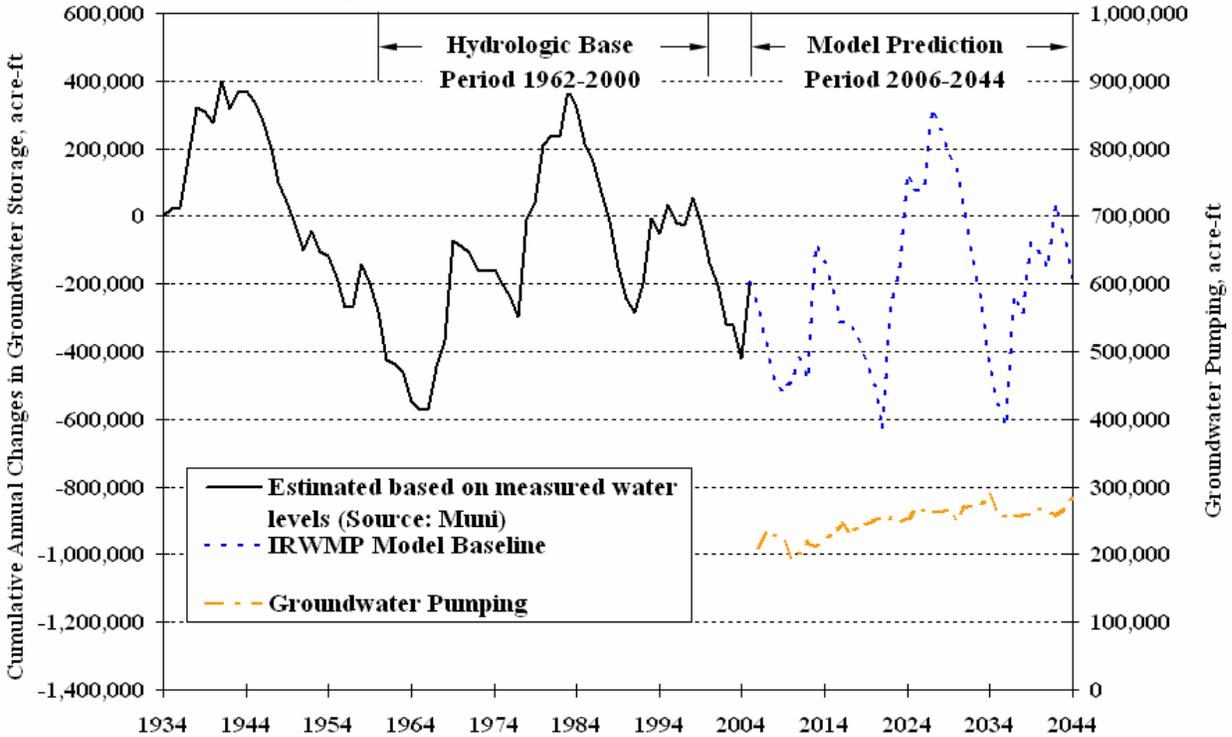


Note: Graph prepared for Valley District/Western Water Rights Applications Hearings

- **Average Year:** Modeling studies assumed that the SAR conservation water will be available to the region (Water Right Applications will be approved by the SWRCB), and SWP water supply reliability is as defined by DWR studies. Under the baseline conjunctive use operation scenario and water demand through 2030, the groundwater storage at the beginning and end of the 39-year study period was 200,000 acre-feet below the full basin (for this discussion, full basin is defined as storage at the 1993 level). This means on average the existing water supply is adequate to meet the demand in the region during the next 20 years, assuming published SWP reliability of 77 percent and that there will not be any long-term depletion of storage in the SBBA. This study was conducted for the Valley District service area and does not include the SGPWA service area, which will have a shortage in 2030.
- **Multi-Year Drought Period:** The modeling studies mimic the 1962 to 2000 period. The period of 1987 to 1992 is the driest recorded period for the SAR. During this period, maximum draw down of the SBBA occurred at approximately 600,000 acre-feet (see Figure 4-19). However, the storage in the basin recovered after the drought period (by 2000). The storage reduction during the multi-year drought period is approximately 10 percent of total groundwater storage.
- **Single-Year Drought:** The driest year of the period was 1992, which coincides with the last year of the multi-year drought period. The cumulative storage change in 1992 was about 600,000 acre-feet. Considering that SBBA storage is over 5 million acre-feet and the water levels recovered by the year 2000, the region can meet its water demand during the single-year drought as well as the multi-year drought period.

It should be mentioned that the modeling studies assumed that the newly conserved SAR water will be available for use and banking in the region (water rights applications are approved by the SWRCB). In order to take advantage of new SAR water, the facilities listed in Section 4.2.1.4.1 should be prioritized and implemented based on cost-effectiveness. This plan also assumes the current water quality problems at Seven Oaks Dam will be resolved by United States Army Corps of Engineers (USACE).

Figure 4-19
Cumulative Annual Changes in Groundwater Storage
for Baseline Conjunctive Use Scenario



4.2.1.6.1 Water Shortage Contingency Plan

The water shortage contingency plan provides a framework for implementing specific measures to deal with water shortages during emergencies. A water shortage contingency plan has been drafted for the region and should be adopted and implemented during severe water shortages. The plan provides specific actions that should be taken to ensure critical water needs of the region are met during a period in which water supplies are cut by 50 percent. A copy of the plan is presented in Appendix F.

4.2.1.6.2 Meeting Daily Peak Demands of Water Purveyors

This section examines the Valley District’s ability to deliver water to meet the purveyors’ service area peak day demand on SWP supplies. The purpose of this evaluation is to determine the adequacy of the conveyance capacity of Valley District’s facilities to make direct deliveries of SWP water during peak demand, today and in the future.



Valley District direct deliveries are to surface water treatment plants that were generally built to treat local surface water and for artificial recharge. The District deliveries are required when local surface water supplies are insufficient.

The peak day water demands for the following purveyors are examined by review of their UWMP:

- City of San Bernardino
- City of Redlands
- City of Rialto
- East Valley Water District
- West Valley Water District
- Yucaipa Valley Water District
- Fontana Water Company

Purveyors may have multiple sources of water to meet their peak demands. Groundwater supplies are generally used by the purveyors in the region to augment other sources of water. After discussion with agencies' staff and review of their UWMP data, Table 4-5 was prepared to show the future peak day demand on SWP supplies and the use of Valley District facilities.

In general, it is assumed for this analysis that there are no local surface water supplies available to meet peak demands. This is a conservative but reasonable assumption, since in some dry years local surface water may be severely limited on summer days; therefore, it is reasonable to examine peak day demands on the facilities when local surface water is not available. It is also assumed that SGPWA is obtaining its full Table A amount. Based on this cursory examination, all turnouts have adequate capacity for delivery of peak day demand on SWP water. The following Valley District's Pipelines, and pumping plants may be undersized for the future peak demands; however, the proposed East Branch Extension Phase II would alleviate all of these undersized facilities. It would provide parallel conveyance to the SARC Pipeline, Greenspot Pump Station, and Morton Canyon Connector I. It includes an annex to the Crafton Hills Pump Station that would contain three new 25 cfs pumps.

- If it is assumed that all Purveyors peak day demands coincide, the SARC Pipeline has a total future peak day demand of 144 cfs. Delivery to spreading grounds for the City of San Bernardino is 15 cfs, which can be

interrupted and rescheduled for when peak day demands on the pipeline do not exceed its capacity. SARC has a capacity of 72 cfs

- The Greenspot Pump Station has a future peak day demand of 100 cfs under these assumptions. It has a current capacity of 80 cfs.
- The Morton Canyon Connector has a future peak day demand of 100 cfs under these assumptions. It has a current capacity of 70 cfs.
- The Greenspot Pipeline has a future peak day demand of 100 cfs under these assumptions. It has a current capacity of 70 cfs.
- The Crafton Hills Pump Station has a future peak day demand of 77 cfs. It has a current capacity of 135 cfs.

A more detailed discussion of meeting peak day water demands of the purveyors is presented in Appendix F.



| Table 4-5 Future Peak Day SWP Demand for SBVMWD | | | | | | | | | | | | | | |
|--|----------------------------------|---|----------------------|-------------------------------|--------------------------------|---------------------------|-------------------------|--------------------------------|-----------------------------|-----------------------------|-----------------------------|--------------------------|-------------------------|--------------------------------------|
| | | Peak Day SWP Demand(cubic-feet per second) | | | | | | | | | | | | |
| | | SWP East Branch Extension | | | | | | | | | | | | |
| Delivery Point (Turnout) | Turnout Capacity | Foothill Pipeline | SARC Pipeline | Greenspot Pump Station | Morton Canyon Connector | Greenspot Pipeline | Crafton Hills PS | Crafton Hills Reservoir | EBX Reach 1 Pipeline | EBX Reach 2 Pipeline | EBX Reach 3 Pipeline | Tate Pump Station | Yucaipa Pipeline | Devil Canyon - Azusa Pipeline |
| City of San Bernardino (Sweetwater (16 in) and Waterman (30 in) Spreading Ground Turnouts) | 35 cfs and 135 cfs, respectively | 15.0 | | | | | | | | | | | | |
| East Valley WTP (Northfork Turnout (two 12in), City Creek (20in) Turnout (alternate)) | 16 cfs and 65 cfs, respectively | 12.4 | 12.4 | | | | | | | | | | | |
| Bear Valley - Northfork Irrigation (Northfork Turnout) | 16 cfs | 4.0 | 4.0 | | | | | | | | | | | |
| Mentone Reservoir (SARC – Bear Valley Sandbox Turnout) | | 6.0 | 6.0 | | | | | | | | | | | |
| City of Redlands - Hinckley WTP (SARC – Bear Valley Sandbox (two parallel 30 in) Turnout) | 40 cfs | 21.7 | 21.7 | | | | | | | | | | | |
| Bear Valley Highline (Bear Valley Highline Connector and/or Bear Valley Highline – Bouillioun Box Turnout) | 20 cfs | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | | | | | | | | |
| Greenspot Grove (Bear Valley #1 Turnout, _ cfs) | 6 cfs | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | | | | | | | | |
| Crafton Water Company (Crafton - Unger Turnout) (20 in) | 25 cfs | 6.0 | 6.0 | 6.0 | 6.0 | | | | | | | | | |
| City of Redlands - Tate WTP (Tate Treatment Plant Turnout) (24 in) Tate Pump Station | 32 cfs | 27.9 | 27.9 | 27.9 | 27.9 | | | | | | | 27.9 | | |
| Yucaipa Regional Park (Yucaipa Regional Park Turnout) (8 in) | 6 cfs | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | | | | | |
| Yucaipa Non-potable system, untreated SWP (Yucaipa Valley Water District #1) | 60 | 25.6 | 25.6 | 25.6 | 25.6 | 25.6 | 25.6 | 25.6 | 25.6 | 25.6 | | | | |
| Yucaipa WTP (Yucaipa Valley Water District #1 Turnout) | | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | | | | |
| San Geronio Pass Water Agency - Current | | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | | | |
| San Geronio Pass Water Agency - Future | | 16.0 | | | | | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | | | |
| West Valley Water District – Oliver P. Roemer WFF (Lytle Creek Turnout) | 32 cfs | | | | | | | | | | | | | 40.9 |
| West Valley Water District - North Villages WFF (Glen Helen (30 in) | 10 cfs | | | | | | | | | | | | | 2.6 |
| Fontana Water Company (Lytle Creek Turnout, 14 cfs) | 14 cfs | | | | | | | | | | | | | 18.7 |
| Facility Peak Day Demand: | | 175.2 | 144.2 | 100.1 | 100.1 | 100.1 | 76.7 | 76.7 | 76.7 | 76.2 | | 27.7 | 0.0 | 67.5 |
| Facility Conveyance Capacity | | 288.0 | 72 | 70 | 70 | 80 | 135 | 104 | 104 | 104 | | | | 110 |



4.2.1.7 Disaster Preparedness Strategies and Projects

This section addresses vulnerability of the region's water supply system to catastrophic events that may interrupt the water supply system in the Region. While not the only cause for catastrophic water supply interruption, the postulated Magnitude 8+ Earthquake certainly will be the predominant example in the region. Since a large magnitude earthquake is generally considered the most significant event for the region, this section concentrates on earthquake effects as the primary water supply interruption, knowing that other events would be treated similarly. Literature reviewed for this section include post-earthquake surveys of water system damage, earthquake planning reports included in purveyor's UWMPs, and available reports prepared by the State and federal agencies. Other catastrophic interruptions caused by regional power failure, terrorist attack, or other man-made or natural catastrophic event could cause similar conditions and issues to water supply systems in the region. For purposes of this report, a major earthquake is defined as an earthquake on the San Andreas Fault (SAF) on the order of 8.0.

The work conducted for this section is intended to be the first step and is at the conceptual level. Additional detailed work should be conducted in the future to further evaluate options to effectively address water supply system vulnerabilities. Details on water supply system vulnerability can be found in Appendix F and is summarized below. Appendix F includes a discussion of the following:

- An earthquake literature search of major earthquake events and what has been learned from such events.
- Evaluation of catastrophic interruption of regional facilities.
- Vulnerabilities of the region's water supply system to SWP supply interruption.
- Vulnerability of local purveyors' systems to an earthquake.
- Summary of Findings and Recommendations including a Water Shortage Contingency Plan.
- Water Shortage contingency planning.

4.2.1.7.1 Findings and Recommendations

Findings

The region is located in a seismically active area of Southern California. Four major fault zones are found in the region, including the San Jacinto Fault, the



Chino-Corona segment of the Elsinore Fault, the Cucamonga Fault, and the SAF. Numerous other minor faults associated with these larger fault structures may also present substantial hazards.

In Southern California, the SAF runs along the southern base of the San Bernardino Mountains, crosses through Cajon Pass, and continues northwest along the northern base of the San Gabriel Mountains. Historical records indicate that massive earthquakes have occurred in the central section of the SAF in 1857 and in the northern section in 1906 (the San Francisco Earthquake). In 1857, an estimated magnitude 8+ earthquake occurred on the San Andreas Fault rupturing the ground for 200 to 275 miles, from near Cholame to Cajon Pass and possibly as far south as San Geronimo Pass. The recurrence interval for a magnitude 8 earthquake along the total length of the fault is estimated to be between 50 and 200 years. It has been 147 years since the 1857 rupture. A study completed by Yuri Fialko (2005) suggests that the SAF in Southern California has been stressed to a level sufficient for an earthquake of magnitude 7.0 or greater.

These findings have been developed from a search of literature reporting the impacts of major earthquakes and limited work by water purveyors. More detailed, site-specific analyses are needed to better quantify and identify impacts from major earthquakes or other catastrophic outages.

- **Reliability of Groundwater Wells.** Review of post-earthquake lifeline performance reports reveals little discussion of groundwater well failure. However, loss of commercial power, damage to electrical equipment and aboveground appurtenances, or damage to the distribution system may effectively put the well out of service. Liquefaction, especially in areas where there is high groundwater levels between depths of 5 to 50 feet, may cause ground settlement and interfere with continued well operation.

No discussion of the performance of well head treatment systems during earthquakes was found. This may be due to the limited amount of well head treatment in place during prior earthquakes. As well head treatment typically includes purchased equipment installed in a field location, there is significant opportunity for lapses in the seismic design.

The groundwater basin and the groundwater production wells are a reliable part of the water supply system for the San Bernardino area.

- **Reliability of Pipelines.** Pipelines are generally the most fragile part of a water system. Generally, damage is a function of displacement rather than shaking. Empirical algorithms have been developed to predict seismic reliability of pipelines.

- **Reliability of Pump Stations.** Past earthquakes indicate that the structural and mechanical elements of a pump station are highly resistant to earthquake damage. The most likely failures are to the electrical equipment and loss of commercial power.
- **Reliability of Surface Water Treatment Facilities.** The major elements of a surface water treatment system are typically concrete structures that are very resistant to damage. However, these facilities include a large variety of mechanical equipment, much of it long and lightweight and subject to damage not only from the direct force of an earthquake, but also from the wave action created by the earthquake. Similar to a pump station, power supply and electrical equipment are fragile.
- **Reliability of the State Water Project.** While little specific information was found on anticipated damage to the SWP, the high susceptibility of the Santa Ana Valley Pipeline is recognized. Major vulnerability of the SWP includes the Sacramento-San Joaquin Delta and the California Aqueduct. The SWP does have a Business Resumption Plan and an Emergency Operations Plan.
- **Length of Outages.** Length of water service outages vary by earthquake and by purveyor. The Loma Prieta earthquake affected a large number of separate systems. The San Jose Water Company serves most of San Jose and all of Los Gatos. Los Gatos was hard hit and half of the water customers lost water service. In San Francisco, the worst hit area was the Marina District. Both fires and liquefaction affected the district. East Bay Municipal Water District serves 1.1 million customers and suffered \$3.7 million in damage. Damage included a break in a 60-inch raw water line.

After the Northridge earthquake, the Los Angeles Aqueducts Nos. 1 and 2 were in and out of service for temporary and permanent repairs over several months; these facilities were not critical at that time. Alternate supplies were available and drought conditions limited supply to these aqueducts.

Valley District's Emergency Operations Plan includes estimates for repair of Valley District facilities. Electrical and pipe repairs are estimated to take 35 to 77 days. Pump repairs are estimated to take 168 to 273 days.

Table 4-6 shows how interruption in each of the Valley District facilities may impact water deliveries for the local purveyors. Interruption in



**Table 4-6
Valley District Facilities Used to Deliver Water to Retail Agencies**

| Agency | Foothill Pipeline | SARC Pipeline | Morton Canyon Connector | Green-spot Pipeline | Green-spot Pump Station | Devil Canyon - Azusa | Tate Pump Station | Crafton Hills PS | Crafton Hills Reservoir | EBX ¹ Reach 1 Pipeline | EBX Reach 2 Pipeline | Yucaipa Pipeline | Baseline Feeder |
|---|-------------------|---------------|-------------------------|---------------------|-------------------------|----------------------|-------------------|------------------|-------------------------|-----------------------------------|----------------------|------------------|-----------------|
| San Bernardino Municipal Water Department | ✓ | ✓ | ✓ | ✓ ² | - - | - - | - - | - - | - - | - - | - - | - - | - - |
| East Valley Water District | ✓ | ✓ | ✓ | ✓ ² | - - | - - | - - | - - | - - | - - | - - | - - | - - |
| City of Redlands – Hinckley | ✓ | ✓ | ✓ | ✓ | ✓ | - - | - - | - - | - - | - - | - - | - - | - - |
| City of Redlands – Tate | ✓ | ✓ | ✓ | ✓ | ✓ | - - | ✓ - | - - | - - | - - | - - | - - | - - |
| Bear Valley MWC - In lieu obligation and irrigation | ✓ | ✓ | ✓ | ✓ | ✓ | - - | - - | - - | - - | - - | - - | - - | - - |
| Yucaipa Valley Water District | ✓ | ✓ | ✓ | ✓ | ✓ | - - | - - | ✓ - | ✓ - | ✓ - | ✓ - | ✓ - | - - |
| Fontana Water Company | ✓ | ✓ | ✓ | ✓ ² | - - | ✓ - | - - | - - | - - | - - | - - | - - | - - |
| West Valley Water District | ✓ | ✓ | ✓ | ✓ ² | - - | ✓ - | - - | - - | - - | - - | - - | - - | ✓ - |
| City of Rialto | - - | - - | - - | - - | - - | - - | - - | - - | - - | - - | - - | - - | ✓ - |

Notes:

¹EBX: East Branch Extension of the California Aqueduct

² Required only if Mill Creek water is being delivered in a westerly direction.

Valley District's conveyance system is used to implement the Santa Ana-Mill Creek Cooperative Water Project and effect deliveries of local surface water and exchanges of local surface water and State Project water.

The Devil Canyon - Azusa Pipeline is owned by San Gabriel Valley Municipal Water District. Valley District has conveyance capacity of the pipeline from Devil Canyon to the Lytle Creek area and uses this capacity to convey water to West Valley, Rialto, and Fontana. It could be used to convey local surface water if the SWP were to fail and if the legal issues were resolved.

The Baseline Feeder is used to convey groundwater to Rialto and West Valley. The groundwater is produced by the City of San Bernardino on behalf of Valley District and by Rialto for Rialto. Valley District deliveries to San Bernardino Municipal Water Department are for recharge. Changes in recharge impact well hydrographs in six to seven months.

Foothill Pipeline, Santa Ana River Connector Pipeline, Morton Canyon Connector, and Greenspot Pipeline affect every purveyor that receives water from Valley District.

4.2.1.7.2 Recommendations for Disaster Preparedness

This section includes recommendations based on the literature review, review of the Valley District facilities, and discussions with District staff and purveyors. Some of the projects already included in the IRWM Plan that would enhance disaster preparedness have also been reviewed in this section.

General Recommendations

- Valley District should consider a Seismic Improvement Program/Water Infrastructure Reliability Project to review the adequacy of Valley District facilities to withstand an earthquake. East Bay Municipal Utilities District and Santa Clara Valley Water District (Santa Clara Valley Water District, 2005) are two agencies that have performed such studies. High priority facilities include Foothill Pipeline, Santa Ana River Connector, Morton Canyon Connector, and Greenspot Pipeline.
- Valley District should consider the opportunities that Big Bear Lake presents as an emergency source of water after an earthquake that interrupts SWP deliveries for many weeks.
- Valley District should consider using the existing MWD agreements to allow the use of Metropolitan Water District facilities to bypass failed Valley District facilities (and the reverse).
- Review the ability to provide drinking water immediately following an earthquake. Arrangements to provide bottled water may be appropriate.
- The USGS Multi-hazards Demonstration Project (MHDP) is leading an effort to create a scenario document for a future M7.8 southern San Andreas Fault earthquake. The document will describe in detail the effects of the earthquake. It will form the basis for a November 2008 statewide earthquake response exercise. This document should be reviewed when it is ready, as useful information for disaster preparedness planning will come out of this effort.

Proposed Projects to Provide Conveyance System Redundancies for the Regional Facilities

Implementation of the following projects (included in the IRWM Plan) may be of particular benefit during major disasters by providing redundancies for the conveyance system.



Project 12 - Central Feeder Pipeline

The Central Feeder System, including projects 12.1 through 12.7, provides the ability to convey Bunker Hill Basin groundwater to purveyors. This project is particularly important because it provides redundancy for the Foothill Pipeline.

Project 36 - West End Pump Station

By conveying Bunker Hill Basin groundwater to the west, provides redundancy to the Baseline Feeder West Extension and the Lytle Creek Pipeline.

Project 37 - 9th Street Feeder

This project conveys Bunker Hill Basin groundwater as an alternative water supply to East Valley.

Project 39.1 - Mentone Pipeline

Mentone Pipeline may be constructed as the East Branch Extension Phase II to provide additional conveyance capacity to the east—YVWD and SGPWA.

Project 54 - Bunker Hill Regional Water Supply

This project improves the ability to produce groundwater and place that groundwater into regional transmission systems.

Project 57 - Bunker Hill Basin Water Supply Reliability Project

This project improves the ability to convey Bunker Hill Basin groundwater to the west and provides alternative conveyance to the Baseline Feeder and Lytle Creek Pipeline. This project also provides redundancy for Project 54.

Project 60 - Baseline Feeder West Extension

This project provides a method to deliver Bunker Hill Basin Groundwater west beyond West Valley’s service area, providing an alternative supply to Fontana Water Company.

4.2.1.7.3 Alternative Local Supplies

This section is intended to initiate a discussion of options that would improve the water supply reliability in case of a catastrophic failure of portions of the Valley District water system.



Foundation for the Redlands Pump Station which will deliver water into the Central Feeder, Phase 1 Pipeline.

Interties between Retail Agencies

Table 4-7 lists interconnections between purveyors. These interties could be used to balance supplies between purveyors during an emergency. An interconnection between the City of San Bernardino and East Valley is currently being used to facilitate blending. This use is anticipated to end in the near future. FWC has historically depended on supplies delivered through its interconnection with Cucamonga Valley to meet peak day demand.

**Table 4-7
System Interties between Retail Agencies**

| Agencies | Direction | Capacity (MGD) | Remarks/data source |
|--|-----------------------|----------------|---|
| City of San Bernardino/East Valley | Either | 4 | Three interties. One currently used to facilitate blending. |
| City of San Bernardino/Riverside | To San Bernardino | 2 | (San Bernardino UWMP, Pg 2-10) |
| City of San Bernardino/West Valley | Either | 3 | (San Bernardino UWMP, Pg 2-10) |
| City of San Bernardino/Loma Linda | Either | 5 | (San Bernardino UWMP, Pg 2-10) |
| City of San Bernardino/Colton | To Colton | 3 | (San Bernardino UWMP, Pg 2-10) |
| City of San Bernardino/Rialto | Either | 3.6 | (San Bernardino UWMP, Pg 2-10) |
| City of San Bernardino/Riverside Highland | To Riverside/Highland | 3 | (San Bernardino UWMP, Pg 2-10) |
| Fontana/Cucamonga Valley | Either | 3.6 | Fontana UWMP (2500 gpm) |
| West Valley/Fontana | Either | | West Valley UWMP. |
| West Valley/Rialto | Either | | West Valley UWMP. |
| West Valley/Colton | | | West Valley UWMP. |
| Redlands/Loma Linda | To Loma Linda | | Greg Gage |
| Rialto/Marygold | To Marygold | | Rialto has historically conveyed 1,500 afy of groundwater to Marygold. The agreement under which this was accomplished is expiring. |
| Sources: San Bernardino Municipal Water Department 2005 UWMP; Jack Nelson, Yucaipa Valley; Ron Buchenwald, East Valley; Greg Gage, Valley District, West Valley 2005 UWMP. Based on the limited sources of data, this list may be incomplete. | | | |

Big Bear Lake

Big Bear Lake has a capacity of over 70,000 acre-feet, most of which is owned by the Bear Valley Mutual Water Company. An agreement could be written that might make water from the lake available for municipal use in case of a catastrophe.



Increased Groundwater Production Capacity and Reliability

If the catastrophe is an earthquake, the most likely impact on groundwater production capacity will be damage to the electrical system of the well or to the electricity supplier's system.

Thus, providing emergency generators for "key" wells would help improve the area's ability to operate after a catastrophic failure.

4.2.1.7.4 Alternative Conveyance of Surface Water

Alternatives to Foothill Pipeline System

The following systems could provide some alternative conveyance of surface water should portions of the Foothill Pipeline System fail.

- Metropolitan's Inland Feeder can convey water stored in Diamond Valley north to the SBVMWD service area. The conveyance capacity of the Inland Feeder operating from Diamond Valley Lake to the north is reported to be 250 cfs.
- Once completed, the tunnel portion of the Inland Feeder, with proper inerties, will be able to convey SWP water from Devil Canyon Afterbay into the Foothill Pipeline.
- The Central Feeder, portions of which are under construction, would increase the ability to convey groundwater between agencies following a catastrophe. Connecting the Central Feeder to the Santa Ana Valley Pipeline and to the Crafton Hills Pump Station would provide redundancy for the Foothill Pipeline.
- The proposed East Branch Extension Phase II will convey SWP water from the eastern portion of the Foothill Pipeline to Crafton Hills Pump Station. This will provide increased capacity for the SARC Pipeline, Greenspot Pump Station, Morton Canyon Connector I, and Greenspot Pipeline.
- The proposed State Water Project Extension (previously called the Desert Aqueduct) contemplates extension of the State Water Project to Coachella Valley. Depending on the alignment chosen, this project could provide an alternative for conveying SWP water to portions of the Valley District service area or to San Geronio's service area.



A segment of the 78-inch-diameter Central Feeder, Phase 1 pipeline is lowered into place.

Alternatives to the Lytle Pipeline

- Metropolitan’s Foothill Feeder, the Rialto Pipeline segment, parallels the Devil Canyon-Azusa Pipeline east for approximately nine miles. With turnouts, it could provide alternative conveyance to West Valley’s and FWC’s surface water treatment plants.
- The Baseline Feeder conveys groundwater to West Valley and Rialto. This groundwater is an alternative to SWP water conveyed by the Lytle Pipeline.

Alternatives to Baseline Feeder System

- The Devil Canyon-Azusa Pipeline conveys SWP water to West Valley, FWC, and Rialto. This surface water is supplemental to groundwater conveyed by the Baseline Feeder.

4.2.1.7.5 Back-Up Power Supplies

Power Supplies for Pumping Plants and Groundwater Wells

A catastrophic earthquake may cause loss of electricity for an indeterminate amount of time. In order to ensure water supplies in the immediate aftermath and weeks following a major earthquake, it is critical to have back-up generators or internal combustion engines for key pumping stations and production wells throughout the region.

Similar evaluations should be conducted for other facilities such as water treatment plants and the key pumping plants, and back-up power generation should be put in place for use during emergencies.

4.2.1.7.6 Climate Change



Climate change may have a considerable impact on management of water supply and flood control systems in the state.

Climate change may have considerable impact on the management of water supply and flood control systems in the State. Climate change impacts may include changes in the following:

- Temperature and its effect on timing of snow melt,
- Precipitation variation and intensity, and
 - Snow pack and snow-covered areas in the watershed.

In July 2006, DWR issued a Technical Memorandum Report entitled “Progress on Incorporating Climate



Change into Management of California's Water Resources." The study presented in the report focused on the four climate change scenarios selected by the Climate Action Team, which was appointed in response to the Governor's Executive Order SB3-05 on climate change. Four climate change simulations represent two greenhouse gas emission scenarios and two different models that were used to evaluate the climate effects. The two gas emission scenarios were developed by the Intergovernmental Panel on Climate Change representing low and high emission scenarios. Each scenario was then examined by two models, the Geophysical Fluid Dynamic Lab model (GFDL) and the Parallel Climate Model (PCM). The results of the study indicate the following:

- By 2050, the PCM model predicts a one-degree Celsius increase in temperature for both gas emission scenarios, while the GFDL model predicts a 2.25-degree increase for both scenarios. Increases up to 5 degrees Celsius occur by 2100 in the GFDL model.
- Climate model projections for changes in total annual precipitation in California through the end of this century are mixed. Models predicting the greatest amount of warming generally predicted moderate decreases in precipitation. Models projecting smaller increases in temperature tend to predict moderate increases in precipitation.
- Changes in runoff associated with climate change can be related to the changes in watershed response due to the modification of the seasonal snow pack. Increasing temperatures will likely push the snow level in watersheds to higher elevations, leaving more of the watershed available to contribute to direct winter runoff processes. In addition, higher elevation snow levels decrease the available watershed area for snow pack to develop.
- Increased temperatures are likely to lead to increased elevations for snow pack formation, which leads to a greater contributing area for winter storm runoff. In addition, warming temperatures may lead to early melting of snow pack. The combination of earlier melt time, greater variability, and greater potential for direct storm runoff may challenge the current flood and water supply system in California.

For Southern California, the GFDL model predicts a 10 percent decrease in precipitation after 2050 for both gas emission scenarios, while the PCM model predicts a 1 percent decrease in precipitation for both scenarios. By 2100, however, the PCM model predicts a 10 percent increase in precipitation for both scenarios. (See Table 4-8.)

**Table 4-8
PCM Model of Precipitation**

| Southern CA | 1961-1990 Average | 2035-2064 Average | Difference |
|-------------|-------------------|-------------------|------------|
| Historical | 14.24 | N/A | N/A |
| GFDL A2 | 17.92 | 17.70 | -0.22 |
| GFDL B1 | | 16.15 | -1.77 |
| PCM A2 | 11.36 | 12.06 | 0.70 |
| PCM B1 | | 11.28 | -0.08 |

Historically, average snowline elevations in California have ranged from about 4,500 feet in the north to above 6,000 feet in the southern Sierra mountains. DWR staff estimates that the average snow-covered area totals about 13,200 square miles in the water-supply-producing basins of the Central Valley and the Trinity River above Lewiston. This is about 8 percent of the State’s total land surface. The northern Sierra and Trinity mountains account for about 7,000 square miles of the 13,200 square mile total. The west slope of the southern Sierra accounts for the remainder. Rising temperatures will cause reductions in the State’s snow pack by raising snowline elevations and reducing the area where annual snow pack accumulates. A rudimentary analysis of the impact of rising temperatures on snow pack shows that a 3 degree Celsius rise will likely cause snowlines to rise about 1,500 feet, based on a moist lapse rate of 500 feet per 1 degree Celsius. This would cause a significant reduction in the amount of snow-covered area in the State and an estimated average annual loss of about 5 million acre-feet of effective water storage in snow pack. Climate model studies support projections for continued reductions in the State’s snow pack as a result of warming. Simulations under various amounts of temperature rise indicate that California’s snow pack is very vulnerable to warming.

Generally, there is great uncertainty in the magnitude, timing, and location of precipitation and runoff changes associated with climate change. However, it is generally understood that climate change would decrease snow runoff and therefore reduce the level of water supply reliability of the existing projects, including the SWP. It is also understood by the water managers that additional data sets, research, and studies will be needed to more accurately bracket the potential impacts of the climate change on the State water supply and flood control system.

There is also a great level of uncertainty in magnitude of reduction in water supply due to climate change for Southern California and for Upper Santa Ana, in particular. Considering uncertainty about the water supply impact of climate change in the Upper Santa Ana Region at this time, the TAG has acknowledged the need for additional studies. Because of the uncertainty about the magnitude



of climate change impact on the water supply, it is premature to plan for expensive infrastructures in Upper Santa Ana to deal with associated impacts. Instead, the TAG has decided to first conduct a sensitivity analysis to determine what range of impact climate change may have on water supply availability and groundwater storage in the region and then plan for strategies to deal with the potential impacts. The sensitivities analysis is followed by formulation of appropriate strategies to deal with potential future water shortage associated with climate change.

The sensitivities analyses indicate that the impact of reduction of SWP reliability and the reduction of the long-term local surface supply by 10 percent will result in a reduction of about 20,000 acre-feet of water supplies in the region.

Assuming reduction of SWP and local supplies will occur as stated above, the region will need about 20,000 acre-feet to offset the impact of climate change.

To deal with the changes in water supply associated with climate change, it is recommended that a series of additional aggressive water conservation and recycling programs be developed for the Upper Santa Ana Region. Because these conservation and recycling programs are in addition to 40 TAF conservations projects envisioned to be implemented to meet 2030 water needs, additional studies should be conducted to develop feasible projects. A detailed discussion of water conservation and water recycling strategies is presented under the water management strategy section of this plan.

4.2.2 Protect and Enhance Water Quality Objective

The goal of this objective is to protect the quality of the region's surface water and groundwater resources. To ensure reasonable protection, the water management strategies for the basin should be consistent with and contribute to the water quality objectives for the region, such as the Santa Ana Regional Water Quality Control Plan and the SAWPA IRWM Plan. The water quality objective is designed to address issues specific to the region.

Groundwater management is currently influenced by the presence of contamination plumes. Most of these plumes resulted from historic military and industrial operations in the region. The following plumes have been identified:

1. Newmark-Muscoy Superfund (trichloroethylene (TCE)
2. Redlands-Crafton (TCE, Perchlorate)
3. Santa Fe Plume (TCE)
4. Former Norton Air Force Base (TCE)
5. Rialto-Colton Subbasin (PCE, TCE, 1,1-DCE, cis-1,2-DCE, perchlorate)
6. No-Mans Land (PCE)

Management strategies will be developed to not only avoid any adverse impacts that would cause these plumes to spread further but also to develop projects that will accelerate the cleanup of these plumes. These strategies will be evaluated using computer models. Avoiding any impacts to and from the plumes, and their removal when possible, is considered a BMO for the region. This BMO is also consistent with the Groundwater Management Planning Act requiring BMOs to be formulated to address groundwater quality issues of the basins.

Federal and State law, the Orange County and Western Judgments, and sound water management practices require compliance with specific water quality standards. The Clean Water Act is the federal law requiring that water quality standards be established and, as appropriate, revised. The Porter-Cologne Act is the State law that established both the SWRCB and the present system of nine RWQCBs. This law directs that each Regional Board formulate a water quality control plan for its region that complies with the requirements of federal and State law and also regularly update these plans. The Upper SAR watershed is subject to the jurisdiction of the Basin Plan.

The Basin Plan establishes water quality standards for all the ground and surface waters in the watershed. It identifies a total of 19 beneficial uses of water in the



SAR Basin and the levels of water quality that must be met and maintained. Examples of these beneficial uses include Municipal and Domestic Supply, Groundwater Recharge, and Wildlife Habitat. The Basin Plan also includes narrative and specific numeric objectives for inland surface waters and groundwater and regulatory plans to achieve these objectives. Dissolved minerals, generally expressed as TDS; nitrogen levels, largely in the form of nitrate; and the presence of groundwater contamination, for example, PCE and TCE contaminants, are primary concerns.

With respect to surface water quality, the Federal Clean Water Act Section 303(d) requires that states identify waters that do not or are not expected to meet water quality standards (beneficial uses, water quality objectives, and the anti-degradation policy) with the implementation of Best Available Technology. Once a water body has been placed on the 303(d) list of impaired waters, states are required to develop a Total Maximum Daily Load (TMDL) to address each pollutant causing impairment.

A TMDL defines how much of a pollutant a water body can tolerate and still meet water quality standards. Each TMDL must account for all sources of the pollutant, including discharges from wastewater treatment facilities; runoff from homes, forested lands, agriculture, streets, or highways; contaminated soils/sediments and legacy contaminants such as dichlorodiphenyltrichloroethane (DDT) and polychlorinated biphenyls (PCBs); on-site disposal systems (septic systems); and deposits from the air. Federal regulations require that the TMDL, at a minimum, account for contributions from point sources (permitted discharges) and nonpoint sources, including natural background.

In addition to accounting for past and current activities, TMDLs allocate allowable pollutant loads for each source, and identify management measures that, when implemented, will ensure that water quality standards are attained. The Basin Plan (described above) must include an implementation plan that describes how the water quality standards established in the Basin Plan will be met. TMDLs, with their associated implementation plans, are adopted into the Basin Plans through the Basin Planning process.

The ability to protect water quality has a direct bearing on the viability of many IRWM Plan objectives and strategies. This section describes strategies and projects for (1) TDS and Nitrogen Management, (2) Remediation of Groundwater Contamination, (3) Water Supply, (4) Surface Water Quality Improvement, and (5) Groundwater and Surface Water Quality Monitoring.

4.2.2.1 Total Dissolved Solids and Nitrogen Management Strategy

Groundwater quality in the Upper SAR watershed is generally good; however, long-term historic land-use practices, particularly agriculture, have resulted in an

accumulation of salts that are now in the unsaturated soils overlying groundwater subbasins (now defined in the Basin Plan as groundwater management zones). These salts will, over time, degrade groundwater quality.

Watershed stakeholders have invested significant resources to better understand and resolve questions concerning the build-up of dissolved minerals in the watershed. These initiatives are in response to water quality monitoring and computer modeling of groundwater indicating that the levels of dissolved minerals, generally expressed as TDS, were exceeding water quality objectives or would do so in the future in some groundwater subbasins unless appropriate controls were implemented. Nitrogen levels, largely in the form of nitrate, were likewise projected to exceed objectives.

In 1996, a Nitrogen and Total Dissolved Solids (TIN/TDS) Task Force was formed in the watershed to conduct scientific investigations regarding the then existing TDS and nitrogen and water quality objectives of the 1995 Basin Plan. This Task Force, administered by SAWPA, was comprised of 22 water supply and wastewater agencies.

In 2003, a Final Technical Memorandum was completed that reported the results of this scientific investigation, *The TIN/TDS Study – Phase 2B of the Santa Ana Watershed Wasteload Allocation Investigation*. In 2004, as a result of this work, the Basin Plan was amended. As amended, the Basin Plan implements new water quality monitoring and reporting requirements. One such requirement is the preparation of an *Annual Report of Santa Ana River Water Quality*.

In June 2007, the third *Annual Report of Santa Ana River Water Quality* was prepared. The report provides water quality information that will be utilized to develop and implement a surface water monitoring program, which, in turn, will enable watershed stakeholders to determine compliance with the nitrogen and TDS objectives of the SAR, and, thereby, the effectiveness of wasteload allocations prescribed in the Basin Plan.

The Basin Plan establishes new TDS and nitrogen water quality objectives for both surface water and groundwater. It also establishes new surface water monitoring commitments associated with certain agencies' "maximum benefit" programs. This is a comprehensive monitoring program implemented by some Task Force members that includes an evaluation of compliance with the TDS and nitrogen objectives for Reaches 2, 4, and 5 of the SAR.

SAR Reach 5 is located in the Upper SAR watershed. The Basin Plan specifies water quality objectives for SAR Reach 5 for TDS, hardness, sodium, chloride, TIN, sulfate, and COD. Along SAR Reach 5, the OCWD monitors a single site, *SAR-WATERMAN-01*. In 2006, this site was monitored by OCWD only once in



August. Based upon analysis of the limited available data collected by OCWD, no constituents were shown to exceed Basin Plan objectives.

Non-tributary discharges to SAR Reach 5 include recycled water inflows from the City of San Bernardino Water Reclamation Facility and potential inflows from San Timoteo Creek produced at Yucaipa Valley Water District (YVWD) Wastewater Reclamation Facility and City of Beaumont's WWTP No. 1. As demonstrated in previous years' measurements of streamflow conducted by YVWD, during dry-weather conditions, the City of Beaumont's recycled water discharge completely infiltrates into the streambed in Cooper's Creek, a tributary of San Timoteo Creek. Prior to San Timoteo Creek's confluence with SAR, almost all of YVWD's recycled water discharge infiltrated the nearby streambed. The U.S. Geological Survey (USGS) maintains two gaging stations for this segment of the SAR—Station 11059300, located along the SAR at E Street near San Bernardino, and station 11057500, located along San Timoteo Creek near Loma Linda.

The water quality strategy for TDS and Nitrogen Management includes the following:

- Continue to work collaboratively with stakeholders throughout the entire Santa Ana watershed, including the RWQCB and the TDS/TIN Task Force to develop sound water management solutions that are responsive to site-specific hydrologic characteristics. Implement the signed agreement between the RWQCB and certain water agencies to "Protect Water Quality and Encourage the Conjunctive Uses of Imported Water in the Santa Ana River Basins." The agreement does not restrict the beneficial uses of SWP water for groundwater recharge, with the acknowledgement that the RWQCB could consider regulatory actions to restrict the use of SWP water for groundwater recharge in the future.
- **YVWD Desalter and Brine Disposal Project** – The construction and operation of groundwater desalters to extract and treat poor quality groundwater has been and continues to be an essential component of salt management in the Upper SAR watershed. Such projects will be increasingly important in the watershed to protect local water supplies and provide supplemental, reliable sources of potable supplies.

In the San Timoteo watershed areas, the YVWD anticipates that demineralization of groundwater or recycled water will be necessary in the future. YVWD is committed to constructing and operating desalting and brine disposal facilities according to terms and conditions described in the Basin Plan. The construction of these facilities will be in accordance with a plan and schedule submitted by YVWD and

approved by the RWQCB. These facilities should be designed to stabilize or reverse the degradation trend evidenced by effluent and/or management zone quality.

- **City of Beaumont and the San Timoteo Watershed Management Authority (STWMA) Desalter and Brine Disposal Project** – The construction and operation of groundwater desalters to extract and treat poor-quality groundwater has been and continues to be an essential component of salt management in the Santa Ana watershed. Such projects will be increasingly important in the Upper SAR watershed to protect local water supplies and provide supplemental, reliable sources of potable supplies.

The City of Beaumont and STWMA will construct and operate desalting facilities and brine disposal facilities according to terms and conditions described in the Basin Plan. The construction of these facilities will be in accordance with a plan and schedule submitted by the City of Beaumont and STWMA and approved by the RWQCB. These facilities shall be designed to stabilize or reverse the degradation trend evidenced by effluent and/or management zone quality.

- **Santa Ana Regional Interceptor (SARI) Improvement Project** – The SARI is primarily a utility for non-reclaimable wastewater. Its highest and best use is the removal of salts from the watershed to keep them from degrading water quality and thereby allowing better long-term and sustainable use of groundwater resources and expansion of the region's ability to reclaim water. The long-term goal of achieving salt balance within the region can be accomplished through the use of local desalters, selective use of imported water in combination with exporting salts from the watershed through the SARI pipeline.

In the Upper SAR watershed, the SARI extends into the cities of Riverside and San Bernardino. The SARI faces challenges such as the deferral of system maintenance and high capital costs for on-going improvements, repairs, refurbishment, and capacity management. Projects will be developed to fully utilize the capacity of the SARI system and to ensure its viability as a means to remove salts from the watershed.

4.2.2.2 Remediation of Groundwater Contamination Strategy

Several contaminant plumes are present throughout the region. These plumes limit the use of groundwater in some areas as well as management of the groundwater basins. Clean-up activities are undertaken for some plumes as discussed below and specific strategies are being developed to expedite



remediation in others. The SBBA is impacted by five major groundwater contamination plumes. Remediation of these plumes is underway. For example, remediation of the Newmark-Muscoy and former Norton Air Force Base Plumes is progressing under the EPA Superfund Program.

The proposed Bunker Hill Regional Water Supply Project is another measure to facilitate and expedite remediation of the Newmark Plume while accomplishing other important purposes—to provide a new source of water supply, improve water supply reliability during dry periods, develop a conjunctive use project that would optimize the capture and storage of imported water in strategic locations within the Bunker Hill Basin, facilitate in-lieu groundwater storage in adjacent groundwater basins, and improve regional water supply reliability during dry periods.

The project is the development of a well field to extract contaminated groundwater from the Newmark Plume and deliver it to a water treatment plant where it would be treated to remove PCE and TCE contaminants. After treatment, the water would be conveyed to Bunker Hill Basin groundwater purveyors for municipal and domestic use. The amount of water to be extracted and supplied ranges from 20,000 to 60,000 acre-feet per year. Annual production from the project could not exceed the quantities previously recharged under the program. In order to sustain these extraction rates, it is assumed that a similar amount of imported water, supplemented by stormwater, would be used to recharge the groundwater basin located upgradient of the proposed well field. This strategy was discussed in detail in Section 4.2.1.3.2 under Bunker Hill Basin Regional Water Supply Program.

FWC currently operates and maintains a groundwater remediation project at its Plant F10 pursuant to a long-term agreement with San Bernardino County, the owner and operator of the Mid Valley Sanitary Landfill, and a corresponding Clean-Up and Abatement order issued to San Bernardino County by the RWQCB. The 5,000 gpm treatment plant utilizes liquid phase granular activated carbon to treat for volatile organic compounds including but not limited to PCE, TCE, 1,1-DCE, and cis-1,2-DCE. The plant treats and removes those contaminants from groundwater extracted from both the Rialto-Colton and No-Mans Land subbasins.

Other projects to protect groundwater quality within the region include septic system conversion for the Highgrove Area and the Pellesier Ranch Barrier wells and water treatment plant.

4.2.2.3 Improving Groundwater Quality by Recharge of the Basins with Good Quality Water

The quality of water supply impacts the multiple beneficial uses of water. For example, the quality of water supply impacts the extent to which wastewater can be reused and recycled without resulting in adverse impacts on affected receiving waters as well as discrete industrial discharges, returns to groundwater from homes using septic tank systems, returns from irrigation of landscaping in sewerred and unsewerred areas, and returns to groundwater from commercial irrigated agriculture.

Imported SWP water is an important part of the region's water supply. The use of higher quality SWP water, with a long-term TDS average of less than 300 milligrams per liter (mg/L), together with the capture of flood/stormwater for groundwater recharge can also be an important part of the region's strategy to protect water quality.

The use of SWP water can allow for maximum reuse of water supplies without aggravating the watershed mineralization. It can also be utilized for direct and in-lieu recharge of groundwater basins to improve long-term and dry-year period water supply reliability. Under certain circumstances, such as the Bunkerhill Regional Water Supply Project (see "Remediation of Groundwater Contamination Strategy"), it can be utilized to facilitate and expedite groundwater remediation. Therefore, the use of high-quality SWP water in the Upper SAR watershed can provide multiple benefits that extend beyond direct water supply.

Likewise, the use of flood water/stormwater for groundwater recharge is an important part of an overall strategy to improve water quality. Most groundwater recharge occurs in the natural channels of the Upper SAR watershed. The San Bernardino County Flood Control District (SBCFCD), the SBVWCD, and other agencies in the region operate extensive recharge facilities that enhance the capture and recharge of high-quality stormwater.

Fully utilizing higher quality SWP water and flood water/stormwater for groundwater recharge will be accomplished through operation of existing facilities to maximize recharge during periods of optimal water quality (e.g., during wet periods) and through the planning, design, and construction of new groundwater recharge facilities and multi-purpose flood control district facilities such as soft-bottom flood control channels. This strategy will also require the planning and development of conveyance facilities and new institutional arrangements to share and coordinate use of facilities that are owned and operated by multiple agencies.



Facilities are planned by STWMA to recharge imported water and stormwater. Facilities are also planned as part of “maximum benefit” proposals by the YVWD, STWMA, and the City of Beaumont. Such proposals include efforts to import and recharge high quality SWP water when it is available. These activities increase both the quantity and quality of available groundwater resources.

4.2.2.3.1 Cooperative Agreement to Protect Water Quality and Encourage the Conjunctive Uses of Imported Water in the Santa Ana River Basin

The Cooperative Agreement to Protect Water Quality and Encourage the Conjunctive Uses of Imported Water in the Santa Ana River Basin was signed in 2007 by the Santa Ana Regional Water Quality Control Board (SARWQCB), and the City of Corona, City of Riverside, Eastern Metropolitan Water District, Elsinore Valley Metropolitan Water District, OCWD, Valley District, SGPWA, and Western (Recharge Parties).

The RWQCB is charged by statute with adopting water quality objectives as may be required to protect the beneficial uses of water within the region. In particular, the long-term conjunctive use of groundwater in the region requires that the quality of water in groundwater basins in the region be managed to meet the water quality objectives for nitrogen and TDS (collectively, the Salinity Objectives) adopted by the RWQCB in the 1995 Water Quality Control Plan for the Santa Ana River Basin, as amended in 2004 by R8 2004-0001 (Basin Plan).

The Salinity Objectives presently included in the Basin Plan are the result of a multi-year, multi-million dollar cooperative effort among many of the parties. The Salinity Objectives are a product of the best scientific and technical information available.

The parties that intentionally recharge imported water within the Santa Ana Region (the Recharging Parties) agree voluntarily to collect, compile, and analyze the TIN/TDS water quality data necessary to determine whether the intentional recharge of imported water in the region may have a significant adverse impact on compliance with the Salinity Objectives within the region. To that end, the Recharging Parties will collect, compile, and analyze such TIN/TDS water quality data and prepare, within 18 months from the effective date of the agreement and every three years thereafter, a report containing the following information:

- a. A summary of the then-current ambient water quality in each groundwater management zone and a comparison of that ambient water quality with the Salinity Objectives. The Recharging Parties shall calculate ambient water quality for each groundwater management zone

in a manner that allows for a technically valid comparison with the Salinity Objectives.

- b. A summary of the amount and quality of imported water recharged in each groundwater management zone during the previous three-year period.
- c. The initial report and each report prepared at six-year intervals thereafter will include a projection of ambient water quality in each groundwater management zone for the subsequent 20 years.
 - (1) The projection of ambient water quality for each groundwater management zone will be based upon professionally accepted modeling techniques, will reasonably account for surface fluxed of salt input, will reflect the effects of all existing and reasonably foreseeable recharge projects for which there is a certified environmental document, and will compare baseline ambient water quality with the Salinity Objectives.
 - (2) The projections for different groundwater management zones may be based on different modeling techniques.
 - (3) Each report that includes a 20-year projection of ambient water quality will also present a comparison of then-current water quality in each groundwater management zone with the ambient water quality projection made six years earlier, together with an evaluation of the reason(s) for any differences.

The Recharging Parties agreed among themselves regarding the manner in which they will prepare the report and the manner in which they will share the cost of preparing the report. The Recharging Parties will circulate a draft version of each report to all other parties for review and written comments for at least a 45-day period prior to completing the final report and submission to the RWQCB.

Each Recharging Party also agreed that, when it serves as a lead agency under the California Environmental Quality Act (CEQA) for a proposed project involving the recharge of imported water within the region, the environmental document will include the water quality data compiled in the most recent triennial report to the RWQCB in the analysis of the potential impacts of the proposed project. The environmental document will also incorporate professionally acceptable modeling techniques.

This agreement provides a framework for groundwater recharge of imported water and will facilitate conjunctive management in the region while protecting water quality. A copy of the agreement is presented in Appendix A.



4.2.2.4 Surface Water Quality Improvement Strategy

The Basin Plan, pursuant to California state law (Porter-Cologne Water Quality Control Act, California Water Code Section 13000 et. seq.) and federal law (Clean Water Act 303(d)), must include an implementation plan that describes how the water quality standards established in the Basin Plan will be met. TMDLs, with their associated implementation plans, are adopted into the Basin Plans through the Basin Planning process. This strategy addresses TMDL implementation with respect to impaired (303(d)) bodies of water located in the Big Bear Lake watershed and consists of developing and implementing plans and projects to improve the water quality of impaired surface water bodies that do not or are not expected to meet water quality standards for beneficial uses pursuant to the 303(d) list of impaired waters.

The Big Bear area watershed is located in the San Bernardino Mountains. Major water bodies in this watershed include Big Bear Lake, Baldwin Lake, Stanfield Marsh, Shay Meadows, Rathbone (Rathbun) Creek, Summit Creek, and Grout Creek. Pursuant to the Clean Water Act Section 303(d), the following water bodies are impaired: Big Bear Lake, due to nutrients, copper, mercury, metals, and siltation; Grout Creek, for metals and nutrients; Summit Creek, due to nutrients; Knickerbocker Creek, for pathogens and metals; and Rathbone Creek, due to nutrients and siltation. The problem pollutants have been identified as coming from nonpoint sources. In conjunction with local stakeholders, the RWQCB has adopted TMDLs for these pollutants (Resolution R8-2006-0023).

A program has been formulated to identify a coordinated and comprehensive plan for management of the lake and surrounding watershed to protect the lake's beneficial uses. The Big Bear Municipal Water District (Big Bear Municipal) will serve as the sponsoring agency, with significant participation of Big Bear Lake watershed stakeholders. The plan will include data collection, modeling and analysis of data, and reporting. It will include a plan and schedule for short-term and long-term in-lake sediment nutrient reduction for Big Bear Lake. The plan will also include an evaluation of the applicability of various in-lake treatment technologies to support development of a long-term strategy for control of nutrients from the sediment, noxious and nuisance aquatic plants, and many other features.

Another water quality improvement project for Big Bear Lake is a phosphorous treatment plant. Based on existing data, phosphorus is the primary nutrient problem within Big Bear Lake. For example, past studies have shown that Big Bear Lake is eutrophic (meaning a body of water whose oxygen content is depleted by organic nutrients) and that the limiting nutrient is phosphorous. The phosphorous treatment project is intended to meet several water quality objectives identified in the Basin Plan, including those related to phosphorous,

dissolved oxygen, and excess algae. The high nutrient levels are causing impairment to beneficial uses. Reducing phosphorous concentrations will restore aquatic habitat by reducing excess algae growth and inhibiting the spread of invasive plant species. In addition to improving water quality, this project will improve access and navigability for swimmers and boaters, particularly along the shallower shoreline of the lake.

The proposed project will expand successful pilot demonstrations supported by previous Proposition 13 grant funds. It will include the broad application of liquefied alum that will establish an ionic bond with dissolved phosphorous, forming an inert mineral salt that rapidly precipitates out of the water column. This project is co-sponsored by Big Bear Municipal, SBCFCD, and the City of Big Bear Lake as a joint effort to implement the water quality management strategies specified in the Basin Plan, the RWQCB's watershed Management Initiative, the Nutrient TMDL, BBMWD's Lake Management Plan, the County's Stormwater Management Plan, and the City's Stormwater Management Plan.

4.2.2.5 Groundwater and Surface Water Quality Monitoring Strategy

Groundwater and surface water quality monitoring and assessment information enables water resource managers to understand the effectiveness or needs for improvement of their water quality management practices. For example, water quality objectives for the SAR for TDS and nitrogen are set forth in the Basin Plan and water rights judgments. In order to ensure compliance, water quality is monitored on the SAR at a point just below Prado Dam. The USGS maintains a gaging station at this location to measure instantaneous flow and a water quality recorder provides continuous measurements of specific conductance. Surface water grab samples are taken by the RWQCB staff, the USGS, and others, and analyzed to determine compliance with water quality objectives. This information is used to assess the effectiveness of water management practices over time.

A comprehensive surface and groundwater monitoring and assessment program is currently underway in the region. Such a program provides information needed to evaluate the effectiveness of a water quality management practice and, as appropriate, modify management practices. Management of groundwater basins in general and the proposed process to manage the SBBA requires extensive monitoring to ensure the annual operation of the basin is in compliance with requirements of existing agreements and judgments and that operation of the basin will result in the expected outcome. A comprehensive groundwater monitoring plan has been prepared for this IRWM Plan and is presented in Appendix B.



4.2.2.5.1 *Surface Water Ambient Monitoring Program*

In general, the RWQCB's surface water monitoring program is not strictly formalized. Other than monitoring at the location just below Prado Dam (described above), the sampling frequency, locations, constituents, and other details vary from year to year depending on identified problems and needs and on staff and funding availability. In addition to these efforts, a number of other agencies conduct surface water monitoring programs in the region, including water purveyors, wastewater dischargers, and flood control agencies.

The Surface Water Ambient Monitoring Program (SWAMP) is a relatively new statewide program (Water Code Section 13192). The purpose of SWAMP is to create an effective surface water quality ambient monitoring program for all of California's surface waters to ensure that water quality is comprehensively measured to protect beneficial uses and to evaluate protection and restoration efforts. The program also intends to capture monitoring information collected under other State and RWQCB programs, such as the State's TMDL, Nonpoint Source, and Watershed Project Support programs.

All State-funded projects that include a surface water monitoring component are required to develop and implement a SWAMP Quality Assurance Plan approved by the RWQCB as a condition of funding. This is a strategy to (1) implement this requirement, and (2) voluntarily adhere to and implement SWAMP Quality Assurance standards and protocols whenever possible for surface water quality monitoring in the Upper SAR watershed. Note that this does not include projects that include effluent or discharge monitoring, which is covered under National Pollutant Discharge Elimination System permits and Waste Discharge Requirements. The guidelines for preparation of such a plan, the Quality Assurance Project Plan, can be found at <http://www.swrcb.ca.gov/swamp/qapp.html>.

4.2.3 Ecosystem Restoration and Environmental Improvement Objective

Protecting and restoring, where possible, the ecological functions of the watershed is an objective for the region. This IRWM Plan provides a framework for the integration and coordination of ecosystem and environmental improvement strategies relating to flood management, recreation and public access, and land use planning. The purpose of this framework is to enable stakeholders to coordinate and advance strategies to improve the ecological health of the watershed and, in the process, improve public awareness, access, stewardship, and enjoyment of this region's most valued water resources.

This section begins with a definition and description of Ecosystem Restoration and Environment Improvement followed by three broad strategies to achieve this objective. The role of watershed stakeholders and the importance of collaboration to achieve this objective are also described. The section concludes with a more detailed explanation of the strategies and the projects to implement them.

Restoration means the reestablishment of structure and function of the Santa Ana watershed ecosystems. The restoration process is used to reestablish the general structure, function, dynamic, and self-sustaining behavior of the ecosystem. As this is accomplished, the natural biological attributes of the system return, such as native plants, fish, birds, and other wildlife, which enriches the quality of life for everyone.

It is not possible, nor would it be desirable, to restore the Upper SAR watershed ecosystem to a pre-disturbance condition. Human activity and use of the landscape has precluded many options and has altered natural ecosystem processes; for example, vegetation is changed and hardscape increased. A return to a more natural, self-sustaining system, however, can lower infrastructure costs, raise property values, and reconnect people with the natural wildland beauty of the Santa Ana watershed.

Many stakeholders, such as federal and state resource agencies; regional, county, and city governments; public and private non-governmental organizations; and the public, are actively engaged in Ecosystem Restoration and Environment Enhancement projects. Accordingly, the strategies described in the IRWM Plan are intended to serve as a framework for the integration and coordination of the projects to be performed by stakeholders. The foundation of this framework is collaboration. Through increasing collaboration, stakeholders are able to more effectively integrate and coordinate their resources to protect, restore, and enhance the environment; institute land use policies that protect the watershed



values; and establish and maintain public access to open space, parks, trails, and other recreational amenities.

While the focus of these strategies is the Upper SAR watershed, it is recognized that all stakeholders within the watershed are linked to one another and to State and national resource management priorities. Accordingly, the Ecosystem Restoration and Environment Enhancement strategies described in this plan are intended to be consistent with broader watershed plans and strategies, such as the strategies described in the “Santa Ana Watershed Project Authority (SAWPA) Integrated Watershed Plan, 2005 Update,” and the “2002 SAWPA Integrated Watershed Plan, Volume 2: Environmental and Wetlands Component.”

The strategies for Ecosystem Restoration and Environment Improvement are (1) Habitat Protection, Restoration, and Enhancement; (2) Land Use Planning; and (3) Recreation and Public Access. Taken together, these strategies will enable stakeholders to advance the objective of ecosystem restoration and environment improvement. These strategies will also provide other benefits to the watershed, such as improved water quality, increased water supply, increased dry-year water supply reliability, increased groundwater storage, improved flood control and stormwater management, and greater public education and awareness that is critical for the long-term stewardship of the watershed.

4.2.3.1 Habitat Protection, Restoration, and Enhancement Strategy

The Upper SAR watershed is home to extraordinary natural resources. The headwaters of the watershed are located in the San Bernardino National Forest. The San Bernardino Valley is home to six unique habitat types, six state endangered species, 13 federally endangered or threatened species, and over 53 species of special concern. Riparian corridors thread through the watershed and provide important habitat.



The San Bernardino National Forest is home to extraordinary natural resources.

This strategy reflects the value of the watershed’s natural resources. It addresses the economic benefits of natural systems; for example, the use of erosion control measures to reduce sediment loading and thereby improve water quality. It also strives to reduce conflict associated with human activity.

This strategy addresses policy, planning, projects, and project initiatives to protect, restore, and enhance Upper SAR watershed habitats. These initiatives

are organized into three categories of projects: (1) Land Management and Habitat Conservation Planning Projects, (2) Habitat Improvement and Environmental Enhancement Projects, and (3) Non-Native Plant Removal Projects.

4.2.3.1.1 Land Management and Habitat Conservation Planning Projects

Land Management and Habitat Conservation Planning projects are policy and planning initiatives that recognize that wildlife habitat is often in direct competition with other land uses and strive to resolve these conflicts in a manner that protects and enhances the ecosystem value of the Upper SAR watershed as habitat for sensitive, threatened, and endangered species.

4.2.3.1.2 Habitat Improvement and Environmental Enhancement Projects

The second category of projects—Habitat Improvement and Environmental Enhancement Projects—are projects to improve habitat and enhance the environment. These are multi-faceted projects that range from property acquisition and construction of facilities, to oversight monitoring, maintenance of land and facilities, public education, and outreach. The benefits of these projects include ecosystem restoration, flood and stormwater management, water quality improvement, public access and recreation, and public outreach and education.

An example of an existing Habitat Improvement and Environmental Enhancement project is the Bear Creek Fishery Project. Located in the San Bernardino National Forest, this project was implemented to sustain the aquatic health of Bear Creek. Big Bear Municipal administers this program, which consists of monitoring and managing carefully controlled releases of water to the creek from Big Bear Lake. An example of a partially completed project is the 145-acre wildlife preserve, the Stanfield Marsh. This project, when completed, will restore and enhance habitat for aquatic species, wetland species, wildlife to include wintering and breeding waterfowl, wintering bald eagles, osprey, and summer residents, and potentially nesting pelicans. An example of a new project initiative is the Lytle Creek Watershed Assessment and Restoration Project. This is a proposed, multi-purpose program to advance ecosystem restoration and improve water quality and local water supply reliability. It also includes public outreach and education, addressing wildfire prevention, non-point pollution prevention, and public outreach targeted to Lytle Creek recreational users.



Upper Santa Ana River Wash Land Management and Habitat Conservation Plan (Project) – Historically, the Santa Ana River Wash was a natural floodplain and alluvial fan that provided a place to convey frequent devastating flood waters depositing sediment percolate surface water to the groundwater basin, providing a significant source of water supply for the Upper SAR watershed. It is also habitat for a variety of sensitive, threatened, and endangered species. Its ecosystem value has become more apparent due to several factors, including the decrease in this type of habitat throughout Southern California.

The proposed project is Land Management, Mining and Reclamation, Water Management and Conservation, and Habitat Conservation Plan for the Upper Santa Ana River Wash Area. The plan is being prepared under the guidance and direction of many stakeholders, with the SBVWCD serving as lead agency. The plan area encompasses approximately 4,500 acres and is generally bounded by the SAR on the south, Alabama Street on the west, Plunge Creek and Green Spot Road on the north, and Mill Creek on the east.

When completed, the plan would directly contribute to all three strategies for ecosystem restoration and environmental improvement presented in this IWRM Plan: (1) habitat protection, restoration, and enhancement; (2) land use planning; and (3) recreation and public access. Habitat preservation would be strategically located in large inter-connected areas with intact natural habitat. A trails system would be maintained, expanded, and improved. Water conservation (groundwater recharge) and flood control activities will continue in areas historically utilized for these activities. Through land use planning and land exchanges, it would confine and minimize mining activities to one area on land currently disturbed by mining or land adjacent to disturbed areas.

San Bernardino National Forest Watershed Management Planning – The upper reaches of the Santa Ana watershed are located in the San Bernardino National Forest. The San Bernardino National Forest is one of 18 national forests in California, collectively referred to as Region 5 of the United States Forest Service (USFS). In 1981, Region 5 entered into a Management Area Agreement with the SWRCB pursuant to Clean Water Act Section 208. This agreement designates Region 5 as the Water Quality Management Agency (WQMA) for the San Bernardino National Forest.

As the WQMA, Region 5 is responsible for the proper installation, operation, and maintenance of State- and EPA-approved BMPs in the San Bernardino National Forest. Region 5 is tasked with the responsibility of (1) correcting water quality problems in National Forests; (2) perpetually implementing BMPs; and (3) carrying out identified processes for improving or developing BMPs. In the Upper SAR watershed, the San Bernardino National Forest works conjunctively with the RWQCB on water quality issues such as TMDLs.

Currently, Region 5 is working with the State and RWQCBs to re-certify the Management Area Agreements pursuant to recent changes in State law, such as the new Nonpoint Source Implementation and Enforcement Policy. The process of revising the WQMP and Management Area Agreements will be a joint SWRCB and Region 5 effort. This will be a collaborative effort to develop a plan that identifies, prioritizes, and annually updates site-specific issues. In addition to re-certification of the Management Area Agreements, the San Bernardino National Forest (SBNF) will be implementing its 2006 Forest Plan. The Forest Plan describes the strategic direction at the broad program-level for managing the SBNF, including watershed management initiatives over the next 10 to 15 years.

Water Resources Institute Watershed Management Internship Program (Project) – Local governments in the Upper SAR watershed are facing major challenges with water quality, stormwater runoff, flood damage liability, and concerns about whether there will be enough water for new development. The long-term protection and management of the watershed will require the development and training of a new generation of water resources professionals.

The WRI- CSUSB is collaborating with the Natural Resource Conservation Service, SAWPA, local resource conservation districts, and other watershed groups to provide multi-disciplinary internships on watershed management projects related to increasing population, changing land use patterns, and expanding urbanization in the Santa Ana watershed. This program is funded by the United States Department of Agriculture. Under this program, up to 30 under-represented students will be selected for paid internships to conduct scientific research on real-world problems in the Santa Ana watershed. This program will also train students in the latest Internet-based information-sharing systems.

Lytle Creek Watershed Assessment and Restoration Project – Lytle Creek is an impaired stream on the 303(d) list with an existing pathogen impact. Because of increasing visitor traffic and recreational use, the condition of Lytle Creek will become worse if corrective actions are not taken.

The Lytle Creek Watershed Assessment and Restoration Project is a multi-faceted program to advance ecosystem restoration and improve water quality and local water supply reliability. Program elements include a water quality assessment and a biological assessment. The program includes bilingual (English and Spanish) public outreach and education and addressing wildfire prevention and non-point pollution prevention. Public outreach will be targeted to Lytle Creek recreational users. This program is sponsored by the WRI-CSUSB.



4.2.3.1.3 *Non-Native (Arundo donax) Plant Removal Maintenance Project*

The third and final project category under this strategy is Non-Native Plant Removal Projects. The removal of non-native plants is a specific type of habitat restoration—for example, Giant Reed or *Arundo donax* consumes large amounts of water and clogs up streams and waterways. Because *Arundo donax* spreads so rapidly, it pushes out native vegetation and the species that inhabit it. These Non-Native Plant Removal projects remove non-native plants and maintain such areas in order to restore native habitats and maintain the quality of restored habitat.

A number of projects to remove non-native plants, especially *Arundo donax*, or giant reed, in order to restore and maintain native habitats have been implemented in the Upper SAR watershed. Some projects are located in environmentally sensitive areas; for example, along important biological corridors that are habitat for threatened and endangered species. Projects require continued vegetation management to maintain restored habitats and monitoring to prevent the establishment of invasive weed species. Many of these areas where removal has been successful, such as the least Bell's vireo, provide important habitat for federal- and State-listed species.

The Inland Empire Resource Conservation District (IERCD), together with Santa Ana Watershed Association (SAWA), removed approximately 2,800 acres of *Arundo donax* within the Upper SAR watershed. *Arundo donax* removal and maintenance is imperative with regards to water resources quantity and quality. An acre of *Arundo donax* is estimated to consume three times more water than an acre of native vegetation within the Santa Ana watershed. If the *Arundo donax* is not managed, it would result in reduced streamflow, reduced groundwater recharge, reduced availability of water for native species, and eventual replacement of native riparian vegetation with *Arundo donax*. Native species naturally hang over rivers and streams, creating shade and keeping water temperatures lower. Streams infested with *Arundo donax* have little shade, which raises water temperature and changes water chemistry. These changes, due to increased sunlight, promote algal growth and raise pH.

Past invasive species removal efforts have been very successful. Eradication contracts have included the initial physical removal of the non-native plants with hand tools or machinery followed by five years of monitoring and spraying with EPA-approved herbicide. IERCD wants to ensure these areas remain free of



Non-native plants can drive out native vegetation and species.

Arundo donax in perpetuity and proposes to monitor and maintain these removal project areas to ensure re-infestation does not occur. *Arundo donax* removal maintenance will assist in accomplishing the following objectives: improve surface water and groundwater management, protect water quality, improve water supply reliability, and restore and sustain riparian ecosystems.

City of San Bernardino Warm Creek Restoration Project – The proposed project consists of restoration activities along Warm Creek in the City of San Bernardino. This area consists of approximately three acres of a highly degraded stream channel that runs through private property. Typically, Warm Creek has contained mostly 100 percent invasive non-native vegetation, including *Arundo donax*.

In the spring of 2006, the project sponsor, the IERCD, obtained landowner approval to remove invasive species, including *Arundo donax* and castor bean, and substantial work has been completed. To complete the restoration and rehabilitation of this urban stream, IERCD will continue to remove additional invasive species such as Mexican fan palm (*Washingtonia robusta*) and Date palm (*Phoenix canariensis*), and actively re-vegetate the riparian areas with native species like Mulefat (*Baccharis salicifoli*) and willow.

Restoring Warm Creek in the City of San Bernardino will allow for the return of native riparian habitat in this highly urban and economically disadvantaged area. In addition, this restoration will save water, increase streamflow, improve instream flow timing, and improve water quality. Restoring native riparian habitat to Warm Creek will also allow for native plant and animal species to occupy the area. The riparian zone may support threatened, endangered, or migratory birds, fish, or other aquatic species.

Stanfield Marsh Wetlands Habitat Restoration Project – Stanfield Marsh is habitat for numerous wet meadow species; the southern Bald Eagle and its roosting, perching, and foraging sites; thousands of wintering waterfowl; numerous breeding waterfowl and upland birds in summer; and a large population of white pelicans. It is also considered the most amenable valley in the Big Bear Lake watershed for ecological enhancement, sensitive land acquisition, education, recreation, and scenic beauty.

The habitat value of the marsh was reduced as the result of construction of Stanfield Cutoff, a causeway (land bridge) built during the 1920s that largely separated the marsh from Big Bear Lake. The history of this site, the presence of wetland species, and hydrologic conditions make this an exceptional site for wetland enhancement. Partial wetlands enhancement has been completed.



The proposed project, when completed, would maintain a more consistently wet marsh area and a permanent wet habitat. When needed, for example, during dry periods, up to several hundred gallons of water per minute would be pumped from Big Bear Lake to the marsh. Pumped water not consumptively used in the marsh would return to the lake through the culverts under Stanfield Cutoff, with lower nutrient concentration and higher dissolved oxygen concentration. In addition to improving habitat and restoring wetlands, this project would improve lake water quality by reducing nutrients and increasing dissolved oxygen. It would also provide numerous public education and public outreach benefits in conjunction with other programs administered by the project sponsor, Big Bear Municipal.

4.2.3.2 Land Use Planning Strategy

Land use in the Upper SAR watershed is regulated by county and city government General Plans and Zoning Ordinances. Within the San Bernardino National Forest, land use planning is guided by the Forest Service Land Management Plan.

The Upper SAR watershed is one of the fastest growing regions in the United States. Substantial new development is forecast for the Upper SAR watershed. Stakeholders are taking into consideration the impacts of growth, such as the potential loss of open space and increase in impervious surfaces such as roads and buildings, and are exploring strategies to efficiently manage land and water resources.

This strategy addresses water resource-efficient land use principles and stewardship actions that can be implemented by local governments and other watershed stakeholders to protect and restore, where possible, the ecological functions of the watershed as well as improve the reliability and quality of the region's water resources. An example is the Ahwahnee Water Principles for Resource Efficient Land Use (Principles) developed by the Local Government Commission to improve the stewardship of local water resources.

The Principles encourage the identification of natural resources in the watershed, such as wetlands, floodplains, recharge zones, open space, and native habitat, to preserve and protect as many valued assets as possible to augment flood protection, improve water quality, recharge groundwater, restore habitat, and sustain overall long-term water resources. For example, as development occurs, its impact to the watershed would be mitigated, in part, by incorporating water holding areas such as creek beds, recessed athletic fields, ponds, cisterns, and other features that allow for natural groundwater recharge, reduce stormwater runoff, and decrease local flooding.

The Principles seek to reduce water demand through water conservation measures and efficient land use practices. For example, all aspects of landscaping, from the selection of plants to soil preparation and the installation of irrigation systems, are addressed to reduce water demand, retain runoff, decrease flooding, and allow for groundwater recharge. Impervious surfaces such as driveways, streets, and parking lots are minimized so that land is available to absorb (recharge) stormwater and reduce polluted urban runoff. Dual plumbing that allows grey water from showers, sinks, and washers to be reused for landscape irrigation is included in the infrastructure for new development. The Principles advocate maximum use of recycled water for appropriate applications, including outdoor irrigation, toilet flushing, and commercial and industrial processes. Urban water conservation technologies such as low-flow toilets, efficient clothes washers, and more efficient water-using industrial equipment are encouraged to be incorporated in all new construction and retrofitted in remodeled buildings.

The Principles also encourage the preservation of water supplies and water quality by promoting growth in the form of compact, mixed-use, transit-oriented development.

4.2.3.2.1 Inland Empire Sustainable Watershed Program Project

The Inland Empire Sustainable Watershed Program is a multi-faceted program to inform and empower local communities to become effective watershed stewards to re-establish sustainable ecological function in the Upper SAR watershed. The program builds regional capacity for community-based watershed management by reaching out to residents, including children, municipalities, water districts, resource agencies, businesses, land developers, and other stakeholders that impact watershed function in their daily activities. California Resource Connection serves as the program manager. This is a CALFED watershed-funded program that began in December 2006 and will be completed in December 2008. The program activities summarized below will support IWRM Plan Ecosystem Restoration and Environment Improvement.

Upper Santa Ana River Watershed Management Opportunities Atlas and Green Map – This is a public outreach and education tool that attractively identifies watershed assets for community stakeholders to visualize open spaces serving areas for groundwater recharge, sensitive habitat needing to be protected, impaired waterways needing to be restored, that trails systems and parks can green the urban landscape, and water management facilities bringing water supplies to homes and businesses.

Model Ordinance Program – This program is assessing regulations in the municipal code and development codes in the Upper SAR watershed that prevent the implementation of the resource-efficient land use practices, such as the



Ahwahnee Water Principles for Resource Efficient Land Use, that were developed by the Local Government Commission with funding from the SWRCB. Model Ordinances will be drafted for local adoption in a form that cities or the county can use in a manner that best fits local conditions.

Green Development Initiative – This is an educational forum for developers, land use planners, architects/engineers, and nurseries in the Upper SAR watershed to promote “green” development practices during this period of rapid development.

Watershed U-Inland Empire – This is an educational program with forums on topics such as ecosystem function, urban greening and design, water-efficient landscaping, and local restoration projects to encourage the public to live and work with fewer impacts on the watershed and to get involved in local projects.

Think River! – This is a hands-on watershed education program for teachers and youth on water sustainability, water quality, geology, plants and wildlife, and other environmental science topics relevant to the Upper SAR watershed.

4.2.3.2 LIDS for KIDS (Low Impact Development for a Healthy Watershed) Project

Urban development in the Upper Santa Ana Region has increased impermeable surface acreage and, as a result, increased the amount of stormwater runoff. This stormwater runoff collects and carries pollutants that decrease the quality of water. The land use planning process can utilize the standards described in “Low Impact Development Design Strategies – An Integrated Design Approach” prepared by the Department of Environmental Resources, June 1999, and other sources to reduce the amount of permeable surface, reduce ecosystem impacts, and improve water quality.

The Lids for Kids project is a public demonstration and public outreach project that will assist with retrofitting existing structures and educating key stakeholders, such as land developers and homebuilders who design and build in the Upper SAR watershed. The project sponsor, IERCD, has been conducting public outreach within the Upper SAR watershed for many years. The objectives of this project are to improve stormwater management practices, encourage environmentally sensitive development practices, reduce construction and maintenance costs associated with the current stormwater control methods, encourage the public to utilize low-impact development methods, and increase “green zones” for wildlife and people of the region.

4.2.3.2.3 Low Impact Development Guidance and Training Project for Southern California

San Bernardino County’s Low Impact Development (LID) Guidance and Training Project for Southern California is aimed at facilitating the incorporation

of LID into National Pollutant Discharge Elimination System (NPDES) and TMDL programs at the local government level. LID employs construction, design, and landscape architecture features that reduce hydro-modification and, in turn, the water pollution caused by stormwater discharges. A Request for Qualifications (RFQ) was issued to compete for a multi-year project that will create a database of performance results for various BMPs by measuring and monitoring the effectiveness of these features at actual LID projects that have been constructed in Southern California.

The project is sponsored by the SBCFCD in cooperation with the Stormwater Monitoring Coalition made up of the three Southern California RWQCBs (Los Angeles, Santa Ana, San Diego), the SWRCB, the municipal permittees (the County of Ventura, Los Angeles, San Bernardino, Riverside, Orange, and San Diego), Heal the Bay, and the Southern California Coastal Water Research Project (SCCWRP).

The project will evaluate a LID pilot site with a combination of BMPs to identify the BMPs to integrate LID into existing design, construction, and maintenance programs. The project will develop a model program for localities in California that are interested in adopting LID strategies and techniques. It will produce a manual and provide training to local government and private planners to balance the needs of development while addressing the environmental concerns associated with urban runoff. Materials developed for the project will provide a foundation and benchmarks for local governments to incorporate LID techniques into their site design and construction and post-construction BMP design process.

4.2.3.2.4 Alluvial Fan Task Force

DWR is utilizing the knowledge and expertise of the WRI-CSUSB to coordinate the activities of an Alluvial Fan Task Force. Alluvial fans are prevalent throughout Southern California where alluvial fan flooding has occurred. The principle hazards associated with alluvial fan flooding at the base of mountain bases are high-velocity, debris-laden flows resulting from a series of storms, particularly following wildfires common in semi-arid regions. Alluvial fans are most prevalent in San Bernardino, Riverside, Los Angeles, Ventura, Santa Barbara, San Luis Obispo, Kern, Orange, Imperial, and San Diego Counties.

The task force will be comprised of stakeholders in areas affected by rapid growth on alluvial fans with broad representation from developers, elected officials, flood control districts, stormwater managers, water suppliers, water quality regulators, Native Americans, and the environmental community. The members of the Alluvial Fan Task Force are charged by the Legislature with reviewing the state of knowledge of alluvial fan flooding and developing a Model Ordinance that will reduce long-term flood damages on alluvial fans and provide land use guidelines for sustainable development on alluvial fans. The ordinance



will be developed collaboratively by the members of the proposed task force, under the guidance of a professional facilitator, and is intended for voluntary adoption by local governments. The findings of the proposed Alluvial Fan Task Force will be reported to the Legislature.

Funding for the task force was provided by FEMA under the Pre-Mitigation Disaster Planning Grant Program with a 25 percent match from DWR Division of Flood Management.

4.2.3.2.5 WRI Watershed Management Internship Program

The WRI-CSUSB is collaborating with the Natural Resource Conservation Service (Redlands office), SAWPA, local resource conservation districts, and other watershed groups to provide multi-disciplinary internships on watershed management-related projects regarding increasing population, changing land use patterns, and expanding urbanization in the Santa Ana watershed.

Funded by the United States Department of Agriculture, the project will select up to 30 underrepresented students for paid internships to conduct scientific research in the Santa Ana watershed on real-world problems and trains students in the latest Internet-based information sharing systems.

4.2.3.4 Recreation and Public Access Strategy

This is a strategy to maintain and create new opportunities for the public to enjoy the area's waterways and other recreational amenities; enhance the watershed's natural features; and ensure access to the region's wetlands, lakes, and streams. In anticipation of further growth in the region, this strategy reflects the need for a balance between growth of urban areas and the environment to maintain a viable habitat for native plant and wildlife species, and to maintain a high quality of life for watershed residents and visitors. An effective means of establishing this balance is the development of open space corridors that allow for multiple species habitat, wetlands, storm flow capture and aquifer recharge, water quality improvements, and passive and active recreational facilities and open spaces.



When completed, the Santa Ana River Trail System will extend from Huntington Beach to the crest of the San Bernardino Mountains.

The development of the Santa Ana River Trail System (SART) trail tread and the integration of the trail tread with other (federal, state, regional, and local) planning initiatives is the backbone of this strategy. The SART is a 110-mile walking/biking/recreational trail system along the SAR. When completed, the trail will extend from the ocean in the City of Huntington Beach to the Crest of the San Bernardino Mountains. It will connect the many trails,

recreation, and open space amenities into one cohesive park and trail system. At the trailhead in the San Bernardino Mountains it will connect to the USFS system of trails and to the Pacific Crest Trail.

Because SART involves many different governmental agencies and would cross many different landowners and water management facilities, it is critical that it be fully integrated with related plans. For example, SART is being planned in coordination with the Upper Santa Ana Wash Habitat Conservation Plan and the land use planning of the Cities of Highland and Redlands and the County of San Bernardino. Through this coordinated approach, the development of SART will advance multiple species habitat, wetlands, storm flow capture and groundwater recharge, water quality improvements, and passive and active recreational open spaces.

In the Upper SAR watershed, the SART will traverse a total of approximately 26 miles, the first eight miles of which are completed. This segment is located entirely in Riverside County beginning at Riverside Narrows and ending at the San Bernardino County line.

In San Bernardino County, the SART will traverse approximately 18 miles, primarily along the south levee of the river. A master plan for the SART was approved by the San Bernardino County Board of Supervisors in July 1990, and two initial phases of trail construction, a total of 6.7 miles, are completed. Planning, design, and permitting are currently underway for the final two phases of the SART, described below.

SART Phase III Project – SART Phase III is a 3.5-mile segment of the SART that will extend from Waterman Avenue in the City of San Bernardino to California Street in the City of Redlands. The trail tread width will be 18 feet, made up of 10 to 12 feet of asphalt and 6 to 8 feet of non-paved shoulder. The trail tread will be designed to Caltrans standards. The sponsor of this project is the County of San Bernardino Parks Department.

SART Phase IV Project – SART Phase IV is the final 7.8-mile segment of the SART system trail tread that will extend from California Street in the City of Redlands to Greenspot Road in the community of Mentone. The trail tread width will be 18 feet, made up of 10 to 12 feet of asphalt and 6 to 8 feet of non-paved shoulder. The trail tread will be designed to Caltrans standards. The sponsor of this project is the County of San Bernardino Parks Department.

5 Integrated Regional Water Management Plan Implementation

5.1 Integration of Water Management Strategies

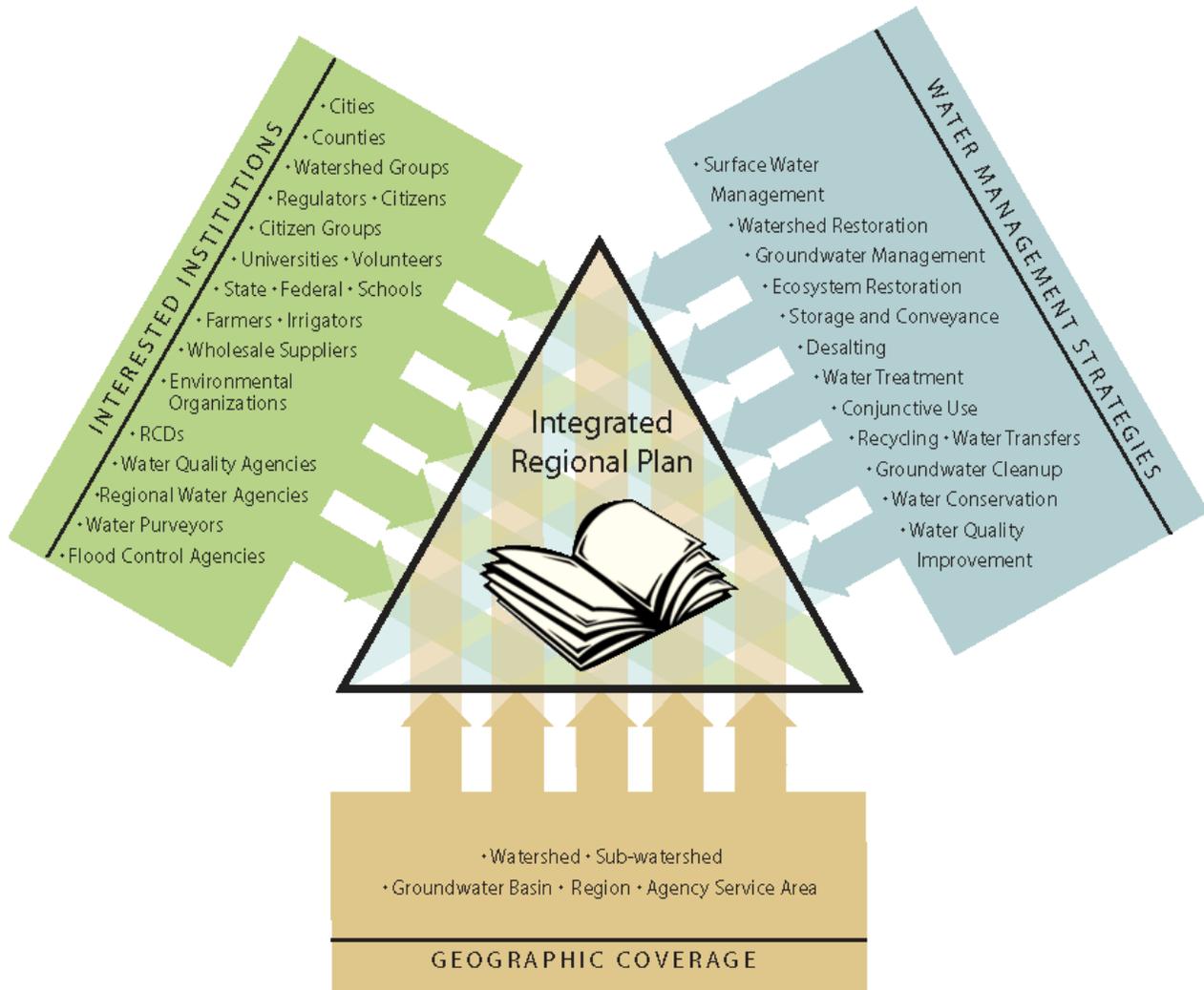
Regional planning is a process in which regional agencies and stakeholders come together to develop a plan that serves the individual agencies involved as well as serving the region as a whole. Regional planning promotes sharing of resources and facilities and implementation of strategies that have benefits for multiple agencies.

Integrated planning encourages broad investigation of the interrelated strategies and implementation of projects that provide multiple benefits and serve a wide range of strategies. The investigation is designed to help develop water management strategies that contribute to achievement of multiple objectives. Integrated regional water management planning brings various water interests, stakeholders, and institutions together to plan for future management and use of resources in a large geographic area (Figure 5-1). With the above concept in mind, the Upper Santa Ana River Watershed Integrated Regional Water Management Plan (IRWM Plan) has been developed to prepare a road map for management of the water resources in the region. The Technical Advisory Group (TAG) recognized from the beginning that management of groundwater resources, surface supplies, stormwater, and imported water are inseparable and intrinsically interrelated. It is also recognized that water quality plays a critical role in management of groundwater basins and groundwater conjunctive use implementation.

During the planning process, interrelated water management strategies are identified and planned so that they work together in an integrated fashion. Some examples of such integrated planning are discussed below.



Figure 5-1
Integrated Regional Water Management Planning



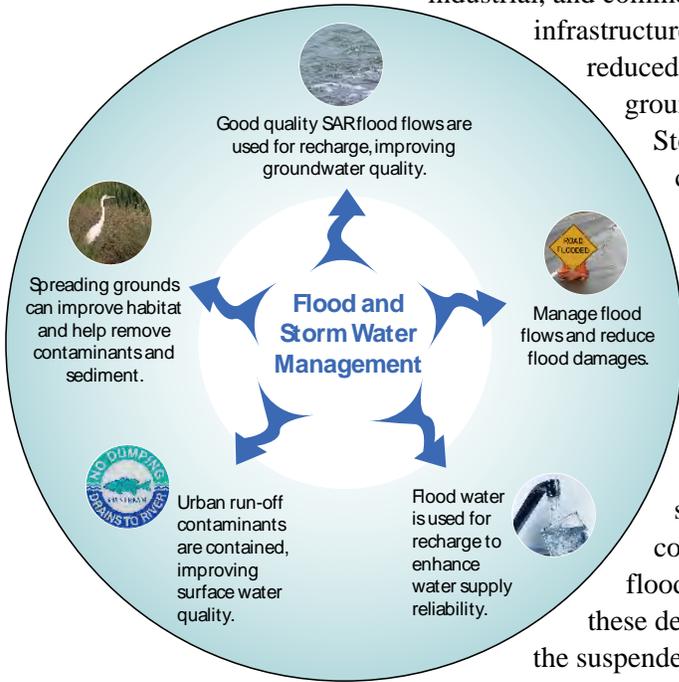
5.1.1 Integration of Surface Water and Groundwater Resources Strategies

Today, groundwater provides 79 percent of the water supply to the region and groundwater basins are used for water storage to regulate the highly variable local surface water and imported supplies. In order to continue to regulate the highly variable surface water in the region, surface water and groundwater resources must be integrated and optimized. When surface water is available it should be used for recharge as well as direct use. In addition, the region should work to limit the amount of high flows that go to the ocean in any given year.

These goals can be achieved through integration of surface water and groundwater.

5.1.2 Integration of Stormwater Management, Flood Management, Water Supply Reliability, and Surface and Groundwater Quality

The Upper Santa Ana River (SAR) Watershed is heavily developed. Housing, industrial, and commercial development, roads, and other urban infrastructure have replaced natural vegetation, which has reduced soil absorption capacity, reduced groundwater recharge, and increased urban runoff.



Stormwater can cause flood damage and can carry sediment and urban pollutants into streams. Although stormwater can cause flooding, with proper management it could provide a source of water supply to this arid region. Improvement in the management of stormwater can help the region achieve multiple objectives while integrating a number of strategies in the Upper Santa Ana Region. Generally speaking, stormwater is captured and conveyed to detention basins to reduce peak flood flows and reduce flood damage. However, these detention basins can also be designed to settle the suspended sediment and pollutants out of the water,

Integration of Water Management and Flood Management Strategies in the Upper Santa Ana River Watershed

increase groundwater recharge, and possibly provide wildlife habitat. Use of stormwater for groundwater recharge and use of flood control detention basins for groundwater recharge during the non-flood seasons are strategies that have been used within the region and should be further enhanced to improve water supply reliability and groundwater quality in the Upper Santa Ana Region.

5.1.3 Integration of Water Supply Reliability and Water Quality Strategies

Contamination plumes present a challenge and constraint for management and use of groundwater resources. An integrated approach has been taken to clean the plumes, which will eventually remove them as a constraint and improve water supply reliability for water users in the region. The Bunker Hill Basin Regional Water Supply Project is an example of a project that seeks to speed the cleanup of a contamination plume by pumping and treating water from the “heart” of the plume. This type of strategy can expedite the clean-up process and



facilitate conjunctive use of the basins while providing reliable water supplies for the water purveyors.

5.1.4 Integration of Imported Water and Local Water Supplies Strategies

The region has a significant public investment in and is dependent upon imported water to meet the region's water needs into the future. However, the State Water Project (SWP) can be unreliable. To improve the reliability of SWP water supply, the region should take delivery of its entire Table A amount each year and store any "leftover" amount that is not used directly by the local water agencies. The water could be stored within local groundwater basins or in a "water bank." By storing as much SWP water as possible during "wet" years, the region will have that water available during drought periods.

5.2 Projects Identified for IRWM Plan Implementation

To implement the water management strategies identified in this plan, over 100 projects have been proposed. Project descriptions have been developed for these projects and are presented in Appendix E.

The focus of these projects is driven by the Water Management Objectives as well as Basin Management Objectives (BMOs) formulated during the planning process. These objectives include improving surface water and groundwater management, water supply reliability, water quality protection, ecosystem improvement, and environmental enhancement.

Some of the projects were taken from previous planning efforts such as the San Bernardino Valley Municipal Water District's (Valley District) Master Plan. The list also includes projects that will allow the region to capture and use SAR floodwater. The City of San Bernardino, the largest pumper in the Bunker Hill Basin and the key local agency with responsibility for mitigation of groundwater contamination, is the lead agency for the Bunker Hill Regional Water Supply Project, which involves several other agencies. Projects included in previous Santa Ana Watershed Project Authority (SAWPA) planning studies and Urban Water Management Plans (UWMPs) were also evaluated to identify specific projects that could achieve the objectives of the region and are incorporated into the plan.

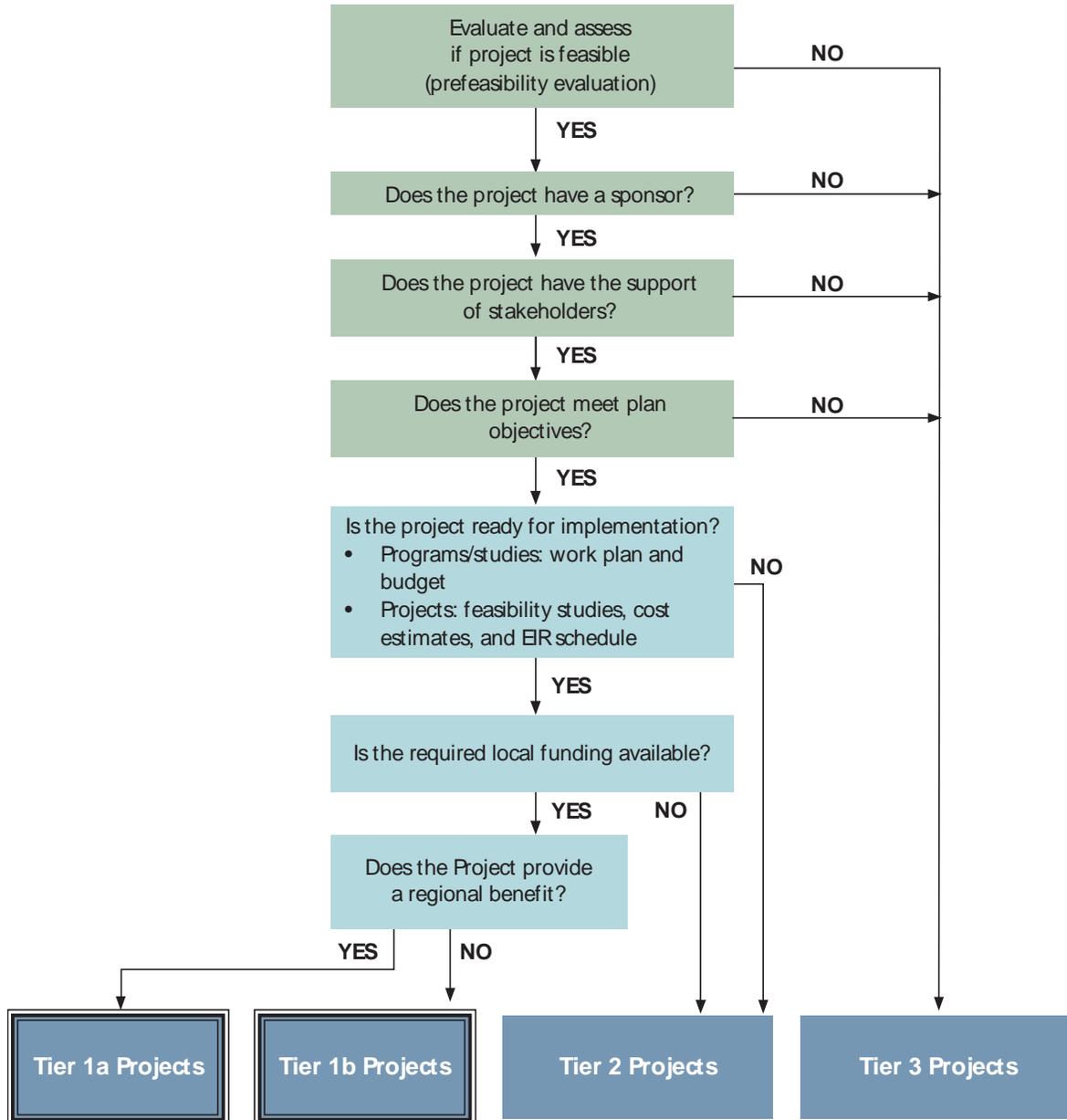
In a series of TAG meetings starting in March 2006 and continuing through 2007, the TAG members reviewed the list of projects and provided additional input. Water agencies within the area that are not part of the TAG were also encouraged to participate in development of the list. Most of these projects are integrated and serve multiple strategies. Together, these projects help develop a regional system that would integrate the use of groundwater, SWP water of the State of California (State) contractors in the region, flood and stormwater, and local surface water to meet the Water Management Objectives.

5.2.1 Project Prioritization and Screening Process

The primary purpose of project prioritization and ranking is to provide a process for water leaders in the region to review the proposed projects and collectively decide the region's priorities for the construction of facilities. To facilitate this task, a prioritization and ranking process was developed and is presented in Figure 5-2. The project prioritization and ranking is a two-step process. The first step is to ensure that the project has a sponsor and meets the planning objectives and strategies. The projects that do not pass the first step will be ranked as Tier 3 projects until additional information is gathered that would suggest that it have a higher priority. The second step is to prioritize the projects that pass the first step. It is important to note that project ranking and prioritization is a



Figure 5-2
Planning Process for Project Screening and Ranking



“snapshot in time” and that projects will move from tier to tier as they meet the criteria requirements.

5.2.1.1 Definitions

5.1.2.1.1 Tier 1 Projects

Tier 1a and 1b projects are currently ready for construction per the following criteria:

- Projects have completed or will complete environmental documentation and feasibility studies and cost estimates by July 1, 2008, and will be ready for implementation by July 1, 2009 (design will be completed).
- Studies that are needed to improve water management in the region have developed a detailed scope of work and study cost estimate.
- Projects have necessary local funding for implementation.
- Projects serve the region and reduce regional water supply system vulnerability.

The only difference between Tier 1a and Tier 1b projects is that Tier 1a projects are regional (serve more than three communities).

5.1.2.1.2 Tier 2 Projects

Tier 2 projects include those projects that may not be ready for implementation or do not have local funding. Once a Tier 2 project meets all of the necessary criteria, it can become a Tier 1a or Tier 1b project.

5.1.2.1.3 Tier 3 Projects

Tier 3 projects are conceptual in nature as defined by the following:

- Technically, economically, or financially not feasible at this time (through a pre-feasibility evaluation of the project).
- Lack of local support/sponsor.
- Inconsistent with current water management goals and objectives of the region.
- Inconsistent with existing regulatory or institutional setting.

Once a Tier 3 project meets all of the necessary criteria, it will become a Tier 2 or Tier 1 project.



To prioritize and rank the project, a set of scoring criteria were developed and reviewed by the TAG. The criteria were then applied to all projects to prioritize implementation. A detailed description of the project ranking and scoring criteria is shown in Appendix E. A list of the projects and the results of the project prioritization and ranking is shown in Table 5-1. Table 5-2 shows how projects meet the region's objectives and their relation to water management strategies.

Figure 5-3 shows the locations of the proposed projects.

Table 5-1
Upper Santa Ana IRWM Plan Project Ranking

| STRATEGY | PROJECT NO | PROJECTS | Agency/ Project Sponsor | Project Effectiveness | | | | | | Project commitment | | Regional Benefit | | Overall Project Implementation Priority | Tier | |
|---|------------|---|-------------------------|------------------------|-----|-----|-----|---|--|----------------------------------|------------------------------|-----------------------------|-------------------|---|------|-----------------------------------|
| | | | | Meets IRWMP Objectives | | | | Supports Integration and Multiple Water Management Strategies | Provides Public Safety and Emergency Needs | Serves Disadvantaged Communities | Readiness for Implementation | Availability of Local Funds | Serves the Region | | | Reduce Water Supply Vulnerability |
| | | | | SGM | WSR | WQP | ESR | | | | | | | | | |
| Tier 1a - Regional Projects that are "Ready" | | | | | | | | | | | | | | | | |
| | 54 | Bunker Hill Regional Water Supply | City of SB | 2 | 1 | 1 | 0 | 5 | 0 | 5 | 5 | 5 | 5 | 5 | 34 | 1a |
| | 90.3 | City Creek Crossing | SBVMWD | 0 | 2 | 0 | 0 | 5 | 0 | 5 | 5 | 5 | 5 | 5 | 32 | 1a |
| | 15 | Seven Oaks Dam Borrow Pit Groundwater Recharge and Habitat | Conservation | 2 | 1 | 0 | 1 | 5 | 0 | 2 | 5 | 5 | 5 | 5 | 31 | 1a |
| | 12 | Central Feeder: | SBVMWD | 1 | 2 | 0 | 0 | 5 | 0 | 2 | 5 | 5 | 5 | 5 | 30 | 1a |
| | 12.1 | Central Feeder Pipeline | SBVMWD | See Project 12 | | | | | | | | | | | | |
| | 12.3 | San Bernardino Pump Station #2 | SBVMWD | See Project 12 | | | | | | | | | | | | |
| | 1.1 | Enhance Spreading | SBVMWD | 2 | 1 | 0 | 0 | 5 | 0 | 2 | 5 | 5 | 5 | 5 | 30 | 1a |
| | 4.0 | Santa Ana River Construction Area - Plunge Pool Pipeline | SBVMWD | 2 | 1 | 0 | 0 | 5 | 0 | 2 | 5 | 5 | 5 | 5 | 30 | 1a |
| | 80.2 | Alabama Street Connector Pipeline | SBVMWD | 1 | 2 | 0 | 0 | 5 | 0 | 2 | 3 | 5 | 5 | 5 | 28 | 1a |
| | 80.3 | Alabama Street Wellfield | SBVMWD | 1 | 2 | | | 5 | 0 | 2 | 3 | 5 | 5 | 5 | 28 | 1a |
| | 46 | Pellesier Ranch Barrier Wells and Water Treatment Plant | RPU | 1 | 2 | 0 | 0 | 5 | 3 | 0 | 3 | 3 | 5 | 5 | 27 | 1a |
| | 19 | Riverside-Corona Feeder | WMWD | 1 | 2 | 0 | 0 | 5 | 0 | 2 | 5 | 1 | 5 | 5 | 26 | 1a |
| | 12.7 | Riverside Pump Station (Raub Emergency Supply Intertie) | RPU, SBVMWD, WMWD | 1 | 2 | 0 | 0 | 3 | 3 | 0 | 3 | 3 | 5 | 5 | 25 | 1a |
| Tier 1b - Non-Regional Projects that are "Ready" | | | | | | | | | | | | | | | | |
| | 9 | Lytle Creek and Glen Helen Turnout | SBVMWD | 1 | 2 | 0 | 0 | 5 | 0 | 0 | 5 | 3 | 3 | 2 | 21 | 1b |
| | 11 | LIDS for Kids- Low Impact Development | IERCD | 1 | 0 | 0 | 2 | 5 | 0 | 2 | 3 | 3 | 5 | 0 | 21 | 1b |
| | 18 | San Timoteo Creek Aquatic Restoration | Redlands | 1 | | | 2 | 5 | 0 | 2 | 3 | 3 | 5 | 0 | 21 | 1b |
| | 42 | Oak Valley WRP | Yucaipa Valley WD | 0 | 2 | 1 | 0 | 5 | 0 | 0 | 5 | 5 | 1 | 2 | 21 | 1b |
| | 48 | Muscoy Spreading Basins | City of SB | 1 | 2 | | | 5 | 0 | 5 | 3 | 5 | 0 | 0 | 21 | 1b |
| | 97 | Erwin Lake/Sugarload Fire Flow & Water Transmission Improvement | BBLDWP | 0 | 2 | 0 | 0 | 3 | 5 | 0 | 5 | 5 | 1 | 0 | 21 | 1b |
| | 99 | Fontana Water Company Recycled Water Project | FWC | 0 | 2 | 1 | 0 | 5 | 0 | | 5 | 5 | 3 | 0 | 21 | 1b |
| | 110 | San Timoteo Canyon State Park Acquisition and Restoration Project | WRI-CSUSB | 0 | 0 | 1 | 2 | 5 | 0 | 2 | 5 | 3 | 3 | 0 | 21 | 1b |
| | 118 | Lytle Creek Watershed Assessment and Restoration | R.L.C. | 0 | 1 | 1 | 2 | 5 | 0 | 2 | 5 | 5 | 0 | 0 | 21 | 1b |
| | 127 | Rialto Direct Connection to State Water Project | Rialto | | 2 | | | 5 | 0 | 5 | 3 | 3 | 1 | 2 | 21 | 1b |
| | 6 | Inland Empire Sustainable Watershed Program | IERCD | 1 | | 1 | 2 | 3 | 0 | 2 | 5 | 3 | 5 | 0 | 22 | 1b |
| | 23 | Installation of Groundwater Monitoring Wells in Santa Ana River | Conservation | 2 | 0 | 0 | 0 | 5 | 0 | 2 | 5 | 3 | 5 | 0 | 22 | 1b |
| | 28 | Tertiary Treatment Plant and Reclaimed Water Expansion Study | Rialto | 0 | 2 | 1 | 0 | 5 | 0 | 5 | 3 | 3 | 3 | 0 | 22 | 1b |
| | 51 | Groundwater Reclamation Interagency Project (GRIP) | City of Redlands | 1 | 2 | 1 | 0 | 5 | 0 | 0 | 3 | 5 | 5 | 0 | 22 | 1b |
| | 53 | Medical Center No. 2 Reservoir and Pump Station to Lower Zone | City of SB | 0 | 2 | 0 | 0 | 3 | 3 | 5 | 5 | 3 | 1 | 0 | 22 | 1b |
| | 58 | City of San Bernardino Water Recycling - RIX | City of SB | 0 | 2 | 1 | 0 | 5 | 0 | 5 | 3 | 3 | 3 | 0 | 22 | 1b |
| | 98 | Waterman-Gage Intertie | RPU | 1 | 2 | 0 | 0 | 5 | 3 | 0 | 3 | 3 | 3 | 2 | 22 | 1b |
| | 113 | Removal of Invasive Plant Maintenance | IERCD | 1 | 1 | 0 | 2 | 3 | 0 | 0 | 5 | 5 | 5 | 0 | 22 | 1b |
| | 124 | SAR Trail - Phase III | SBCPD | 0 | 0 | 0 | 2 | 5 | 0 | 2 | 3 | 5 | 5 | 0 | 22 | 1b |
| | 125 | SAR Trail - Phase IV | SBCPD | 0 | 0 | 0 | 2 | 5 | 0 | 2 | 3 | 5 | 5 | 0 | 22 | 1b |
| | 128 | Characterization Study of the Contaminant Plume in the Rialto- | Rialto | | 1 | 2 | | 5 | 0 | 5 | 3 | 3 | 1 | 2 | 22 | 1b |
| | 129 | Groundwater Production and Perchlorate Removal Treatment | Rialto | | 2 | 1 | | 5 | 0 | 5 | 3 | 3 | 1 | 2 | 22 | 1b |
| | 131 | Groundwater Remediation - Capture High-Concentration Perchlorate | Rialto | | 1 | 2 | | 5 | 0 | 5 | 3 | 3 | 1 | 2 | 22 | 1b |
| | 132 | Long-Term Remediation Plan for Rialto-Colton Basin | Rialto | | 1 | 2 | | 5 | 0 | 5 | 3 | 3 | 1 | 2 | 22 | 1b |
| | 16 | Recycled Water Program | BBARWWA | 0 | 2 | 1 | 0 | 5 | 0 | 0 | 5 | 5 | 3 | 2 | 23 | 1b |
| | 22 | City of Beaumont WWTP | City of Beaumont | 0 | 2 | 1 | 0 | 5 | 0 | 0 | 5 | 5 | 3 | 2 | 23 | 1b |
| | 27 | Rialto-Colton Basin Groundwater Recharge Study | WVWD, Rialto | 2 | 1 | 0 | 0 | 5 | 0 | 5 | 5 | 5 | 0 | 0 | 23 | 1b |
| | 102 | Big Bear Lake - Lake Management Plan | Multiple Agencies | 0 | 0 | 2 | 1 | 5 | 0 | 0 | 5 | 5 | 5 | 0 | 23 | 1b |
| | 126 | North Village Water Treatment Facility | WVWD | 1 | 2 | 1 | | 3 | 3 | 0 | 5 | 5 | 3 | 0 | 23 | 1b |
| | 130 | Extension of the Baseline Feeder Agreement | Rialto | | 2 | | | 5 | 0 | 5 | 3 | 5 | 1 | 2 | 23 | 1b |
| | 13 | Riverside North Recharge Basin | RPU | 2 | 1 | 1 | 0 | 5 | 0 | 0 | 5 | 5 | 5 | 0 | 24 | 1b |
| | 25 | North Lake Project | SBVMWD | 0 | 2 | 0 | 1 | 3 | 5 | 2 | 3 | 3 | 5 | 0 | 24 | 1b |
| | 114 | Warm Creek Restoration Project | IERCD | 1 | 1 | 0 | 2 | 3 | 0 | 2 | 5 | 5 | 5 | 0 | 24 | 1b |
| | 31 | Randall Basin | FCD | 2 | 1 | 0 | 0 | 3 | 3 | 5 | 5 | 5 | 1 | 0 | 25 | 1b |
| | 33 | Sand/Warm Confluence | FCD | 2 | 1 | 0 | 0 | 5 | 3 | 5 | 5 | 3 | 1 | 0 | 25 | 1b |
| | 36 | West End Pump Station | SBVMWD | 1 | 2 | 0 | 0 | 5 | 0 | 2 | 5 | 5 | 5 | 0 | 25 | 1b |
| | 121 | Alluvial Fan Development Guideline | WRI-CSUSB | 2 | 1 | 1 | 1 | 5 | 0 | 2 | 5 | 3 | 5 | 0 | 25 | 1b |
| | 10 | Wash Land Management Habitat Conservation Plan | Conservation | 1 | 1 | 0 | 2 | 5 | 0 | 2 | 5 | 5 | 5 | 0 | 26 | 1b |
| | 120 | Water Conservation Demonstration Garden | SBVMWD | 1 | 2 | 0 | 1 | 5 | 0 | 2 | 5 | 5 | 5 | 0 | 26 | 1b |
| | 123 | Regional W. C. Feasibility Study | SBVMWD | 1 | 2 | 0 | 1 | 5 | 0 | 2 | 5 | 5 | 5 | 0 | 26 | 1b |
| | 8 | Lytle Creek Construction Area | SBVMWD | 2 | 1 | 0 | 0 | 5 | 0 | 2 | 5 | 5 | 5 | 2 | 27 | 1b |
| | 119 | Model Institutional WC Makeover | SBVMWD, WRI-CSUSB | 1 | 2 | 1 | 1 | 5 | 0 | 2 | 5 | 5 | 5 | 0 | 27 | 1b |
| | 29 | Cactus Basins #4 and #5 | FCD | 2 | 1 | 1 | 1 | 5 | 3 | 5 | 5 | 5 | 1 | 0 | 29 | 1b |
| | 30 | Cactus Basin #3 | FCD | 2 | 1 | 1 | 1 | 5 | 3 | 5 | 5 | 5 | 1 | 0 | 29 | 1b |

Notes: Project readiness include completion of pre-feasibility study, environmental documentation, project design, and expected implementation date

Tier: 1a - If Regional Benefit is 10 and Total Score is more than 20.
1b - If Total Score is more than 20
2 - If Regional Benefit is less than 10 and Total Score is less than 21
3 - If score for Project Commitment is 4 or less

Terms: SGM Surface Water and Groundwater Management
WSR Water Supply Reliability
WQP Water Quality Protection
ESR Ecosystem Restoration

Agencies: BBARWWA Big Bear Area Regional Wastewater Agency
BBLDWP Big Bear Lake Department of Water and Power
IERCD Inland Empire Resource Conservancy District
RPU City of Riverside Public Utility Department
RLD Riverside Land Conservancy
SBVMWD San Bernardino Valley Municipal Water District
City of San Bernardino San Bernardino Municipal Water Department
SBCPD San Bernardino County Parks Department
WRI-CSUSB Water Resources Institute - California State University San Bernardino
WVWD West Valley Water District
Conservation San Bernardino Valley Water Conservation District
WMWD Western Municipal Water District
FWC Fontana Water Company

Scoring Criteria

- Meets Objectives: Score 2 for one objective. Add 1 point for each additional objective met.
- Supports Strategies: Score 1 for single strategy. Score 3 if integrated. Score 5 if integrated and supports multiple strategies.
- Provides for Public Safety and Emergency Needs: Project is needed for either, score 3. Project is needed for both, score 5.
- Serves Disadvantaged Communities: Provides regional benefit including disadvantaged communities, score 2. Provides specific benefit to disadvantaged communities and addresses environmental justice concerns, 5 points.
- Ready for Implementation: Score 1 point for limited information. Score 3 points for a completed feasibility study or pre-design documents and a preliminary scope of work and budget estimate. Score 5 points if environmental documentation and feasibility study is complete and has a detailed scope of work and budget.
- Available Local Funds: No funds, 0 point. 10%, 2 points. 50%, 3 points. 90% or more, 5 points.
- Serves the Entire Region: Serves single agency, 1 point. Serves up to three agencies, 3 points. Serves multiple communities and agencies and is a regional project, 5 points.
- Reduces Water Supply System Vulnerability: For single community, 2 points. For the region, 5 points.

Table 5-1
Upper Santa Ana IRWM Plan Project Ranking

| STRATEGY | PROJECT NO PROJECTS | Agency/ Project Sponsor | Project Effectiveness | | | | | | | Project commitment | | Regional Benefit | | Overall Project Implementation Priority | Tier |
|---|--|-------------------------|------------------------|-----|-----|-----|---|--|----------------------------------|------------------------------|-----------------------------|-------------------|-----------------------------------|---|------|
| | | | Meets IRWMP Objectives | | | | Supports Integration and Multiple Water Management Strategies | Provides Public Safety and Emergency Needs | Serves Disadvantaged Communities | Readiness for Implementation | Availability of Local Funds | Serves the Region | Reduce Water Supply Vulnerability | | |
| | | | SGM | WSR | WQP | ESR | | | | | | | | | |
| Tier 2 - Projects Needing Additional Work | | | | | | | | | | | | | | | |
| 45 | Septic System Conversion Highgrove Area - Phase II | RPU | 1 | 1 | 2 | 0 | 5 | 0 | 0 | 3 | 3 | 3 | 2 | 20 | 2 |
| 70.3 | Yucaipa Connector | SBVMWD | 1 | 2 | 0 | 0 | 3 | 3 | 0 | 3 | 3 | 5 | 0 | 20 | 2 |
| 43 | Riverside Regional Water Quality Control Plant | | 0 | 2 | 1 | 0 | 5 | 0 | 0 | 3 | 3 | 3 | 2 | 19 | 2 |
| 20 | Regional Water Supply Renewal | YVWD | 0 | 1 | 2 | 0 | 5 | 0 | 0 | 3 | 3 | 3 | 0 | 17 | 2 |
| 26 | City of Redlands WWTP | City of Redlands | 0 | 2 | 1 | 0 | 5 | 0 | 0 | 3 | 3 | 1 | 2 | 17 | 2 |
| 24 | Security Fencing of Groundwater Recharge Facilities | Conservation | 2 | 1 | 0 | 0 | 5 | 0 | 2 | 3 | 3 | 0 | 0 | 16 | 2 |
| 57 | Bunker Hill Basin Water Supply Reliability | WVWD | 1 | 2 | 0 | 0 | 5 | 0 | 0 | 3 | 3 | 1 | 0 | 15 | 2 |
| 21 | Horace P. Hinckley WTP | City of Redlands | 0 | 2 | 1 | 0 | 3 | 0 | 0 | 3 | 3 | 1 | 0 | 13 | 2 |
| Tier 3 - Projects Further Out on the "Planning Horizon," Need More Implementation Commitment | | | | | | | | | | | | | | | |
| 39.1 | Mentone Pipeline | SBVMWD | 1 | 2 | 0 | 0 | 5 | 0 | 2 | 1 | 3 | 5 | 5 | 24 | 3 |
| 39.2 | Mentone Feeder | SBVMWD | 1 | 2 | 0 | 0 | 5 | 0 | 2 | 1 | 3 | 5 | 5 | 24 | 3 |
| 39.3 | Citrus Pump Station (Mentone Pump Station) | SBVMWD | 1 | 2 | 0 | 0 | 5 | 0 | 2 | 1 | 3 | 5 | 5 | 24 | 3 |
| 39.4 | Citrus Reservoir (Mentone Reservoir) | SBVMWD | 1 | 2 | 0 | 0 | 5 | 0 | 2 | 1 | 3 | 5 | 5 | 24 | 3 |
| 40.1 | DWR Pump Station Alternative 1 | SBVMWD | 1 | 2 | 0 | 0 | 5 | 0 | 2 | 1 | 3 | 5 | 5 | 24 | 3 |
| 40.2 | DWR Pump Station Alternative 2 (only count cost of 40.1 as these are alternatives) | SBVMWD | 1 | 2 | 0 | 0 | 5 | 0 | 2 | 1 | 3 | 5 | 5 | 24 | 3 |
| 7 | Devil Canyon Construction Area | SBVMWD | 2 | 1 | 0 | 0 | 5 | 0 | 2 | 1 | 3 | 5 | 2 | 21 | 3 |
| 12.6 | Redlands Reservoir | SBVMWD | 0 | 2 | 0 | 0 | 5 | 0 | 2 | 1 | 3 | 5 | 2 | 20 | 3 |
| 35 | Existing Pilot Dewatering and Phased Dewatering Project | SBVMWD | 2 | 1 | 0 | 0 | 5 | 3 | 5 | 1 | 3 | 0 | 0 | 20 | 3 |
| 37 | 9th Street Feeder | SBVMWD | 1 | 2 | 0 | 0 | 5 | 0 | 5 | 1 | 3 | 1 | 2 | 20 | 3 |
| 14 | Surface Water Treatment Plants | SBVMWD | 1 | 2 | 1 | 0 | 3 | 0 | 5 | 1 | 1 | 5 | 0 | 19 | 3 |
| 59 | Lytle Creek Reservoir | City of SB | 0 | 2 | 0 | 0 | 3 | 0 | 5 | 1 | 3 | 5 | 0 | 19 | 3 |
| 60.1 | Baseline Feeder West Extension | SBVMWD | 1 | 2 | 0 | 0 | 5 | 0 | 2 | 1 | 3 | 5 | 0 | 19 | 3 |
| 80.1 | Orange Street Connector Pipeline | SBVMWD | 1 | 2 | 0 | 0 | 5 | 0 | 2 | 1 | 3 | 5 | 0 | 19 | 3 |
| 12.4 | Redlands Pump Station | SBVMWD | 0 | 2 | 0 | 0 | 3 | 0 | 2 | 1 | 3 | 5 | 2 | 18 | 3 |
| 70.2 | Yucaipa Pump Station | SBVMWD | 1 | 2 | 0 | 0 | 3 | 3 | 0 | 1 | 3 | 5 | 0 | 18 | 3 |
| 1 | Seven Oaks Dam and Reservoir Construction Area | SBVMWD | 1 | 2 | 0 | 0 | 5 | 0 | 2 | 1 | 1 | 5 | 0 | 17 | 3 |
| 32 | Constructed Wetlands | WRI-CSUSB | 0 | 0 | 1 | 2 | 5 | 0 | 5 | 1 | 3 | 0 | 0 | 17 | 3 |
| 38.1 | South End Feeder | SBVMWD | 1 | 2 | 0 | 0 | 5 | 0 | 0 | 1 | 3 | 5 | 0 | 17 | 3 |
| 38.2 | South End Pump Station | SBVMWD | 1 | 2 | 0 | 0 | 5 | 0 | 0 | 1 | 3 | 5 | 0 | 17 | 3 |
| 60.2 | Baseline Feeder Pump Station (East and/or West Alternative) | SBVMWD | 0 | 2 | 0 | 0 | 3 | 0 | 5 | 1 | 3 | 3 | 0 | 17 | 3 |
| 34 | Cable Creek | FCD | 2 | 1 | 0 | 0 | 3 | 3 | 2 | 3 | 1 | 1 | 0 | 16 | 3 |
| 55 | Medical Center to Virginia Street Connector | City of SB | 0 | 2 | 0 | 0 | 3 | 0 | 5 | 1 | 3 | 1 | 0 | 15 | 3 |
| 100 | Foothill Pipeline Enlargement | SBVMWD | 0 | 2 | 0 | 0 | 3 | 0 | 2 | 1 | 3 | 1 | 3 | 15 | 3 |
| 61 | Waterman Pump Station to Lower Zone | City of SB | 0 | 2 | 0 | 0 | 3 | 0 | 5 | 1 | 3 | 0 | 0 | 14 | 3 |
| 12.2 | San Bernardino Pump Station #1 | SBVMWD | 0 | 2 | 0 | 0 | 3 | 0 | 0 | 1 | 3 | 1 | 2 | 12 | 3 |
| 70.1 | Yucaipa Lakes Pipeline | SBVMWD | 0 | 2 | 0 | 0 | 3 | 0 | 0 | 1 | 3 | 1 | 0 | 10 | 3 |
| 4.1 | Morton Canyon Hydroelectric Gen. Plant | SBVMWD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| DWR Projects | | | | | | | | | | | | | | | |
| 39.5 | East Branch Extension of the SWP, Phase 2 | DWR | 1 | 2 | 0 | 0 | 5 | 0 | 2 | 3 | 3 | 5 | 5 | 26 | 1a |
| 39.6 | DWR Pump Station Expansions | DWR | 0 | 2 | 0 | 0 | 5 | 0 | 2 | 3 | 3 | 5 | 5 | 25 | 1a |
| 39.8 | Zanja Reservoir | DWR | 1 | 2 | 0 | 0 | 5 | 5 | 2 | 1 | 3 | 3 | 3 | 25 | 3 |
| 39.7 | Sunrise Ranch Reservoir | DWR | 1 | 2 | 0 | 0 | 5 | 5 | 2 | 1 | 3 | 5 | 0 | 24 | 3 |
| Back Burner Projects | | | | | | | | | | | | | | | |
| | BCV Forest Land Reserved | | | | | | | | | | | | | | |
| | Bogart Park Wetlands | | | | | | | | | | | | | | |
| | City of Beaumont Desalter | City of Beaumont | | | | | | | | | | | | | |
| | Sari Improvement Project | | | | | | | | | | | | | | |
| | Stanfield Marsh | | | | | | | | | | | | | | |
| 122 | Numeric Groundwater Model for Riverside/Arlington Groundwater Basins | RPU, WMWD | | | | | | | | | | | | | |

Notes: Project readiness include completion of pre-feasibility study, environmental documentation, project design, and expected implementation date

Tier: 1a - If Regional Benefit is 10 and Total Score is more than 20.
1b - If Total Score is more than 20
2 - If Regional Benefit is less than 10 and Total Score is less than 21
3 - If score for Project Commitment is 4 or less

Terms: SGM Surface Water and Groundwater Management
WSR Water Supply Reliability
WQP Water Quality Protection
ESR Ecosystem Restoration

Agencies: BBARWWA Big Bear Area Regional Wastewater Agency
BBLDWP Big Bear Lake Department of Water and Power
IERCD Inland Empire Resource Conservancy District
RPU City of Riverside Public Utility Department
RLD Riverside Land Conservancy
SBVMWD San Bernardino Valley Municipal Water District
City of San Bernardino San Bernardino Municipal Water Department
SBPCD San Bernardino County Parks Department
WRI-CSUSB Water Resources Institute - California State University San Bernardino
WVWD West Valley Water District
Conservation San Bernardino Valley Water Conservation District
WMWD Western Municipal Water District
FWC Fontana Water Company

Scoring Criteria

- Meets Objectives: Score 2 for one objective. Add 1 point for each additional objective met.
- Supports Strategies: Score 1 for single strategy. Score 3 if integrated. Score 5 if integrated and supports multiple strategies.
- Provides for Public Safety and Emergency Needs: Project is needed for either, score 3. Project is needed for both, score 5.
- Serves Disadvantaged Communities: Provides regional benefit including disadvantaged communities, score 2. Provides specific benefit to disadvantaged communities and addresses environmental justice concerns, 5 points.
- Ready for Implementation: Score 1 point for limited information. Score 3 points for a completed feasibility study or pre-design documents and a preliminary scope of work and budget estimate. Score 5 points if environmental documentation and feasibility study is complete and has a detailed scope of work and budget.
- Available Local Funds: No funds, 0 point. 10%, 2 points. 50%, 3 points. 90% or more, 5 points.
- Serves the Entire Region: Serves single agency, 1 point. Serves up to three agencies, 3 points. Serves multiple communities and agencies and is a regional project, 5 points.
- Reduces Water Supply System Vulnerability: For single community, 2 points. For the region, 5 points.

Table 5-2
Upper Santa Ana IRWMP Prioritization and Cost

| OBJECTIVES | STRATEGY | | Agency/ Project Sponsor | Project Ranking/ Tier | Objectives | | | | Strategies | Funding Opportunities | Projected Costs |
|----------------------------------|--------------------------------------|--|-------------------------|-----------------------|------------|-------|-----|-----|--------------|-----------------------|-----------------|
| | PROJECT NO | PROJECTS | | | SGM | WSR | WQP | ESR | | | |
| | | | | | | | | | | | |
| IMPROVE WATER SUPPLY RELIABILITY | WATER TREATMENT AND RECYCLING | | | | | | | | | | |
| | 14 | Surface Water Treatment Plants | SBVMWD | 3 | ✓ | ✓ | ✓ | | WS, SWQ | PROP 84 | |
| | 16 | Big Bear Area Regional Wastewater Agency Plant | BBARWWA | 2 | | ✓ | ✓ | | WTR, SWQ, WS | SWRCB | \$42,600,000 |
| | 21 | Horace P. Hinckley WTP | City of Redlands | 2 | | ✓ | ✓ | | WTR, SWQ, WS | SWRCB, DPH | |
| | 28 | Tertiary Treatment Plant and Reclaimed Water Expansion Study | Rialto | 1b | | ✓ | ✓ | | WTR, SWQ, WS | SWRCB | \$165,000 |
| | 58 | City of San Bernardino Water Recycling - RIX | City of SB | 1b | | ✓ | ✓ | | WTR, SWQ, WS | SWRCB | \$67,800,000 |
| | 22 | City of Beaumont WWTP | City of Beaumont | 1b | | ✓ | ✓ | | WTR, SWQ, WS | SWRCB, DPH | |
| | 26 | City of Redlands WWTP | City of Redlands | 2 | | ✓ | ✓ | | WTR, SWQ, WS | SWRCB, DPH | |
| | 42 | Oak Valley WRP | Yucaipa Valley WD | 1b | | ✓ | ✓ | | WTR, SWQ, WS | SWRCB, DPH | |
| | 43 | Riverside Regional Water Quality Control Plant | | 2 | | ✓ | ✓ | | WTR, SWQ, WS | SWRCB, DPH | |
| | 126 | North Village Water Treatment Facility | WVWD | 1b | | ✓ | ✓ | | WTR, SWQ, WS | SWRCB | \$14,540,000 |
| | 99 | Fontana Water Company Recycled Water Project | FWC | 1b | | ✓ | ✓ | | WTR, SWQ, WS | SWRCB | \$7,547,352 |
| | WATER CONSERVATION | | | | | | | | | | |
| | 123 | Regional W. C. Feasibility Study | SBVMWD | 1b | ✓ | ✓ | | ✓ | WC, WS, EHE | PROP 84 CH 2, PROP 50 | \$250,000 |
| | 120 | Water Conservation Demonstration Garden | SBVMWD | 1b | ✓ | ✓ | | ✓ | WC, WS, EHE | PROP 50, PROP 84 | \$120,000 |
| | 119 | Model Institutional WC Makeover | SBVMWD, WRI-CSUSB | 1b | ✓ | ✓ | | ✓ | WC, WS, EHE | PROP 50, PROP 84 | \$350,000 |
| | CONVEYANCE AND INTERTIE | | | | | | | | | | |
| | 9.1 & 9.2 | Lytle Creek and Glen Helen Turnout | SBVMWD | 1b | ✓ | ✓ | | | CI, WS | PROP 84 CH 2 | \$4,160,000 |
| | 12.1 | Central Feeder Pipeline | SBVMWD | 1a | ✓ | ✓ | | | CI, WS | PROP 84 CH 2 | \$117,000,000 |
| | 12.2 | San Bernardino Pump Station #1 | SBVMWD | 3 | | ✓ | | | CI, WS | PROP 84 CH 2 | \$2,900,000 |
| | 12.3 | San Bernardino Pump Station #2 | SBVMWD | 1b | | ✓ | | | CI, WS | PROP 84 CH 2 | \$10,000,000 |
| | 12.4 | Redlands Pump Station | SBVMWD | 3 | | ✓ | | | CI, WS | PROP 84 CH 2 | \$55,000,000 |
| | 12.7 | Riverside Pump Station (Raub Emergency Supply Intertie) | RPUD | 1a | ✓ | ✓ | | | CI, WS | PROP 84 CH 2 | \$8,000,000 |
| | 19 | Riverside-Corona Feeder | WMWD | 1a | ✓ | ✓ | | | CI, WS | PROP 84 CH 2 | \$176,000,000 |
| | 36 | West End Pump Station | SBVMWD | 1b | ✓ | ✓ | | | CI, WS | PROP 84 CH 2 | \$10,000,000 |
| | 37 | 9th Street Feeder | SBVMWD | 3 | ✓ | ✓ | | | CI, WS | PROP 84 CH 2 | \$24,100,000 |
| | 38.1 | South End Feeder | SBVMWD | 3 | ✓ | ✓ | | | CI, WS | PROP 84 CH 2 | \$11,500,000 |
| | 38.2 | South End Pump Station | SBVMWD | 3 | ✓ | ✓ | | | CI, WS | PROP 84 CH 2 | \$1,090,000 |
| | 39.1 | Mentone Pipeline | SBVMWD | 3 | ✓ | ✓ | | | CI, WS | PROP 84 CH 2 | \$11,700,000 |
| | 39.2 | Mentone Feeder | SBVMWD | 3 | ✓ | ✓ | | | CI, WS | PROP 84 CH 2 | \$18,800,000 |
| | 39.3 | Citrus Pump Station (Mentone Pump Station) | SBVMWD | 3 | ✓ | ✓ | | | CI, WS | PROP 84 CH 2 | \$13,800,000 |
| | 39.5 | EBX Phase 2 (Pipeline, PS & Reservoirs) | DWR | 1a | ✓ | ✓ | | | CI, WS | PROP 84 CH 2 | \$196,000,000 |
| | 39.6 | DWR Pump Station Expansions (Crafton Hills PS, Greenspot PS, Cherry Valley PS) | DWR | 1a | | ✓ | | | CI, WS | PROP 84 CH 2 | \$5,000,000 |
| | 40.1 | DWR Pump Station Alternative 1 | SBVMWD | 3 | ✓ | ✓ | | | CI, WS | PROP 84 CH 2 | \$23,300,000 |
| | 40.2 | DWR Pump Station Alternative 2 (only count cost of 40.1 as these are alternatives) | SBVMWD | same as above | Same as | above | | | CI, WS | PROP 84 CH 2 | See 40.1 |
| | 55 | Medical Center to Virginia Street Connector | City of SB | 3 | | ✓ | | | CI, WS | PROP 84 CH 2 | \$3,475,000 |
| | 60.1 | Baseline Feeder West Extension | SBVMWD | 3 | ✓ | ✓ | | | CI, WS | PROP 84 CH 2 | \$30,300,000 |
| | 60.2 | Baseline Feeder Pump Station (East and/or West Alternative) | SBVMWD | 3 | | ✓ | | | CI, WS | PROP 84 CH 2 | \$3,100,000 |
| | 61 | Waterman Pump Station to Lower Zone | City of SB | 3 | | ✓ | | | CI, WS | PROP 84 CH 2 | \$1,010,000 |
| | 70.1 | Yucaipa Lakes Pipeline Replacement | SBVMWD | 3 | | ✓ | | | CI, WS | PROP 84 CH 2 | \$760,000 |
| | 70.2 | Yucaipa Pump Station | SBVMWD | 3 | ✓ | ✓ | | | CI, WS | PROP 84 CH 2 | \$12,900,000 |
| | 70.3 | Yucaipa Connector | SBVMWD | 2 | ✓ | ✓ | | | CI, WS | PROP 84 CH 2 | \$4,500,000 |
| | 80.1 | Orange Street Connector Pipeline | SBVMWD | 3 | ✓ | ✓ | | | CI, WS | PROP 84 CH 2 | \$4,900,000 |
| | 80.2 | Alabama Street Connector Pipeline | SBVMWD | 1a | ✓ | ✓ | | | CI, WS | PROP 84 CH 2 | \$8,800,000 |
| | 80.3 | Alabama Street Well Field | SBVMWD | 1a | ✓ | ✓ | | | CI, WS | PROP 84 CH 2 | \$4,500,000 |
| | 90.3 | City Creek Crossing | SBVMWD | 1a | | ✓ | | | CI, WS | PROP 84 CH 2 | \$5,200,000 |
| | 97 | Erwin Lake Fire Flow | BBLDWP | 1b | | ✓ | | | CI, WS | PROP 84 CH 2 | \$1,600,000 |
| | 98 | Waterman-Gage Intertie | RPUD | 1b | ✓ | ✓ | | | CI, WS | PROP 84 CH 2 | \$5,300,000 |
| | 100 | Foothill Pipeline Enlargement | SBVMWD | 1b | | ✓ | | | CI, WS | PROP 84 CH 2 | \$25,000,000 |
| | 127 | Rialto Direct Connection to State Water Project | Rialto | 1b | | ✓ | | | CI, WS | PROP 84 CH 2 | \$12,119,379 |
| | 130 | Extension of the Baseline Feeder Agreement | Rialto | 1b | | ✓ | | | CI, WS | PROP 84 CH 2 | |
| | STORAGE | | | | | | | | | | |
| | 12.5 | San Bernardino Reservoir | SBVMWD | 1b | | ✓ | | | STO, WS | PROP 84 CH 2 | \$4,500,000 |
| | 12.6 | Redlands Reservoir | SBVMWD | 3 | | ✓ | | | STO, WS | PROP 84 CH 2 | \$5,700,000 |
| | 25 | North Lake Project | SBVMWD | 1b | | ✓ | | ✓ | STO, WS | PROP 84 CH 2 | \$133,000,000 |
| | 39.4 | Citrus Reservoir (Mentone Reservoir) | SBVMWD | 3 | ✓ | ✓ | | | STO, WS | PROP 84 CH 2 | \$91,000,000 |
| | 39.7 | Sunrise Ranch Emergency Reservoir | DWR | 3 | ✓ | ✓ | | | STO, WS | PROP 84 CH 2 | \$133,000,000 |
| | 39.8 | Zanja Emergency Storage | DWR | 3 | ✓ | ✓ | | | STO, WS | PROP 84 CH 2 | \$130,000,000 |
| | 53 | Medical Center No. 2 Reservoir | City of SB | 1b | | ✓ | | | STO, WS | PROP 84 CH 2 | \$18,100,000 |
| | 59 | Lytle Creek Reservoir | City of SB | 3 | | ✓ | | | STO, WS | PROP 84 CH 2 | \$16,100,000 |

✓ Denotes Primary Objective
 ✓ Denotes Secondary Objective
 Strategies in **bold** are primary
 Strategies not in **bold** are secondary

Notes: Project readiness include completion of pre-feasibility study, environmental documentation, project design, and expected implementation date

Tier: 1a - If Regional Benefit is 10 and Total Score is more than 20.
 1b - If Total Score is more than 20
 2 - If Regional Benefit is less than 10 and Total Score is less than 21
 3 - If score for Project Commitment is 4 or less

Terms: SGM Surface Water and Groundwater Management
 WSR Water Supply Reliability
 WQP Water Quality Protection
 ESR Ecosystem Restoration

Strategy Abbreviations

WTR Water Treatment and Recycling
 WC Water Conservation
 CI Conveyance and Intertie
 STO Storage
 GWM Groundwater Management
 GQP Groundwater Quality Protection
 CU Conjunctive Use
 WS Water Supply
 SWM Surface Water Management
 FSW Flood and Storm Water Management
 TNM TDS and Nitrogen Management
 SWQ Surface Water Quality Improvement
 EHE Ecosystem Protection and Habitat Enhancement
 WR Wetlands Restoration
 LU Land Use
 RPA Recreation and Public Access
 WR Water Recycling

Table 5-2
Upper Santa Ana IRWMP Prioritization and Cost

| OBJECTIVES | STRATEGY | | Agency/ Project Sponsor | Project Ranking/ Tier | Objectives | | | | Strategies | Funding Opportunities | Projected Costs |
|---|---|---|-------------------------|-----------------------|------------|-----|-----|----------|------------------------------------|--|-----------------|
| | PROJECT NO | PROJECTS | | | SGM | WSR | WQP | ESR | | | |
| | | | | | | | | | | | |
| IMPROVE SURFACE WATER AND GROUNDWATER MANAGEMENT | GROUNDWATER MANAGEMENT | | | | | | | | | | |
| | 15 | Seven Oaks Dam Borrow Pit Groundwater Recharge and Habitat Restoration Project | Conservation | 1a | ✓ | ✓ | | ✓ | GWM, CU, EHE | PROP 84 CH 2, PROP 84 CH 5 | \$9,700,000 |
| | 23 | Installation of Groundwater Monitoring Wells in Santa Ana River Forebay | Conservation | 1b | ✓ | | | | GWM | AB 303 | \$640,000 |
| | 27 | Rialto-Colton Basin Groundwater Recharge Study | WVWD | 1b | ✓ | ✓ | | | GWM, CU | PROP 84 CH 2 NON-IRWMP, AB303 | \$280,000 |
| | 121 | Alluvial Fan Development Guideline | WRI-CSUSB | 1b | | | | | GWM, LU, FSW | PROP 84 CH 3, 1E | \$630,000 |
| | 122 | Numeric Groundwater Model for Riverside/Arlington Groundwater Basins | RPUD, WMWD | | ✓ | ✓ | | | GWM, CU | AB 303 | |
| | GROUNDWATER QUALITY PROTECTION | | | | | | | | | | |
| | 35 | Existing Pilot Dewatering and Phased Dewatering Project | SBVMWD | 3 | ✓ | ✓ | | | GWM, GQP, WS | PROP 84 CH 2 | Unknown |
| | 45 | Septic System Conversion Higrove Area- Phase II | RPUD | 2 | ✓ | ✓ | ✓ | | GQP, WS | PROP 84 CH 2, DPH | \$9,730,000 |
| | 46 | Pellesier Ranch Barrier Wells and Water Treatment Plant | RPUD | 1a | ✓ | ✓ | | | GQP, WS, CI | PROP 84 CH 2, PROP 84 CH 2 NON-IRWMP, DPH | \$17,700,000 |
| | 51 | Groundwater Reclamation Interagency Project (GRIP) | City of Redlands | 1b | ✓ | ✓ | ✓ | | GQP, WS, WR | PROP 84 CH 2 | \$9,100,000 |
| | 54 | Bunker Hill Regional Water Supply | City of SB | 1a | ✓ | ✓ | ✓ | | GQP, WS, GWM | PROP 84 CH 2, PROP 84 CH 2 NON-IRWMP, DPH | \$86,300,000 |
| | 57 | Bunker Hill Basin Water Supply Reliability | WVWD | 2 | ✓ | ✓ | | | GQP | PROP 84 CH 2 | \$13,000,000 |
| | 128 | Characterization Study of the Contaminant Plume in the Rialto-Colton Basin | Rialto | 1b | ✓ | ✓ | | | GQP, WS | AB 303 | \$6,490,561 |
| | 129 | Groundwater Production and Perchlorate Removal Treatment | Rialto | 1b | ✓ | ✓ | | | GQP, WS | PROP 84 CH 2, DPH | \$6,060,000 |
| | 131 | Groundwater Remediation - Capture High-Concentration Perchlorate Contamination in the Rialto-Colton Basin | Rialto | 1b | ✓ | ✓ | | | GQP, WS | PROP 84 CH 2, DPH | \$14,500,000 |
| | 132 | Long-Term Remediation Plan for Rialto-Colton Basin | Rialto | 1b | ✓ | ✓ | | | GQP, WS | PROP 84 CH 2, DPH | \$250,000 |
| | CONJUNCTIVE USE | | | | | | | | | | |
| | 1 | Seven Oaks Dam and Reservoir Construction Area | SBVMWD | 3 | ✓ | ✓ | | | SWM, CU, WS | PROP 84 CH 2 | \$29,000,000 |
| | 1.1 | Enhance Spreading | SBVMWD | 1a | ✓ | ✓ | ✓ | | SWM, CU, WS | PROP 84 CH 2 | \$8,000,000 |
| | 4.0 | Santa Ana River Construction Area | SBVMWD | 1a | ✓ | ✓ | | | SWM, CU, WS | PROP 84 CH 2 | \$122,000,000 |
| | 4.1 | Morton Canyon Hydroelectric Gen. Plant | SBVMWD | 3 | | | | | CU | OTHER | \$38,000,000 |
| | 7 | Devil Canyon Construction Area | SBVMWD | 3 | ✓ | ✓ | | | SWM, CU, WS | PROP 84 CH 2 | \$1,720,000 |
| | 8 | Lytile Creek Construction Area | SBVMWD | 1b | ✓ | ✓ | | | SWM, CU, WS | PROP 84 CH 2 | \$13,500,000 |
| | 13 | Riverside North Recharge Basin | RPUD | 1b | ✓ | ✓ | ✓ | | CU, SWM, WS | PROP 84 CH 2 | \$13,400,000 |
| | 48 | Muscoy Spreading Basins | SBVMWD | 1b | ✓ | ✓ | ✓ | | CU, SWM | PROP 84 CH 2 | \$5,227,200 |
| | FLOOD AND STORM WATER MANAGEMENT | | | | | | | | | | |
| | 29 | Cactus Basins #4 and #5 | FCD | 1b | ✓ | ✓ | ✓ | ✓ | FSW, SWM, CU, SWQ | PROP 84 CH 3, PROP 84 CH 5, 1E | \$21,300,000 |
| | 30 | Cactus Basins #3 | FCD | 1b | ✓ | ✓ | ✓ | ✓ | FSW, SWM, CU, SWQ | PROP 84 CH 3, PROP 84 CH 5, 1E | \$21,300,000 |
| | 31 | Randall Basin | FCD | 1b | ✓ | ✓ | | | FSW, SWM, CU, SWQ | PROP 84 CH 3, PROP 84 CH 5, 1E | \$1,460,000 |
| | 34 | Cable Creek Debris Basin | FCD | 3 | ✓ | ✓ | | | FSW, SWM, CU, SWQ | PROP 84 CH 3, PROP 84 CH 5, 1E | \$38,000,000 |
| | 33 | Sand/Warm Confluence | FCD | 1b | ✓ | ✓ | | | FSW | PROP 84 CH 3, PROP 84 CH 5, 1E | \$2,600,000 |
| | TDS AND NITROGEN MANAGEMENT | | | | | | | | | | |
| | 20 | Desalter and Brine Disposal | YVWD | 2 | | ✓ | ✓ | | TNM, WS | PROP 84 CH 2, PROP 84 CH 2 NON-IRWMP | \$9,600,000 |
| | | City of Beaumont Desalter | City of B. | 0 | | | | | TNM, WS | PROP 84 CH 2 | |
| | | Sari Improvement Project | | 0 | | | | | TNM, WS | PROP 84 CH 2 | |
| | SURFACE WATER QUALITY IMPROVEMENT | | | | | | | | | | |
| | 24 | Security Fencing of Groundwater Recharge Facilities | Conservation | 2 | ✓ | ✓ | | | SWQ, GQP | PROP 84 CH 2, PROP 84 CH 2 NON-IRWMP | \$1,140,000 |
| | 102 | Big Bear Lake Management Plan | Multiple Agencies | 1b | | | ✓ | ✓ | SWQ, WS, EHE | PROP 84 CH 2, PROP 84 CH 2 NON-IRWMP, PROP 84 CH 5 | \$260,000 |
| ECOSYSTEM PROTECTION AND HABITAT ENHANCEMENT | | | | | | | | | | | |
| 10 | Wash Habitat Conservation Plan | Conservation | 1b | ✓ | ✓ | | ✓ | EHE, CU | PROP 84 CH 5, PROP 84 CH 9, AB 303 | \$300,000 | |
| 110 | Lytile Creek Watershed Assessment and Restoration | WRI-CSUSB | 1b | | ✓ | ✓ | ✓ | EHE | PROP 84 CH 5, PROP 84 CH 9 | \$260,000 | |
| 118 | San Timoteo Canyon State Park Acquisition and Restoration | R.L.C. | 1b | | | ✓ | ✓ | EHE | PROP 84 CH 5, PROP 84 CH 9 | \$5,500,000 | |
| 113 | Removal of Invasive Plant | IERCD | 1b | ✓ | ✓ | | ✓ | EHE | PROP 84 CH 5, PROP 84 CH 9 | \$300,000 | |
| 114 | Warm Creek Restoration Project | IERCD | 1b | ✓ | ✓ | | ✓ | EHE | PROP 84 CH 5, PROP 84 CH 9 | \$63,000 | |
| WETLANDS RESTORATION | | | | | | | | | | | |
| | Stanfield Marsh | | | | | | | WR, EHE | | | |
| | Bogart Park Wetlands | | | | | | | WR, EHE | | | |
| LAND USE | | | | | | | | | | | |
| 6 | BCV Forest Land Reserved | | | | | | | LU, SWQ | | | |
| | I.E. Sustainable Watershed Project | IERCD | 1b | ✓ | | ✓ | ✓ | LU, SWQ | CALFED | \$115,000 | |
| 11 | LIDS for Kids- Low Impact Development | IERCD | 2 | ✓ | | | ✓ | EHE, SWQ | PROP 84 CH 5, PROP 84 CH 9 | \$237,000 | |
| RECREATION AND PUBLIC ACCESS | | | | | | | | | | | |
| 18 | San Timoteo Creek Aquatic Restoration | Redlands | 1b | | | | | | | \$5,500,000 | |
| 32 | Constructed Wetlands | WRI-CSUSB | 1b | | | ✓ | ✓ | RPA | PROP 84 CH 8, PROP 84 CH 9 | Unknown | |
| 124 | SAR Trail - Phase III | SBCPD | 1b | | | | ✓ | RPA | PROP 84 CH 5 | | |
| 125 | SAR Trail - Phase IV | SBCPD | 1b | | | | ✓ | RPA | PROP 84 CH 5 | | |
| Total: | | | | | | | | | | \$1,989,749,492 | |

✓ Denotes Primary Objective
 ✓ Denotes Secondary Objective

Strategies in **bold** are
 Strategies not in bold are secondary

Notes: Project readiness includes completion of pre-feasibility study, environmental documentation, project design, and expected implementation date

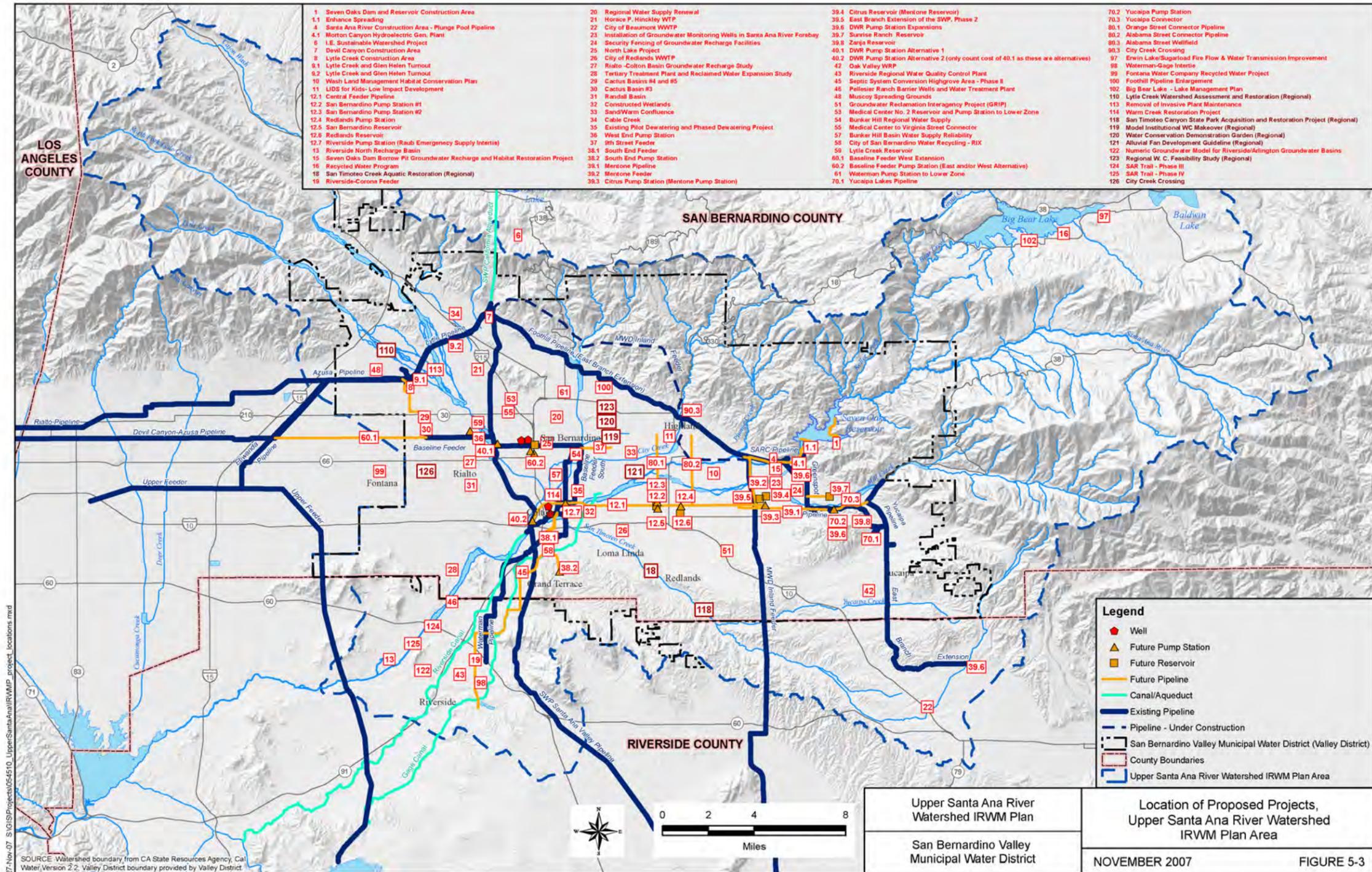
Tier: 1a - If Regional Benefit is 10 and Total Score is more than 20.
 1b - If Total Score is more than 20
 2 - If Regional Benefit is less than 10 and Total Score is less than 21
 3 - If score for Project Commitment is 4 or less

Terms: SGM Surface Water and Groundwater Management
 WSR Water Supply Reliability
 WQP Water Quality Protection
 ESR Ecosystem Restoration

Strategy Abbreviations

WTR Water Treatment and Recycling
 WC Water Conservation
 CI Conveyance and Intertie
 STO Storage
 GWM Groundwater Management
 GQP Groundwater Quality Protection
 CU Conjunctive Use
 WS Water Supply
 SWM Surface Water Management
 FSW Flood and Storm Water Management
 TNM TDS and Nitrogen Management
 SWQ Surface Water Quality Improvement
 EHE Ecosystem Protection and Habitat Enhancement
 WR Wetlands Restoration
 LU Land Use
 RPA Recreation and Public Access
 WR Water Recycling

Figure 5-3
Project Locations





Upper Santa Ana River Watershed Integrated
Regional Water Management Plan

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5.2.2 Economic and Technical Feasibility of the Projects

As stated above, a pre-feasibility evaluation of the projects is conducted to assess technical and economical feasibility of the projects. Those projects that are deemed not feasible at this time (based on a pre-feasibility evaluation) are ranked as Tier 3 and considered not ready for implementation. These projects will be evaluated in the future as additional information is developed and becomes available.

The projects that pass the above test are ranked as Tier 1 or Tier 2. Tier 1 projects are considered to be ready for implementation. These projects must have or should have a completed feasibility study, pre-design documents, and environmental documents by mid-2008. Therefore, only those projects that are deemed economically and technically feasible will move forward for implementation. The project's sponsoring agency is responsible for meeting the stated schedule for conducting the feasibility evaluations.



5.3 Implementation Considerations

5.3.1 *Institutional Structures Needed for Plan Implementation*

The responsibility for implementation of the IRWM Plan will be shared among the individual entities that participated in the planning process and prepared this plan. The implementation responsibility is based upon the jurisdiction of each responsible entity. The following summarizes the proposed implementation approach for those projects, programs, and investigations that have been formulated to date, and identifies recommendations to assist in future program and project formulation and direction.

5.3.1.1 Management of San Bernardino Basin Area

The Basin Technical Advisory Committee (BTAC) will develop the annual operation plan for managing the San Bernardino Basin Area (SBBA). The annual basin management plan will then be forwarded on to the applicable elected officials for review and approval. The BTAC will be comprised of staff representatives from plaintiffs and non-plaintiffs of the Western Judgment (Western Municipal Water District of Riverside County v. East San Bernardino County Water District, Case No. 78426). A detailed discussion of the process for managing the SBBA and BTAC responsibility is presented in Chapter 4.

5.3.1.2 Management of the Groundwater Basins

Most of the groundwater basins in the Upper SAR Watershed are adjudicated by pumpers or adjudicated “in gross” and are overseen by “Watermasters” who keep an accounting of recharge and extractions.

5.3.2 *Project Implementation*

Implementation of the projects is the responsibility of the project sponsor(s). For projects funded through the grant programs, the TAG will work with regional agencies as well as SAWPA to coordinate, apply, receive, and distribute the grant funding for project implementation. Projects formulated for this plan must periodically be updated and reprioritized, and new projects may be introduced for screening and prioritization. These activities will also be the responsibility of the TAG, which will be coordinated by Valley District. Project implementation responsibilities include coordination with the appropriate local, State, and federal agencies to prepare and complete necessary environmental documents and to pursue opportunities to fund the projects that are under their jurisdiction, consistent with the IRWM Plan.

5.3.3 *Periodic Review and Update of the IRWM Plan*

In order to keep the IRWM Plan current, it should be refined as necessary. These refinements will be the result of knowledge gained through the use of the plan.

Valley District will assume responsibility for making updates to the plan on an interval agreed upon by the TAG. Reviews and updates will focus on analyzing new information developed since the adoption of the previous plan and the need for specific water management actions. The reviews would identify areas where the plan has been successfully implemented, as well as areas where deficiencies are apparent.

Valley District will continue to coordinate the regional planning activities of the TAG as needed, and coordinate with other IRWM Plan planning activities in the region and with State and federal agencies.

5.3.3.1 Monitoring and Data Management

Implementation of monitoring programs and data management and coordination is the responsibility of the entities managing the basins, as summarized below.

- The BTAC will be responsible for monitoring, data management, and coordination for the SBBA, Rialto-Colton Basin, and North Riverside Basin as defined in the monitoring program developed for this plan.
- San Timoteo Watershed Management Authority is responsible for data collection, management, and coordination activities related to the San Timoteo Basin.
- Big Bear MWD is responsible for data collection, storage, and monitoring coordination activities associated with the Big Bear Lake Basin.

5.3.4 Implementation Schedule

The IRWM Plan will be implemented during the next 25 years. The first step in implementation is to prepare a capital improvement plan to identify funding sources for proposed projects. It is anticipated that feasible Tier 1a and 1b projects will be implemented during the next 20 years. Tier 2 and 3 projects will be periodically reviewed and as additional project information becomes available, will move up for implementation. Additional projects may be identified for implementation. Implementation schedules for individual projects will also be prepared along with feasibility studies. Figure 5-4 is a snap shot (as of December 2007) of the Plan implementation schedule. This schedule will be updated as additional information is developed and full feasibility of the projects is completed.

5.3.5 Regional and Statewide Priority and Issues of State Significance

Improving water supply reliability and reducing reliance on the SWP during droughts is considered an issue of Statewide significance. Environmental and fishery issues of the Sacramento-San Joaquin Delta (Delta), including endangered species, vulnerability of Delta levees, and Delta water quality issues, significantly reduce reliability of the SWP supplies. Recently, State water leaders and the Governor’s Office have had renewed discussion of an “Isolated Facility” around the Delta as an alternative to the current “broken” operations in the Delta. The isolated facility has the potential to improve fishery issues, reduce the impact of water diversions on listed species, and improve drinking water quality (less total dissolved solids (TDS), trihalomethane, and bromide) for millions of Californians. This translates into increased reliability for the SWP supplies. The resolution of Delta conveyance issues, therefore, will benefit the region and its water supply, and will significantly contribute to water supply reliability and water quality improvement in the Upper Santa Ana Region.

It should also be noted that a major consideration and a regional priority for formulation of this IRWM Plan is to improve water supply reliability and optimize the use of imported water to reduce reliance on imported water during droughts. Implementation of water management strategies of this plan, therefore, will reduce stresses on SWP supplies, especially during drought periods, and will provide statewide water supply benefits.



5.4 Capital Improvement Funding

Implementation of the projects listed in Table 5-1 requires an estimated investment of over \$2 billion. This level of funding is beyond the financial abilities of local agencies of the region at this time. Therefore, it is important for the water leaders to develop a capital improvement plan that identifies funding sources and further refines priorities for project implementation. In addition, the agencies should actively engage in obtaining grant funding to assist in project implementation.

Depending on the characteristics and scope of a particular project, some activities and projects currently identified in this IRWM Plan and future activities will likely be in some part contingent on securing funding from federal, State, and/or local sources. The following summarizes project funding approaches to date, as well as anticipated funding strategies.

5.4.1 Federal Funding

The federal grant funding sources are currently limited. The U.S. Bureau of Reclamation's (Reclamation) Challenge Grant Program provides funding for water management programs and projects in the western United States. This grant program might help fund the implementation of water conservation projects. Reclamation also provides funding for water recycling programs in Southern California. The Environmental Protection Agency (EPA) provides funding for environmental improvement projects. In addition, funding can be directed for implementation of projects under the IRWM Plan, through the Federal Energy and Water Development Appropriations legislation.

5.4.2 State Grant Funding

State funding may be a significant source of funding for implementation of the IRWM Plan. Current key State funding sources include the following:

- The Water Use Efficiency Program, which is currently administered by DWR and is funded through various bond initiatives, and provides grant funding for agricultural and urban water conservation programs.
- DWR's AB 303 Local Groundwater Assistance Program funds groundwater management, data collection, modeling, monitoring, and assessment programs. AB 303 is a potential source of funding for a range of groundwater management projects.
- The Integrated Regional Water Management Grant Program is well suited for funding of the projects developed for the IRWM Plan. Proposition 84 allocated \$114 million for the Santa Ana Region integrated regional plans, which is a small fraction of the funding needed for the region's projects.

- The passage of Proposition 84 in the November 2006 election allocated \$800 million for flood control projects in which \$180 million is allocated for the subvention program to help local agencies outside the Central Valley to implement local flood control projects.
- Proposition 1E provides \$300 million in funding for stormwater management and other projects outside of the Central Valley.
- Proposition 84 allocated \$45 million in funding to expand and improve the Santa Ana River Parkway.

5.4.3 Local Agency Funding

Local entities for years have been implementing cost-effective projects and programs at the local level. In the past, local funding has been used in part or in total to fund local water projects. Today, however, a major constraint in implementing many of the projects in this IRWM Plan is the lack of financial capacity and funding availability at the local level. Some of the communities in the Upper Santa Ana Region are economically disadvantaged (i.e., their median income is less than 80 percent of the average) and they may not be able to finance costly projects. Bond laws (i.e., Chapter 8 of Proposition 50) generally require local agencies to share the cost of implementing their project unless the project is benefiting an economically disadvantaged community, in which case, the community could be qualified for exemption from local cost-sharing requirements.



5.5 Obstacles to Implementation

The most significant obstacle to implementation of the IRWM Plan is funding of capital improvement projects. Considering the limited financial capacity of the agencies in the Upper Santa Ana Region, it would be very difficult to fund projects with an estimated cost of \$2 billion. Steps that can be taken to remedy funding obstacles include development of a capital improvement plan, implementation phasing, obtaining grant funding, and forging partnerships to fund major projects. No other insurmountable obstacles to implementation of the IRWM Plan have been identified. As described earlier, the agencies within the Plan Area have successfully worked together in the past on the development and implementation of projects and programs to improve the water resources management within the region. Working together, these agencies have developed a successful relationship, enabling them to accomplish things that satisfy the varied interests within the Upper SAR Watershed. Developing these initial relationships, trust, and accountability among the participating groups is one of the biggest challenges to any regional cooperation. The stakeholders and interested parties within the Upper Santa Ana Region can continue to successfully work together to implement future projects to improve the water resources management for the citizens of the region.

5.6 Impacts and Benefits of the Upper Santa Ana IRWM Plan

5.6.1 IRWM Plan Benefits

Probably the most significant benefit of the Upper Santa Ana River Watershed IRWM Plan is the planning process itself. The process has created a cooperative environment among all agencies in the region. They meet on a regular basis to discuss the water management issues and plan for meeting future water needs of the region. The agencies worked together to develop solution-oriented programs, they forged agreements, and they work together to provide the most basic and essential service to the communities—serving water. The planning process provided a framework for developing regional and integrated solutions.

Full implementation of the Upper Santa Ana River Watershed IRWM Plan will result in multiple benefits associated with meeting the objectives identified in Chapter 4 of this IRWM Plan. Key public and overall benefits from implementation of the plan elements include the following:

- Significant improvement in water supply reliability during drought periods while reducing reliance on imported water.
- Improved and coordinated management of the region’s surface water and groundwater resources, including conjunctive management of groundwater and surface water resources and recharge of groundwater basins.
- Improved water quality through effective management of groundwater resources, expediting clean up process of contaminant plumes in the region, and improving stormwater management.
- Enhancement of water-dependent environmental assets.
- Improved water-related education, recreation, and public access opportunities in the region.
- Improved understanding of the region’s water resources, including focused regional monitoring to ensure groundwater is used in a sustainable manner.
- Improved coordination of water management activities of the region through sharing of ideas and mutually beneficial management of project opportunities.
- Coordinated development of water management strategies and associated projects.



5.6.2 IRWM Plan Impacts

The potential negative impacts from implementing most of the projects in the Upper Santa Ana River Watershed IRWM Plan are anticipated to be primarily short-term facility construction impacts. It is proposed that conjunctive water management projects include a monitoring and assessment element to evaluate the impacts of project implementation. Monitoring and assessment elements will provide tools to evaluate and modify project operation to mitigate potential impacts. Further discussion of project monitoring and assessment is presented in Chapter 6.

5.6.2.1 Environmental Documentation and County Ordinance Compliance

Permitting and environmental documentation will be required for many of the new project facilities in accordance with federal, State, and local laws and ordinances. The project-specific environmental compliance will be performed by project sponsors on a case-by-case basis prior to project construction. Impacts and benefits of the proposed actions will be further assessed. All actions and investigations will be coordinated with local, State, and federal agencies to share information and ensure compliance with applicable laws and ordinances.

6 Data Management and Monitoring, Technical Analyses, and Plan Performance

This chapter summarizes the technical analyses, data management, and performance of the Integrated Regional Water Management Plan (IRWM Plan). The chapter is organized in two parts. Part I describes data management and monitoring as well as technical analyses conducted during plan preparation. Part II examines monitoring, data management, and plan performance during plan implementation. This chapter also describes how the performance data will be used to adapt the IRWM Plan and its management tools in response to plan implementation success and its performance.



6.1 Part I: Data Management and Technical Analyses for Plan Preparation

6.1.1 Use of Available Information to Develop the IRWM Plan

The Upper Santa Ana River (SAR) IRWM Plan documents the results of a comprehensive two-year effort of over 20 agencies with varying water management and flood control responsibilities in the region focused on developing a coordinated approach to water resources management. The IRWM Plan was prepared using information and guidance from the Technical Advisory Group (TAG) and the local agencies involved in water resources management and can, in turn, be used by these same agencies to guide and support their future water management efforts.

Prior to the preparation of the IRWM Plan, the water management agencies within the region often worked on an agency-by-agency basis to define their individual needs, and collectively to address water management issues that affect regional issues. During this time, extensive information and data were collected, compiled, and evaluated, including numerous agreements, memorandums of understanding (MOUs), and court judgments. This information served as the foundation for the development of this plan, as described below.

6.1.2 Existing Information and Reports

The IRWM Plan is a document that is intended to provide a common vision for water resources management within the Upper Santa Ana Watershed. A considerable amount of available information was used to develop this plan. Following is a general description of the existing reports that were extensively used in the IRWM Plan and their main contributions.

- Information in local water purveyors' 2005 **Urban Water Management Plans** was used in preparing the water budget for the region. Information analyzed included water demand projections through 2030, water supply reliability strategies in general, and water conservation and water recycling strategies in particular.
- **Master Plans** prepared by local water and flood control agencies were used to estimate water use, supplies, and existing and planned facilities, and for development of the conveyance and recharge strategies for the region.
- **County and City General Plans** were reviewed to ensure that land use assumptions and information used in the IRWM Plan are consistent with the Master Plans.

- **Court Judgments and Agreements** between or among water agencies were used as the basis of groundwater and surface water management activities and to develop surface water and groundwater management strategies that include developing a process to manage the San Bernardino Basin Area (SBBA) (Figure 4-12). These documents were reviewed to ensure the groundwater and surface water management strategies prepared for the Plan are consistent with these documents.
- **Environmental Impact Report for Santa Ana River Water Rights Applications for Supplemental Water Supply** information was used for water supply analyses, water supply reliability strategies, and background information about the region and its water resources.
- A number of other reports and data sources (Western Watermaster Reports, water level data, U.S. Geological Survey (USGS) models and reports, contaminant plume(s) data, and Conservation District Engineering Investigations) were used in a minor role to prepare this plan. A detailed list of reports used in the preparation of the IRWM Plan is included in Section 8, *References*.

6.1.3 Data Management and Monitoring

An extensive network of groundwater and surface water monitoring is in place in the region. Data from these monitoring sites were used extensively in the Operation Model, Allocation Model, Groundwater Model, and other studies conducted for the IRWM Plan. Surface water and groundwater data collected throughout the region by various agencies were used for preparation of the plan. The data are used in various models to evaluate water management strategies and potential benefits of the proposed projects. The majority of the data used in the preparation of the IRWM Plan are available to the public through the local agencies. The existing data and new data collected as a result of the preparation of the IRWM Plan are available to the TAG, stakeholders, interested parties, California Department of Water Resources (DWR), and other state agencies.

The Upper SAR Watershed IRWM Plan is nested within the larger Santa Ana Watershed Project Authority's (SAWPA) IRWM Plan, which serves as an umbrella plan. The information developed as part of the Upper SAR Watershed IRWM Plan is provided for inclusion in the umbrella watershed plan.

6.1.4 Technical Analyses to Develop the IRWM Plan and Projects

The initial efforts in preparing the IRWM Plan focused on identifying the key water resources goals and objectives of the Plan Area. Once the objectives were identified, a considerable amount of time, resources, and technical effort was allocated during a period of 18 months to evaluate surface water and groundwater



resources of the region and define water management strategies that would meet plan objectives. A brief summary of the key technical analyses for the IRWM Plan is presented below.

- **Development and Use of Operations Model (OPMODEL).** OPMODEL was developed to estimate the quantity of unappropriated SAR water available for diversion by the San Bernardino Valley Municipal Water District (Valley District) and Western Municipal Water District (Western) after accounting for diversions by prior water rights holders and environmental flows. This model provides basic water supply data needed to evaluate the feasibility of conjunctive use strategies using local surface water supplies.
- An “**Allocation Model**” was developed and used to evaluate the use and allocation of local surface water and State Water Project (SWP) supplies throughout the service area, including direct deliveries to existing water treatment plants and spreading grounds.
- **Use of Groundwater Model.** A detailed and enhanced groundwater model was developed for the SBBA. Upon completion and calibration of the model, it was extensively used to evaluate potential conjunctive use projects and to define the locations and sizes of the recharge basins and the location and number of groundwater production wells needed for each conjunctive use scenario. The model is a tool that can be used for operation and management of the groundwater basin and for management of water levels and water quality in the SBBA.
- The surface and groundwater data collected in the SBBA were extensively used for development and calibration of the models and for the analysis of the conjunctive use scenarios.
- Preliminary engineering analyses were conducted for evaluation of diversion and conveyance facilities to convey water to the spreading basins.
- Water demand and supply analyses were conducted to understand water demands in the region and how future demands will be met.
- Detailed analyses of water demands and supplies included the ability of the purveyors to meet water demands during a single-year drought and a multiple-year drought scenario. In addition, water needs for the peak day demand of water purveyors within the Valley District service area were studied.

- A sensitivity analysis was conducted to determine the significant level of impact on meeting future water needs, assuming reduced local surface water and reduced reliability in SWP supplies. This analysis intended to capture uncertainties related to SWP future water supply reliability and/or uncertainties of local surface water supplies due to climate change.
- Conceptual engineering analyses were conducted to evaluate the impact of water supply interruption during major disasters and its impact on meeting customers' water needs as well as evaluation of the facilities needed to provide redundancies for infrastructures.
- Pre-feasibility evaluations were conducted of individual projects identified in response to water management strategies and to determine project benefits and associated costs.

The agencies began identifying individual projects that may contribute to meeting the planned water management strategies and objectives. Each project and program included in the Upper SAR IRWM Plan were identified by a local lead agency (project sponsor) that was primarily responsible for the project's description and technical evaluation, as well as the project's integration into the IRWM Plan. The project's sponsor will be responsible for any further project refinement, pursuit of funding, project implementation, and assessment of project performance.

The project description and available supporting information were used to evaluate and rank the individual projects and programs. There was a large range of available supporting information for the projects that tended to reflect the maturity of the planning process and previous efforts made to define project details and establish a project's readiness to proceed. Compared to other projects, the highest ranked projects (Tier 1a and 1b projects) typically had considerable supporting information such as feasibility studies, cost estimates, and preliminary design information. Completion of required additional studies and investigations needed for some of the other projects could improve ranking of such projects in the future.



6.2 Part II: Monitoring, Data Management, Plan Performance, and Adaptive Process during Plan Implementation

6.2.1 Data Collection and Monitoring

As stated earlier, an extensive network of data collection is already in place in the region. A monitoring plan was also developed for the region as a component of this IRWM Plan to formalize and standardize data collection procedures. The objectives of the monitoring plan are to:

- Provide a standard methodology for the collection, storage, and reporting of hydrologic data.
- Document the collection of data needed for management of the groundwater basin to meet the requirements of various judgments. In the SBBA and other adjudicated basins, the Watermaster is responsible for collection, review, and compilation of the data needed for management of the basin and for providing a level of coordination among many water users.
- Provide the data needed for developing the “Annual Operation Plan” for management of the SBBA.
- Provide standardized procedures to collect source water data that agencies use to meet requirements of the California Department of Public Health (CDPH) (formerly the California Department of Health Services) drinking water standards.

The monitoring plan is presented in Appendix B. Currently, the following hydrologic data are being collected in the region:

- **Groundwater data:** Groundwater monitoring is in place for measuring groundwater production, water quality, and water levels representative of the various subbasins. Groundwater level data were used to evaluate the groundwater level trends as well as to evaluate the groundwater flows and included the following:
 - USGS multi-level monitoring wells.
 - Target wells used in the groundwater model. A list of these wells, as well as a map showing the location of the targeted modeling wells, is presented in Appendix B.

- Groundwater monitoring wells identified in various agreements (e.g., Seven Oaks Accord, Riverside Agreement). Monitoring of these wells is required to ensure full compliance with the terms of the agreements. A list of these wells is presented in Appendix B.
 - Environmental Protection Agency (EPA)/City of San Bernardino Newmark-Muscoy plume(s) monitoring wells.
 - Local purveyors' water production data required by judgments and provided to the Watermaster. All purveyors of wells that pump groundwater are required to report the annual production of the wells to the Watermaster. Production data are then presented in an annual report prepared by the Watermaster.
 - Water quality data collected by water purveyors for each well. These data are periodically monitored according to Title 22 and are required by the CDPH.
- **Stream gage data:** Stream gages in the region are operated by either the USGS or the San Bernardino County Flood Control District (SBCFCD).
 - **Subsidence monitoring:** During the period from 1944 to 1969, at least one foot of subsidence occurred in the Pressure Zone immediately north of Loma Linda between the San Jacinto and Loma Linda faults. Currently, there is no subsidence monitoring station in place. No evidence of any significant subsidence is present in the subbasins at this time.

6.2.2 Data Gaps/Additional Monitoring Requirements

Although vast amounts of data are currently collected for management of the basin's water resources, there is always opportunity to collect additional data to fill necessary gaps. One such gap could be the lack of subsidence monitoring data in the region. The following additional data collection activities would be needed to fulfill the data gaps of the region:

- A network of benchmarks in the Pressure Zone area could be helpful in monitoring subsidence. Each benchmark should be established and surveyed by a California-licensed land surveyor. Locations of the benchmarks are dependent upon permitting from the appropriate agency. (This task should be coordinated with USGS to ensure there is not any duplication of efforts. USGS may collect some of these data.)
- If proven necessary, some extensometer wells could be installed on the basis of periodic land surveys within the Pressure Zone area where the



highest probability of subsidence may occur. Extensometers could be installed to measure non-recoverable compaction of fine-grained materials interbedded within the aquifer systems.

6.2.3 Management of the Data

As part of the USGS program for disseminating water data, the USGS maintains a distributed network of computers for the acquisition, processing, review, and long-term storage of water data. This distributed network of computers is called the National Water Information System (NWIS). Many types of data are stored in the NWIS, including comprehensive information for site characteristics, well construction details, time-series data for gage stage, streamflow, groundwater level, precipitation, and physical and chemical properties of water. Data collected by the USGS in the region are available to stakeholders and the public through the NWISWeb (<http://nwis.waterdata.usgs.gov/nwis>).

Data collected as part of the IRWM Plan will be stored, organized, and secured in an electronic database. Valley District is developing a comprehensive database that will be utilized to house the data needed for management of surface and groundwater resources of the region.

The database created for storing all monitoring data will be maintained by Valley District. Valley District will provide a central storage location for data and documentation. Valley District will coordinate with all agencies collecting data to facilitate exchanges in a consistent manner.

Data collected in the region will be available to the stakeholders, DWR, and other local and state agencies. Data collected in support of state-funded water quality-related projects will be made available to the State Water Resources Control Board's (SWRCB) Surface Water Ambient Monitoring Program and Groundwater Ambient Monitoring and Assessment Program.

Monitoring data collected each year will be summarized in an Annual Monitoring Report. This report will incorporate the past year's data in tabular and electronic format.

6.2.4 Adaptive Management and Plan Performance for the Upper Santa Ana River Watershed IRWM Plan

The Upper SAR Watershed IRWM Plan presents the current state of water resources planning in the region, based upon available information, and recognizes that water management strategies will continue to evolve in response to changing conditions. In recognition of the fluid nature of water management in the region, the IRWM Plan incorporates an adaptive management approach that is intended to allow the IRWM Plan to stay current in light of changing

conditions, such as local and regional water needs and changing regulatory requirements.

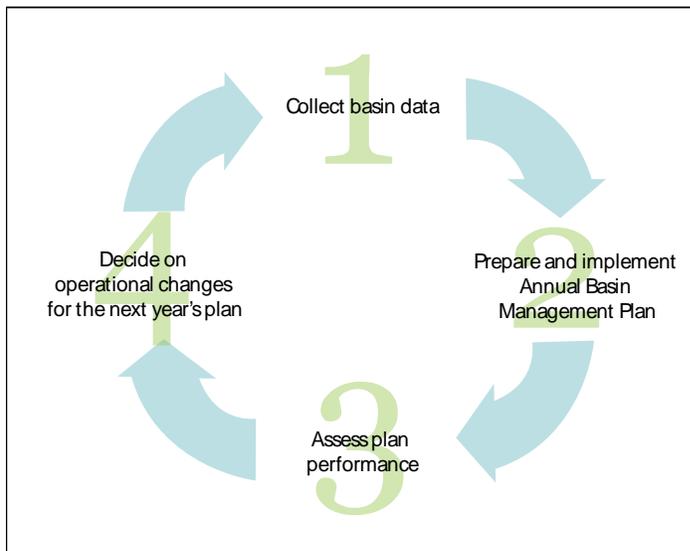
In that sense, the planning process is continually evolving in response to these changing conditions and the development of additional data that improve our understanding, which may redefine our objectives and priorities to respond to these changing conditions.

The adaptive management framework is based on an iterative process of:

- Collecting information and data regarding the conditions within the IRWM Plan Area,
- Evaluating the new data to determine plan/project performance, and
- Formulating a plan in response to these changing conditions.

For this IRWM Plan, adaptive management will primarily occur in the following areas:

**Performance Evaluation and Adaptive Process
For Preparing the SBBA Annual Basin Management Plan**



1. Preparation of the Annual Basin Management Plan for the SBBA. The process for updating the annual plan is discussed in detail in Chapter 4 and illustrated in Figure 4-12. This process is designed to manage the basin considering basin conditions especially in the preceding year. Performance is characterized by meeting specific water level and water quality objectives established for the basin. The data collected for specified key stations are reviewed. The groundwater levels and water quality data are compared with established performance criteria.

Based on conditions of the groundwater basin, an annual basin management plan is prepared and adopted for implementation in the subsequent year. This process for management of the SBBA is continuous and adaptive.



2. Periodic review of the water management strategies and reprioritization of project implementation based on availability of funding, readiness of the projects to proceed, and changing conditions.
3. Continuous refinement of the IRWM Plan process in an adaptive management framework to proactively manage the available resources, including making a significant investment in the planning and implementation of new projects and programs. This includes preparation of periodic updates of the IRWM Plan as needed to respond to changing conditions and through a continued working relationship with the TAG and other means, and to inform project participants and stakeholders about changes to the IRWM Plan.

The performance evaluation activities will be conducted for the IRWM Plan in association with the implementation of projects identified in the Upper SAR Watershed IRWM Plan. Some form of performance evaluation criteria, such as a Project Assessment and Evaluation Plan (PAEP), could be developed for projects that include public funding prior to implementing the project. PAEP was developed by the SWRCB to measure the effectiveness of a project. The goals of a PAEP are as follows:

- To provide a framework for assessment and evaluation of project performance,
- To maximize the value of public expenditures to achieve results,
- To identify measures that can be used to monitor progress towards achieving project goals, and
- To provide information to help improve current and future projects.

The PAEP will be based on project-specific information, which may be included in the implementation of a funding contract agreement to:

- Describe project characteristics and the project sponsor,
- Demonstrate consistency with local planning documents such as the IRWM Plan,
- Identify project goals and link goals with desired outcome,
- Select performance indicators,
- Identify expected benefits and impacts,

- Determine outcome indicators (site-specific, regional, and system-wide),
- Identify/implement monitoring needed to evaluate a project’s performance,
- Analyze and assess data,
- Evaluate overall success of the project, and
- Communicate the results to the TAG.

Table 6-1 presents an example of a project performance indicator that can be used for evaluation of overall success of the proposed projects for the Upper SAR Watershed IRWM Plan.

**Table 6-1
Example of Project Performance Indicator to Assess Project Success**

| Projects/Programs | Project Goal | Desired Outcome | Outcome Indicators | Target |
|--------------------------|---------------------|------------------------|---------------------------|---------------|
| Project #1 | | | | |
| Project #2 | | | | |

Implementation of projects that support one or more of the water management strategies identified in the Upper SAR Watershed IRWM Plan may have several monitoring efforts. These monitoring efforts will provide tools for evaluation of project performance. As mentioned earlier, the most significant performance evaluation will be the process for managing the SBBA. The annual operation of the SBBA must comply with a series of conditions set forth in judgments, agreements, and MOUs between signed parties for operation of the basin. The operation of the basin is examined every year to ensure the performance requirements are met or that specific adaptive management actions will be put into place as part of the annual plan for basin operation.

7 Abbreviations and Acronyms

ABBREVIATIONS AND ACRONYMS

| | |
|-------------------------|--|
| | |
| Accord | Seven Oaks Accord |
| ACEC | Area of Critical Environmental Concern |
| Advisory Commission | San Bernardino Valley Municipal Water District Advisory Commission on Water Policy |
| AHHG | Area of Historic High Groundwater |
| Association | Upper Santa Ana Water Resources Association |
| Banning | City of Banning |
| Basin Plan | 1995 Water Quality Control Plan for the Santa Ana River Basin as amended in 2004 by R8 2004-0001 |
| BBARWA | Big Bear Area Regional Wastewater Agency |
| BBCSD | Big Bear Community Services District |
| BBLDWP | City of Big Bear Lake Department of Water and Power |
| BCVWD | Beaumont-Cherry Valley Water District |
| Bear Valley Mutual | Bear Valley Mutual Water Company |
| Beaumont | City of Beaumont |
| bgs | below ground surface |
| Big Bear Municipal | Big Bear Municipal Water District |
| BLM | Bureau of Land Management |
| BMO | Basin Management Objectives |
| BMP | Best Management Practice |
| BTAC | Basin Technical Advisory Committee |
| Caltrans | California Department of Transportation |
| CDPH | California Department of Public Health |
| CEQA | California Environmental Quality Act |
| cfs | cubic feet per second |
| CLAWA | Crestline-Lake Arrowhead Water Agency |
| Colton Public Utilities | City of Colton Public Utilities Department |



ABBREVIATIONS AND ACRONYMS

| | |
|---------------|--|
| CRA | Colorado River Aqueduct |
| CSUSB | California State University at San Bernardino |
| CUWCC | California Urban Water Conservation Council |
| DBCP | debromochloropropane |
| DDT | dichlorodiphenyltrichloroethane |
| Declaration | Declaration of Fully Appropriated Streams |
| DEIR | Draft Environmental Impact Report |
| Delta | Sacramento-San Joaquin Delta |
| DMM | Demand Management Measures |
| DWP | Department of Water and Power |
| DWR | California Department of Water Resources |
| East Valley | East Valley Water District |
| EC | electrical conductivity |
| EOC | Engineering and Operations Community |
| EPA | Environmental Protection Agency |
| ESRI | Environmental Systems Research Institute |
| Exchange Plan | Santa Ana River-Mill Creek Cooperative Water Project Agreement |
| FEMA | Federal Emergency Management Agency |
| FWC | Fontana Water Company |
| GFDL | Geophysical Dynamic Lab |
| GIS | Geographic Information System |
| GMP | Groundwater Management Program |
| gpm | gallons per minute |
| HET | High-Efficiency Toilet |
| ICGMP | Institutional Controls Groundwater-Management Program |
| ICSA | Institutional Controls and Settlement Agreement |
| IEUA | Inland Empire Utilities Agency |
| IRWM Plan | Integrated Regional Water Management Plan |
| IWP | Integrated Watershed Plan |
| LID | Low Impact Development |
| Lockheed | Lockheed Martin Corporation |
| Marygold | Marygold Mutual Water Company |
| MCL | maximum contaminant level |

ABBREVIATIONS AND ACRONYMS

| | |
|------------------------|--|
| Metropolitan | Metropolitan Water District of Southern California |
| mg/L | milligrams per liter |
| mgd | million gallons per day |
| MOU | memorandum of understanding |
| MPD | Master Plan of Drainage |
| MSHCP | Multi-Species Habitat Conservation Plan |
| msl | mean sea level |
| Muscoy | Muscoy Mutual Water Company |
| Newmark Site | Newmark Groundwater contamination Superfund Site |
| NPDES | National Pollutant Discharge Elimination System |
| NPS | National Park Service |
| NWIS | National Water Information System |
| OCWD | Orange County Water District |
| OPMODEL | operations model |
| Orange County Judgment | April 17, 1969 Orange County Superior Court Judgment |
| PAEP | Project Assessment and Evaluation Plan |
| PCB | Polychlorinated Biphenyls |
| PCE | perchloroethylene |
| PCM | Parallel Climate Model |
| ppb | parts per billion |
| Reclamation | U.S. Bureau of Reclamation |
| Regents | Regents of the University of California |
| Region | Integrated Regional Water Management Plan Area |
| RFQ | Request for Qualifications |
| Rialto | City of Rialto |
| Riverside Highland | Riverside Highland Water Company |
| RIX | Rapid Infiltration Extraction |
| RM | river mile |
| RPU | City of Riverside Public Utilities Department |
| RRWQCP | Riverside Regional Water Quality Control Plant |
| RWQCB | Regional Water Quality Control Board |
| SAR | Santa Ana River |



ABBREVIATIONS AND ACRONYMS

| | |
|------------|--|
| SARI | Santa Ana Regional Interceptor |
| SARRWQCB | Santa Ana River Regional Water Quality Control Board |
| SART | Santa Ana River Trail |
| SAWA | Santa Ana Watershed Association |
| SAWPA | Santa Ana Watershed Project Authority |
| SAWPA Plan | Santa Ana Watershed Project Authority Plan |
| SBBA | San Bernardino Basin Area |
| SBCFCD | San Bernardino County Flood Control District |
| SBMWD | San Bernardino Municipal Water Department |
| SBNF | San Bernardino National Forest |
| SBVWCD | San Bernardino Valley Water Conservation District |
| SCADA | Supervisory Control and Data Acquisition |
| SCAG | Southern California Association of Governments |
| SCCWRP | Southern California Coastal Water Resource Project |
| SGPWA | San Geronio Pass Water Agency |
| SOC | synthetic organic compound |
| State | State of California |
| STWMA | San Timoteo Watershed Management Authority |
| STWMP | San Timoteo Watershed Management Program |
| SWAMP | Surface Water Ambient Monitoring Program |
| SWP | State Water Project |
| SWRCB | State Water Resources Control Board |
| TAF | thousand acre-feet |
| TAG | Technical Advisory Group |
| TCE | trichloroethylene |
| TDS | total dissolved solids |
| TMDL | total maximum daily load |
| UCR | University of California Riverside |
| ULFT | Ultra-Low-Flow Toilet |
| USACE | U.S. Army Corps of Engineers |
| USFS | U.S. Forest Service |
| USGS | U.S. Geological Survey |

ABBREVIATIONS AND ACRONYMS

| | |
|------------------|---|
| UWMP | Urban Water Management Plan |
| Valley District | San Bernardino Valley Municipal Water District |
| VOC | volatile organic compound |
| West Valley | West Valley Water District |
| Western | Western Municipal Water District |
| Western Judgment | Western Municipal Water District of Riverside County v. East San Bernardino County Water District, Case No. 78426 |
| WQMA | Water Quality Management Agency |
| WQO | water quality objectives |
| WRI | Water Resources Institute |
| WRP | Water Reclamation Plant |
| WSPA | Wooly-Star Preserve Area |
| WWTP | waste water treatment plant |
| YVWD | Yucaipa Valley Water District |

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Sam Fuller, San Bernardino Valley MWD, July 2007

Ron Buchwald, East Valley, August 2007

Tom Crowley, West Valley, August 2007. Email on August 28.

Chris Diggs, Redlands, August 2007

Jack Nelson, Yucaipa Valley, August 2007

Matt Litchfield, August 2007

2005 Urban Water Management Plans:

East Valley Water District

Fontana Water Company

City of Redlands

West Valley Water District

Yucaipa Valley Water District



Thanks

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Appendix G

Approved Santa Ana River Water Rights Application

**STATE WATER RESOURCES CONTROL BOARD
BOARD MEETING SESSION – DIVISION OF WATER RIGHTS
OCTOBER 20, 2009**

ITEM 6

SUBJECT

CONSIDERATION OF A PROPOSED DECISION TO CONDITIONALLY APPROVE TWO WATER RIGHT APPLICATIONS FOR SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT AND WESTERN MUNICIPAL WATER DISTRICT TO DIVERT AND USE WATER FROM THE SANTA ANA RIVER, AND FROM BEAR CREEK, BREAKNECK CREEK, KELLER CREEK AND ALDER CREEK, TRIBUTARIES TO THE SANTA ANA RIVER, IN SAN BERNARDINO COUNTY

DISCUSSION

On May 2-8, 2007, the State Water Board conducted an adjudicative hearing on Applications 31165 and 31370 filed jointly by San Bernardino Valley Municipal Water District and Western Municipal Water District (Muni/Western).¹ Muni/Western filed these applications to divert 200,000 acre-feet per annum (afa) of water from the Santa Ana River and its tributaries: Bear, Breakneck, Keller, and Alder Creeks. Muni/Western proposes to directly divert and collect water to storage year-round for municipal, industrial, irrigation, heat control, frost protection and recreational uses.

The relevant issues at the hearing were:

- 1) Will the approval of Applications 31165 and 31370 result in any significant adverse impacts to water quality, and the environment or public trust resources?
- 2) Is approval of Applications 31165 and 31370 in the public interest?
- 3) Will the proposed diversions by the applicant cause injury to the prior rights of other legal users of water?
- 4) Will the approval of Application 31165 and 31370 have an effect on movement of any contaminated groundwater plumes?

Witnesses for Muni/Western presented evidence that the effects on water quality and public trust resources of Muni/Western's diversions from the Santa Ana River and tributary creeks will be mitigated by measures included in the environmental impact report (EIR). The project is in the public interest because it affords replenishment of the San Bernardino Basin with a local, rather than imported, water supply. Also, the project allows Muni/Western to supply pristine water to blend with treated water downstream. In addition, the several judgments, settlement agreements and memoranda in place for the Santa Ana River ensure the permits issued for Applications 31165 and 31370 will not injure prior rights of other legal users of water. Finally, Muni/Western will implement mitigation measures as outlined in the EIR in an effort to minimize or eliminate impacts related to the groundwater contaminant plumes in the San Bernardino Basin Area:

¹ The State Water Board also held the hearing to receive evidence relevant to determining whether the State Water Board should approve, subject to terms and conditions, water right Application 31174 of Orange County Water District, Application 31369 of Chino Basin Watermaster, and Application 31372 and Wastewater Change Petition WW-0045 of City of Riverside. These applications and wastewater change petition are not considered in this decision.

POLICY ISSUES

Should the State Water Board adopt the proposed decision?

FISCAL IMPACT

This activity is budgeted within existing resources, and no additional fiscal demands will occur as a result of approving this item.

REGIONAL BOARD IMPACT

None

STAFF RECOMMENDATION

Staff recommends that the State Water Board adopt the proposed decision.

State Water Board action on this item will assist the Water Boards in reaching Goal 3 of the Strategic Plan Update, 2008-2012: To increase sustainable local water supplies available for meeting existing and future beneficial uses by 1,725,000 acre-feet per year, in excess of 2002 levels, by 2015, and ensure adequate flows for fish and wildlife habitat.

DRAFT

October 7, 2009

STATE OF CALIFORNIA
STATE WATER RESOURCES CONTROL BOARD

DECISION XXX

In the Matter of Applications 31165 and 31370
**San Bernardino Valley Municipal Water District and
Western Municipal Water District,**
Applicants

**City of Redlands
East Valley Water District
Santa Ana River Mainstem Local Sponsors
California Department of Fish and Game
San Bernardino Valley Water Conservation District
Bear Valley Mutual Water Company, Lugonia Water Company, North Fork Water
Company and Redlands Water Company
California Sportfishing Protection Alliance
United States Forest Service**
Protestants

**City of Chino
Southern California Edison
Center for Biological Diversity**
Interested Parties

SOURCES: Santa Ana River, Bear Creek, Breakneck Creek, Keller Creek and Alder Creek

COUNTY: San Bernardino

DECISION PARTIALLY APPROVING APPLICATIONS 31165 AND 31370

BY THE BOARD:

INTRODUCTION

This decision of the State Water Resources Control Board (State Water Board or Board) partially approves water right Applications 31165 and 31370 of San Bernardino Valley Municipal Water District (Muni) and Western Municipal Water District (Western) (collectively referred to as Muni/Western or Applicants) to appropriate water by direct diversion and storage to

groundwater basins for beneficial use within the boundaries of the areas administered by Muni/Western, in San Bernardino and Riverside Counties.

1.0 BACKGROUND

In Order [WR 2000-12](#), the State Water Board acted on two petitions to revise the Declaration of Fully Appropriated Streams (Declaration) to appropriate water from the Santa Ana River (or River). Order [WR 98-08](#) was revised to allow for processing two water right applications, including Application 31165 submitted by Muni/Western.

Subsequently, the State Water Board received four additional petitions requesting revision of the Declaration to allow for processing four additional applications. At that time, Muni/Western submitted Application 31370. Based on evidence in the record, the State Water Board found that the Declaration as adopted in Order WR 98-08 should be revised to allow processing of these water right applications.

2.0 PROJECT DESCRIPTION

Muni/Western filed Application 31165 on March 21, 2001 and Application 31370 on November 4, 2002. The applications were publicly noticed on January 11, 2002 and January 31, 2003, respectively. Under Applications 31165 and 31370, Muni/Western applied to divert water from the Santa Ana River and from Bear Creek, Breakneck Creek, Keller Creek and Alder Creek, which are tributary to the Santa Ana River. Applicants propose to operate the project as a combination of storage and direct diversion not to exceed 100,000 acre-feet per annum (afa) under each application, with a combined total diversion of 200,000 afa under the two applications.

Under Application 31165, Muni/Western proposes to divert up to 50,000 afa to storage at Seven Oaks Dam (Dam) and up to 100,000 afa to 12 spreading facilities (Muni/Western 5-1, par. 84; Muni/Western 5-35)² for underground storage and subsequent extraction and use. Applicants also propose to directly divert up to 800 cubic feet per second (cfs) under Application 31165, not to exceed a total of 100,000 afa. (SWRCB-1.)

² Exhibits introduced at hearing will be referred to in this decision by party name and exhibit number (e.g., SWRCB-1 refers to State Water Board Exhibit 1).

Under Application 31370, Muni/Western seeks a right to appropriate 50,000 afa to surface storage at the Dam, 100,000 afa to off-stream storage,³ and up to 100,000 afa to existing spreading facilities for underground storage for subsequent extraction and use. The applicants also propose to directly divert up to 1,100 cfs under Application 31370, not to exceed 100,000 afa. The 17 points of diversion and rediversion requested in the two applications are within the County of San Bernardino. The place of use for each application is within the Counties of San Bernardino and Riverside. (SWRCB-1.) The locations of the points of diversion and/or rediversion for each application are described in Tables A and B of this decision (see pages 64 66). As some of the points of diversion and rediversion in the original applications described the same point, the points have been renumbered. Table B also includes points of rediversion for Lake Mathews, Diamond Valley Lake, and Lake Skinner. There are now a total of 15 points of diversion and/or rediversion between the two applications.

Muni/Western proposes to divert water year-round for the purpose of municipal, industrial, irrigation, heat control, frost protection and recreational uses. Muni/Western proposes to use existing and new facilities in Seven Oaks Dam and reservoir construction area. Muni/Western also proposes construction of facilities (1) immediately downstream of Seven Oaks Dam; (2) adjacent to the Devil Canyon Power Plant and afterbays of the State Water Project, (3) in the area of lower Lytle Creek just north of the City of Rialto, and (4) an area immediately south thereof. (SWRCB-1.)

3.0 PROTESTS TO APPLICATIONS 31165 AND 31370

Eight protests were filed against Applications 31165 and 31370. Protests by Bear Valley Mutual Water Company, Lugonia Water Company, North Fork Water Company, City of Redlands, East Valley Water District, and Redlands Water Company were resolved as part of the 2004 *Settlement Agreement Relating to the Diversion of Water From the Santa Ana River System* (Seven Oaks Accord). (SWRCB-1: April 5, 2007 settlement agreement.)

Protests by California Department of Fish and Game (CDFG), San Bernardino Valley Water Conservation District (Conservation District), and United States Forest Service were resolved through a separate settlement or memorandum of agreement. (SWRCB-1: letters dated

³ The Notice of Application to Appropriate Water by Permit dated January 31, 2003 did not state Muni/Western applied for 100,000 afa to offstream storage.

April 12, 2007 and March 19, 2007 and April 24, 2007 settlement agreement.) California Sportfishing Protection Alliance (CSPA) did not appear at the pre-hearing conference or at the hearing. The State Water Board subsequently dismissed CSPA's protest for failure to respond. On May 8, 2007, Santa Ana River Mainstem Local Sponsors⁴ (Local Sponsors) and Muni/Western submitted a stipulation to the State Water Board regarding the protests by the Local Sponsors to Applications 31165 and 31370. (Local Sponsors 1-18.) In that stipulation, Muni/Western and Local Sponsors agreed to continue negotiating in good faith toward an access agreement.

In addition, Local Sponsors, and United States Forest Service each asked to have a term added to any water right granted pursuant to Applications 31165 and 31370. Those terms are included in the order portion of this Decision.

4.0 HEARING ISSUES

On February 1, 2007, the State Water Board issued a Notice of Public Hearing and Pre-Hearing Conference (Notice).⁵ The Notice was revised on March 1, 2007, with modifications to the date of the pre-hearing conference, the name of the Hearing Officer, and the correction of some typographical errors in the original hearing notice. The notice specified six key issues:

1. Is there water available for appropriation by each of the applicants? If so, when is water available and under what circumstances?
2. Will approval of any of the applications or the petition result in any significant adverse impacts to water quality, the environment or public trust resources? If so, what adverse impact or impacts would result from the project or projects? Can these impacts be avoided or mitigated to a level of non-significance? If so, how? What conditions, if any, should the State Water Board adopt to avoid or mitigate any potential adverse impacts on fish, wildlife, or other public trust resources that would otherwise occur as a result of approval of the applications and petition?

⁴ "Local Sponsors" is comprised of Orange County Flood Control District, Riverside County Flood Control and Water Conservation District and San Bernardino County Flood Control District.

⁵ The hearing concerned four water right applications and a wastewater change petition. The fifth water right application (Application 31371) was withdrawn by the applicant, San Bernardino Valley Water Conservation District, prior to the hearing. This decision addresses only Applications 31165 and 31370 by Muni/Western.

3. Is each of the proposed projects in the public interest? If so, what conditions, if any, should the State Water Board adopt in any permits that may be issued on the pending applications, or in any order that may be issued on the wastewater change petition, to best serve the public interest?
4. Will any of the proposed appropriations by the applicants and/or the proposed change in treated wastewater discharge by the petitioner cause injury to the prior rights of other legal users of water?
5. What should be the relative priority of right assigned to any permits that may be issued on the pending applications?
6. What effect, if any, will the projects have on groundwater and/or movement of any contaminated groundwater plumes? Can the effects be mitigated? If so, how?

5.0 PARTIES TO THE PROCEEDINGS

In a water right proceeding, the parties include the applicants, persons who filed unresolved protests, and any other persons who are designated as parties in accordance with the procedures set forth in the notice of hearing. (Cal. Code Regs., tit. 23, § 648.1, subd. (b).) Persons presenting non-evidentiary policy statements are not parties. (*Id.*, § 648.1, subd. (d).) Accordingly, the parties in this matter include the Santa Ana River applicants, the Center for Biological Diversity, and the Santa Ana River Mainstem Local Sponsors.

The State Water Board's hearing procedures do not require the filing of a protest as a prerequisite to participating in a hearing. Nonetheless, during the pre-hearing conference on April 6, 2007, the participants requested an opportunity to brief the Board on the extent to which the Center for Biological Diversity (Center) should be allowed to participate as a party. According to the Center's Notice of Intent to Appear, the Center intended to present a case-in-chief on the impacts of the applications on public trust resources. Certain applicants objected to the Center's presentation of evidence on the grounds that the Center had not protested their applications. In its brief, Muni/Western contended the allowance of a late appearance at a hearing by a person who did not file a protest results in unfair surprise to the hearing participants. Orange County Water District joined with Muni/Western's request to limit the

Center's participation to its protest against the wastewater change petition submitted by the City of Riverside.

In his April 20, 2007 ruling the Hearing Officer stated that it is within the State Water Board's discretion to allow an interested party who has not submitted a protest to participate in an adjudicative proceeding as a party, citing the Administrative Procedure Act, the State Water Board's regulations, and its hearing procedures. He further noted that the Center has an extensive history of advocacy and legal involvement in the Santa Ana River watershed and its public trust and environmental interests in this proceeding are unique and are not represented by other parties. The Hearing Officer concluded that the Center, having complied with the procedural requirements for participating in the hearing, would be allowed to participate fully.

STATE WATER BOARD FINDINGS

When approving an application to appropriate water, the State Water Board must make findings regarding water availability, beneficial use, public trust, and public interest. Each one of these findings is discussed below in the context of the noticed hearing issues.

6.0 WATER AVAILABILITY

When considering whether to approve an application to appropriate water, the State Water Board must determine whether unappropriated water is available to supply the project described in an application. (Wat. Code, §1375, subd. (d).) Unappropriated water includes water that has not been either previously appropriated or diverted for riparian use. (Wat. Code, §§ 1201, 1202.) According to the State Water Board's regulations, a permit can be issued only for unappropriated water. Unappropriated water does not include water being used pursuant to an existing right, whether the right is owned by the applicant, or by another person. (Cal. Code Regs., tit. 23, § 695.)

In determining the amount of water available for appropriation, the State Water Board shall take into account, whenever it is in the public interest, the amounts of water needed to remain in the source for protection of beneficial uses. Beneficial uses include, but are not limited to, instream uses, recreation and the preservation of fish and wildlife habitat. (Wat. Code, § 1243.)

Muni/Western contends that unappropriated water is available to supply the project described in Applications 31165 and 31370. Muni/Western proposes to operate the project so that the total combined annual amount of water appropriated as a combination of storage and direct diversion under the two applications does not exceed 200,000 acre-feet (af) in any one year.

(SWRCB-1.) At the hearing, Muni/Western reduced the combined direct diversion rate for the two applications from 1,500 cfs to 1,250 cfs (May 8, 2007 R.T. p. 13), but did not reduce the total diversion amount of 200,000 afa under the two applications. The combined total amount of water stored behind Seven Oaks Dam under the two applications will not exceed 50,000 afa.

(Muni/Western 4-3, p. 2-3.)

Muni/Western proposes to put the water diverted under Applications 31165 and 31370 to beneficial use through a combination of direct delivery to water treatment facilities, spreading to recharge groundwater basins, and storage in surface storage reservoirs for future direct delivery or groundwater recharge, all of which serve the Muni/Western service area.

6.1 Surface Storage Facilities

Muni/Western proposes to store water at Seven Oaks Dam, which is a 550-foot high earth/rock-fill dam with a gross storage capacity of 147,970 af at spillway crest. (Muni/Western 4-3, p. 3.1-6.) Seven Oaks Dam is owned and operated by the Santa Ana River Mainstem Local Sponsors. The watershed above Seven Oaks Dam drains approximately 177 square miles. (Muni/Western 4-3, p. 3.1-22.) Big Bear Dam, which forms Big Bear Lake upstream of Seven Oaks Dam, is the only major dam that affects runoff into Seven Oaks Dam.

(Muni/Western Exhibit 5-1, par. 24a.) In its Environmental Impact Report (EIR), Muni/Western states that up to 50,000 af of water could be impounded behind Seven Oaks Dam for seasonal storage for the project after the designated flood control season (October through February).

(Muni/Western 4-3, pp. 2-2 & 2-3.) Muni/Western also states that under current operations, from June through October of each year, all of the water collected behind Seven Oaks Dam is released downstream. From the beginning of November to the end of May, all flows except 3 cfs are stored behind the dam until a target debris pool storage height of 2,200 feet National Geodetic Vertical Datum (NGVD) (approximately 3,000 af of storage) is met. Once the storage amount reaches 2,200 feet NGVD, the reservoir is operated so that outflow equals inflow. In the event of a flood, Seven Oaks Dam is operated in conjunction with Prado Dam. In that case, Seven Oaks Dam releases do not exceed 500 cfs until the peak water surface elevation has

passed at Prado Dam. Following a flood, water is released from Seven Oaks Dam at up to 7,000 cfs until target storage is again reached. Releases as great as 8,000 cfs, however, are possible through the outlet works under emergency operating conditions. Releases greater than 8,000 cfs can only be made utilizing the dam spillway. From June through September, the debris pool is emptied. (Muni/Western 4-3, p. 3.1-6.)

In addition to Seven Oaks Dam, Muni/Western proposes surface storage in Diamond Valley Lake, Lake Mathews, and Lake Skinner. (Muni/Western 7-1, p. 5.) Diamond Valley Lake, Lake Mathews, and Lake Skinner are existing reservoirs owned by Metropolitan Water District and have storage capacities of 800,000 af, 182,800 af, and 44,400 af, respectively. (Muni/Western 7-1, p. 5.)

6.2 Analysis of Water Available for Appropriation

Although Muni/Western seeks to divert 200,000 af of water each year under Applications 31165 and 31370, Messrs. Robert Reiter, Robert Beeby, and Dennis Williams, witnesses on behalf of Muni/Western, provided testimony that the amount of water Muni/Western seeks to appropriate in their applications will not always be available. (Muni/Western Exhibit 3-1, pp. 12-13; Muni/Western 5-1, pp. 19, 21; Muni/Western 6-1, pp. 16-18; May 2, 2007 R.T., p. 219.) The goal of Muni/Western's project is to capture large flood flows, which seldom occur. Stream gage records show the highly variable nature of Santa Ana River flows, with large floods and long periods of extremely low flow. The actual amount of water available for diversion and recharge, therefore, will vary greatly from year to year. (Muni/Western 4-3, p. 3.1-2.)

Muni/Western provided conflicting testimony regarding how much water is available for appropriation. Muni/Western looked at flow immediately downstream of the Francis Cuttle Weir⁶ as the point of interest. For the purposes of their analyses, Muni/Western used gage data⁷ and synthesized flow coming out of Big Bear Lake to estimate how much water was available for appropriation. The synthesized hydrology used in the estimate assumes current

⁶ The Francis Cuttle Weir was built in 1932 and is located approximately one mile downstream from Seven Oaks Dam. Water diverted from the Santa Ana River is conveyed from the weir to the Santa Ana River Spreading Grounds through the Conservation District Canal. (Muni/Western 5-1, p. 6.)

⁷ According to Mr. Beeby's testimony and Muni/Western's EIR, the accuracy of USGS gaging stations in the portion of the Santa Ana River affected by the project are rated "Fair" largely due to the fact that the channel is somewhat unstable and irregular. Because these stations are rated as "Fair", the accuracy is defined by the USGS as plus or minus 15 percent. (Muni/Western 5-1, pp. 9-10; Muni/Western 4-4, p. 2-35.)

operations of Big Bear Lake⁸ and current operations of Seven Oaks Dam.⁹ United States Geological Survey (USGS) gage data included the “Combined Flow” Mentone Gage (USGS record 11051501), which is a combination of three gages and represents the sum of streamflow recorded in the River at the Mentone Gage, in addition to flow that would have been in the river at this location had it not been diverted upstream for use in the Southern California Edison hydroelectric system. (Muni/Western 5-1, pp. 9, 16-17.)

In his testimony, Mr. Beeby presented a graph that purported to show the amount of unappropriated water subject to appropriation by Muni/Western with implementation of the project. (Muni/Western 5-90, Slide 18; Muni/Western Exhibit 5-12.) The exhibit is a graphical representation of historical flow below Seven Oaks Dam and includes historical diversions by the Senior Water Rights Claimants¹⁰ and the San Bernardino Valley Water Conservation District (Conservation District). The graph illustrates that from Water Year (WY) 1961-62 through WY 1999-2000, the maximum amount of water available to Muni/Western, assuming no habitat flows, was roughly 175,000 af and the total flow was roughly 212,000 af. This occurred in WY 1968-69. (Muni/Western 5-12; Muni/Western 5-1, pp. 16-17; 21; 33.)

Using this gage data input, including the synthesized hydrology for Bear Valley Dam, Muni/Western then analyzed how much water would be available for diversion through modeling. As Muni/Western’s project is a flood project, Muni/Western did not perform an analysis meant to demonstrate that the water would be available every year, or even every average water year. In their analyses, Muni/Western looked at how much flow would have been available for capture for their project if there were a repetition of a 39-year hydrologic period (WY 1961-62 through WY 1999-2000), with some adjustments. The 39-year base period was

⁸ During the course of the base period that was established for the hydrologic and the engineering analyses, the operations of Big Bear reservoir changed. So in order to be consistent throughout the analysis period, Muni/Western created synthesized flows at Big Bear to reflect the changes in reservoir operations. (May 2, 2008 R.T. p. 192.)

⁹ Construction of Seven Oaks Dam was completed in 1999. (Muni/Western 4-3, p. 1-3.)

¹⁰ The “Senior Water Rights Claimants” are a group of purveyors, as defined in Muni/Western’s EIR, who claim pre-1914 water rights on the Santa Ana River. They are: Bear Valley Mutual Water Company (and shareholders, including City of Redlands), Lugonia Water Company, North Fork Water Company (and shareholders, including East Valley Water District), and Redlands Water Company. The Senior Water Rights Claimants receive all of their Santa Ana River water via diversions made from the Santa Ana River at the Redlands Tunnel, the New Southern California Edison Conduit, Old Southern California Edison Conduit, and the smaller Auxiliary River Pickup. (Muni/Western 5-1, p. 11; Muni/Western 4-3, p. 2-2.) The Conservation District also claims pre-1914 water rights on the Santa Ana River. The Conservation District exercises its claimed pre-1914 rights primarily at the Cuttle Wier. (Muni/Western 4-3, p.3.1-19.) The State Water Board does not express any opinion in this decision on the validity or invalidity of any of these water rights.

chosen to best represent average hydrologic conditions in the project area.¹¹ (Muni/Western Exhibit 5-1, p. 16.) According to Muni/Western's witness, Mr. Beeby, these analyses were conducted using a suite of computer models developed by Science Applications International Corporation (SAIC) and Geoscience Support Services, Inc., who worked cooperatively in model development and in evaluating the results. The computer models were used to simulate hydrologic conditions based on a repetition of historical hydrology. Muni/Western used these models to estimate the amount of potential capture of unappropriated water from the Upper Santa Ana River that can be put to beneficial use for a range of scenarios, as well as to evaluate the effects of such capture on the downstream channel hydrology and hydraulics. The models were also used to analyze the effects of various proposed settlement alternatives. Sixteen project scenarios were developed based on a number of variables, and five scenarios were analyzed in detail because they represented the high and low range of capture amounts for diversion rates of 500 cubic feet per second (cfs) and 1,500 cfs under specific conditions. According to Mr. Beeby's testimony, SAIC engineers and technical staff also worked closely with the modeling staff at Geoscience Support Services, Inc., to ensure consistency between the surface water modeling efforts and groundwater modeling efforts. (Muni/Western 5-1, pp. 2, 5.)

Muni/Western used modeling to forecast future surface water conditions. The Operations Model (OPMODEL) was used to estimate the amount of water potentially available to Muni/Western for diversion after accounting for diversions by prior right holders and other uses. The initial input Muni/Western used for the OPMODEL was an estimate of inflow to Seven Oaks Reservoir, which, as described above, was based primarily on USGS historical data, modified to reflect current operation of Bear Valley Dam. Muni/Western then estimated annual reservoir evaporation and subtracted that amount to account for the current operations of Seven Oaks Dam. (Muni/Western 5-1, pp. 32-33.)

According to Muni/Western's EIR and testimony from their witness, 198,317 af of water would have been available for diversion in the wettest year (WY 1968-69) during the hydrologic period of WY 1961-62 through WY 1999-2000. (Muni/Western 4-3, Appendix A, Table 4.2-8; May 2 2007 R.T., p. 216.) According to their own calculations, Muni/Western would have only been

¹¹ Mr. Beeby presented testimony that surface runoff analyses by Science Applications International Corporation, and precipitation analysis by Geoscience Support Services, Inc., led to the selection of the 39-year base period (WY 1961-62 through 1999-2000) to best represent average hydrologic conditions. (Muni/Western 5-1, p. 16, par. 47.)

able to capture 99,678 af or more in 4 of the thirty-nine years of the hydrologic base period. (Muni/Western 5-83.) Consequently, Robert Reiter for Muni/Western suggested a 50-year period of development in any permits issued for the project, in order to build the necessary facilities and allow a reasonable period of time for there to be an extremely wet year, given the erratic hydrology of the Santa Ana River. Mr. Reiter also stated that the "flashy" Santa Ana River hydrology should be reflected in any permits granted to Muni/Western. The analysis contained in the Draft and Final EIRs shows that very wet years, like WY 1969 or WY 1980, are infrequent. (Muni/Western 3-1, pp. 12-13.)

In Muni/Western's modeling simulations, the maximum diversion scenario is the maximum potential appropriation by Muni/Western at a diversion rate of 1,500 cfs and is the result of assuming: (1) historical diversions by senior water rights claimants; (2) licensed diversions by the Conservation District; (3) environmental restoration without releases from Seven Oaks Dam; and (4) seasonal water conservation storage at Seven Oaks Dam. (Muni/Western 4-3, p. 3.0-4.) Under the maximum diversion scenario for the wettest year during the 39-year base period, the results of the model showed a capture of 198,317 acre-feet, which Muni/Western rounded up to 200,000 acre-feet. The results of the model showed an average capture of 27,000 acre-feet for the maximum diversion scenario. (May 2, 2008 R.T. p. 216.) Mr. Beeby states in his testimony that capture of 198,317 af can be accomplished without affecting downstream obligations under the various judgments and with recognition of the rights of local senior water right holders to divert water from the Santa Ana River. (Muni/Western 5-1, p. 3.)

Mr. Beeby testified that the greatest effects on the Santa Ana River channel, in terms of flow rate, depth and area inundated will be in the segments from Seven Oaks Dam to the confluence with Mill Creek. Downstream from the confluence with Mill Creek, the effects of Muni/Western diversions become less when compared to the No Project condition because of the influence of tributary inflow and discharges from the existing wastewater treatment plants. Downstream from Riverside Narrows, the effects of Muni/Western diversions are so small they cannot be accurately measured. (Muni/Western 5-1, pp. 2-3.)

Mr. Beeby testified that in wet years, even with Muni/Western's diversions as well as the downstream diversions, water will still flow to the ocean because of tributary inflow between Seven Oaks Dam and the downstream outfall to the ocean. The absorption capacity of the river

channel, the diversions, and all other uses are not adequate to capture very high intensity high flow flood events. (May 2, 2007 R.T. p. 195.)

6.3 Water Available at Individual Points of Diversion Upstream of Seven Oaks Dam

According to Muni/Western's EIR, "...water diverted at a number of points of diversion (PODs) upstream of Seven Oaks Dam is currently conveyed (after being used for power generation) through the existing Southern California Edison (SCE) Canal for delivery to senior water right claimants. Water that is diverted upstream of Seven Oaks Dam is conveyed downstream in the SCE Canal to the Head Breaking Structure that is located west of, and at a lower elevation than, the spillway of Seven Oaks Dam. At the Head Breaking Structure (designed to reduce pressure in the pipeline) the SCE Canal bifurcates, delivering water to (a) the SCE Santa Ana River Powerhouse No. 2/3 via the New SCE Conduit; and (b) the Greenspot Forebay via the Old SCE Conduit. As part of the 1976 Santa Ana River-Mill Creek Cooperative Water Project Agreement, water diverted upstream of Seven Oaks Dam is physically taken by Muni downstream of the dam at the existing Greenspot Forebay and conveyed through the Greenspot Pipeline for delivery by gravity to locations which would otherwise require the use of the Greenspot Pump Station. Under the Project, Muni/Western would divert water at the foregoing PODs above Seven Oaks Dam in addition to water already taken in accordance with the Santa Ana River Mill Creek Cooperative Water Project, and would initiate new PODs downstream of Seven Oaks Dam." (Muni/Western 4-3, p. 2-2.)

Muni/Western did not provide any evidence regarding the water availability at individual points of diversion upstream of Seven Oaks Dam. (R.T. pp. 274-275.) Southern California Edison operates its diversion works for power generation under Federal Energy Regulatory Commission (FERC) license Project No. 1933. The State Water Board also issued a Clean Water Act Section 401 Water Quality Certification (401 Certification) for SCE's project on March 13, 2003.¹² Because Muni/Western will be diverting from SCE facilities which are currently subject to United States Army Corps of Engineer's (ACOE) permitting authority and to water quality certification by the State Water Board, the Board finds that Muni/Western shall only divert water at PODs 5 through 10 (see Tables A and B of this decision) in compliance with the terms and conditions of FERC license Project No. 1933 and 401 Certification. The FERC

¹² We take official notice of FERC license Project No. 1933 and March 13, 2003 401 Certification pursuant to California Code of Regulations, title 23, section 648.2, and Evidence Code section 452, subdivisions (c) and (h).

license and 401 Certification contain bypass flow requirements. However, this water would then flow to Seven Oaks Dam if not diverted by SCE's facilities. Therefore, this should not affect Muni/Western's overall water availability for the project.

6.4 Muni/Western will not Exchange Water

In their EIR, Muni/Western proposes to deliver water in excess of the immediate needs of the Muni/Western service areas during wet years outside the place of use to Metropolitan Water District of Southern California (Metropolitan) for exchange at a later date. In testimony at the hearing, however, Muni/Western stated that they did not propose to transfer water outside the place of use at this time. (May 2, 2008 R.T. p. 247; Muni/Western 5-1, p. 32, par. 99; Muni/Western 7-1, p. 1.) Rather than delivering outside the place of use proposed in Applications 31165 and 31370, Muni/Western reevaluated the project in order to put all water to beneficial use within the Muni/Western service area. (May 2, 2008 R.T. pp. 211-212, 242-248; Muni/Western 7-1.)

Mr. Jack Safely, Water Resources Manager, Western Municipal Water District, presented testimony on behalf of Muni/Western that an exchange with Metropolitan is not necessary in order for Muni/Western to put up to 198,319 af of the 200,000 af requested in the applications to reasonable and beneficial use in their service areas in a single year. (May 2, 2008 R.T. pp. 243-248; Muni/Western 7-1.) As stated above, according to Muni/Western's analysis, the greatest quantity of water that could be expected to be diverted from the Santa Ana River, assuming a repeat of the historically wet hydrologic conditions that occurred during WY 1968-69, is 198,317 af. Mr. Safely testified that all of the water diverted from the Santa Ana River can be beneficially used in the Muni/Western service area within a 12-month period using existing and planned facilities. (Muni/Western 7-1, p 1.)

6.5 Conclusion as to Water Availability

Having considered the foregoing, the State Water Board concludes that during high flow periods, up to 198,317 af of water is available for appropriation to direct diversion, surface storage, and groundwater recharge for beneficial use under Applications 31165 and 31370. The permits issued pursuant to this decision will be subject to all prior rights to the use of water. Before issuing a license that confirms the right to appropriate 198,317 af, the State Water Board

will determine whether such an amount has been applied to beneficial use by Muni/Western. (Wat. Code, §1610.) If those flood flows never materialize, or Muni/Western does not capture and put the full 198,317 af to beneficial use, the State Water Board may, when the project is licensed, reduce the right to appropriation to the maximum amount of water put to beneficial use in any one year over the life of the permit. (Wat. Code, §1610.5.)

7.0 WATER QUALITY AT SEVEN OAKS DAM

Under both Applications 31165 and 31370, Muni/Western has applied to store 50,000 afa at Seven Oaks Dam (100,000 afa total). According to Muni/Western's EIR, water storage may present problems: certain water quality characteristics can change during impoundment in natural and artificial ponds, lakes, and reservoirs. Solar heating increases water temperature and reduces the natural ability of water to maintain dissolved oxygen concentrations. Further, natural degradation of biological materials reduces dissolved oxygen concentrations. The water column may become stratified, and mixing may be reduced or eliminated, thus fostering the development of anaerobic conditions. Anaerobic conditions can also cause exceedance of several other water quality parameters. For example, hydrogen sulfide can be generated in harmful quantities when materials containing sulfur, such as biological detritus and mineral sulfides, are available. In addition, ammonia can be generated from nitrogen-containing material; un-ionized ammonia, in particular, can be toxic to many aquatic organisms. Anaerobic conditions can also lower the pH (which results in the release of trace metals found in bottom sediments), and local nuisance conditions such as algal blooms and mosquito breeding are also more likely to occur. The *Final Supplemental Environmental Impact Statement, Santa Ana River Mainstem Including Santiago Creek, Phase II General Design Memorandum. Counties of Orange, Riverside, and San Bernardino* (ACOE, August 1988) (1988 FSEIS) published by the ACOE maintained that, should a portion of the water become anaerobic, acidic conditions would tend to be counteracted by the buffering capability (high pH) of the inflowing water. (Muni/Western 4-4, p. 2-12.) However, anaerobic conditions and resultant changes in other water quality parameters were observed in the summer of 2004 following the formation of the first debris pool behind Seven Oaks Dam.

The final EIR describes the Operations and Maintenance Manual for Seven Oaks Dam (August 2002), which establishes a water quality monitoring program to be performed at Seven Oaks Dam by the Local Sponsors. The Local Sponsors shall monitor water quality after initial

filling of the reservoir and during operation. Sampling shall be conducted in the reservoir pool and downstream of the Dam for chemical, limnological, and bacteriological parameters. Sampling shall occur within the pool and outlet during the months of January, April, May, June, and October when water is present in the reservoir pool. If warranted, a number of control measures are available and shall be used to control water quality in the reservoir. (Muni/Western 4-4, p. 2-14.)

Muni/Western has also proposed a project-specific mitigation measure, MM SW-1 to reduce the risk of anaerobic conditions in Seven Oaks Reservoir. MM-SW-1 requires participation in a program to avoid and reverse anaerobic conditions in the reservoir.

Water Code section 1258 requires the State Water Board to consider any water quality control plans that have been established under the Porter-Cologne Water Quality Control Act (Wat. Code, § 13000 et seq.) and authorizes the State Water Board to condition appropriations as necessary to carry out those water quality control plans. Accordingly, this order includes a condition that discharges from Seven Oaks Dam shall not cause an exceedance of any water quality objective in any applicable water quality control plan.

In addition, adverse changes in water quality are subject to the federal antidegradation policy, 40 C.F.R. § 131.10, and State Water Board Resolution 68-16. As explained in State Water Board Decision 1631 (1994) at pp. 150-151, these policies establish general narrative water quality objectives that apply over and above any specific water quality objectives in the applicable water quality control plans.

The federal antidegradation policy requires, in pertinent part, that:

- (1) Existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected.

- (2) Where the quality of the waters exceed levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, that quality shall be maintained and protected, unless the State finds that allowing lower water quality is necessary to accommodate important economic or social development in the area in

which the waters are located. In allowing such degradation or lower water quality, the State shall assure water quality adequate to protect existing uses fully.

(40 C.F.R. § 131.12(a).)

State policy for water quality control requires that where water quality is better than required by the applicable Basin Plan objectives, that water quality will be maintained unless it has been demonstrated that a change: 1) is consistent with the maximum benefit to the people of the State, 2) does not unreasonably affect present and anticipated beneficial uses of the waters, and 3) does not result in water quality less than that prescribed in applicable water quality control plans. (State Water Board [Resolution 68-16](#); see also State Water Board Order [WQ 86-17](#) [State Water Board Resolution 68-16 incorporates the federal antidegradation policy as applied to situations where the federal antidegradation policy is applicable]; [State Water Board Decision 1631](#) (1994) at p. 152 [same].)

This order includes a condition requiring compliance with applicable water quality objectives, as required by State Water Board Resolution 68-16. The State Water Board also finds that with the conditions established in this order, present and potential beneficial uses, including instream beneficial uses, will be protected.

The State Water Board also finds that so long as water quality objectives are attained and the other water quality requirements of this order are satisfied, any reduction in water quality resulting from the project are necessary to accommodate important social and economic development, within the meaning of the federal antidegradation policy, and consistent with the maximum benefit of the people of this state. Water development and water conservation projects may be considered to be important social and economic development. In addition, environmental protection may constitute important social development within the meaning of the federal antidegradation policy. ([State Water Board Order WQ 2009-0007](#) at pp. 14-15.) As explained in greater detail below (section 9.0), the project will provide water for projected growth, promote water recycling, reduce liquefaction and accelerate groundwater cleanup.

In summary, while there may be some adverse impacts on water quality from operations from storage at Seven Oaks Dam, the project as conditioned by this order will be consistent with applicable water quality objectives, State Water Board Order 68-16, and the federal antidegradation policy.

8.0 PUBLIC TRUST

In this decision, the State Water Board has considered the Project's potential impacts to public trust resources. Evidence and testimony presented at the hearing demonstrated the Project will not have significant impacts upstream of Seven Oaks Dam due to flood control operations. Downstream of the Dam, viable aquatic and riparian habitats and aquatic species are currently restricted to three reaches of the River where perennial streamflows occur between Seven Oaks Dam and the Prado Basin. The sources of water for these reaches are tributary creeks, groundwater, and runoff from a golf course rather than outflow from Seven Oaks Dam. The EIR presented mitigation measures Muni/Western will implement to lessen the Project's construction impacts to less than significant for the Santa Ana River woolly-star (*Eriastrum densifolium* spp. *sanctorum*) and San Bernardino Kangaroo Rat (*Dipodomys merriami parvus*). However, the EIR found the project will significantly decrease river flow in Segment F on non-storm days (Impact SW-7). Segment F provides habitat for the endangered Santa Ana sucker. Therefore this order will include a mitigation term for that impact.

For study purposes, Muni/Western divided the Santa Ana River into the following segments:

Segment A – Seven Oaks Dam plunge pool upstream to the confluence of the Santa Ana River with Bear Creek (River Mile (RM) 70.93 to Bear Creek (about RM 78.0), or 7.07 miles)

Segment B – Seven Oaks Dam plunge pool downstream to the Cuttle Weir (RM 70.93 to RM 70.46, or 0.47 mile);

Segment C – Cuttle Weir downstream to just upstream of the confluence with Mill Creek (RM 70.46 to RM 68.59, or 1.87 miles);

Segment D – Mill Creek confluence downstream to just upstream of "E" Street (RM 68.59 to RM 57.69, or 10.9 miles);

Segment E – "E" Street downstream to just upstream of the Rapid Infiltration/Extraction Wastewater Treatment Plant and Rialto Wastewater Treatment Plant Outfall (RIX and Rialto Outfall) (RM 57.69 to RM 53.49, or 4.2 miles);

Segment F – RIX and Rialto Outfall downstream to just upstream of the Riverside Narrows (RM 53.49 to RM 45.2, or 8.29 miles); and

Segment G – Riverside Narrows downstream to the Prado Flood Control Basin (RM 45.2 to RM 35.5, or 9.7 miles).

(Muni/Western 9-0, p. 5.)

Upstream of Seven Oaks Dam (Segment A)

No adverse impacts to biological resources are anticipated due to the fact that all construction activities on the upstream side of Seven Oaks Dam will take place in areas that are already heavily disturbed. Furthermore, under flood control operations, it is anticipated that biological resources will be disturbed regularly by inundation during the winter storm season.

(Muni/Western 4-4, p. 2-16.)

Conservation storage of up to 50,000 afa would impound water up to 2,418 feet NGVD.

Biological impacts addressed in the 1988 Final Environmental Impact Statement include effects on vegetation in the upper Santa Ana Canyon up to the 50-year flood line. The 50-year flood line is at a surface elevation of approximately 2,425 feet NGVD. Modeling by Muni/Western demonstrated that no increases in the duration of flood flows extending beyond the 50-year flood line were expected to occur under the project alternatives. (Muni/Western 4-4, p. 2-20.)

Therefore, all vegetation impacts at 2,418-foot water levels were previously addressed and mitigated as part of the *Phase H General Design Memorandum on the Santa Ana River Mainstem Including Santiago Creek, California Supplemental Environmental Impact Statement* (ACOE 1988). (*Ibid*, p. 2-19.)

The project would subject approximately 1.33 miles of the Santa Ana River immediately upstream of the Seven Oaks Dam to periodic inundation. Reservoir operations for flood control or conservation storage will cause the riparian habitat to be temporarily inundated or desiccated. However, the habitat on the perimeter of the desiccation area will continue to provide habitat for the endangered southwestern willow flycatcher (*Empidonax traillii extimus*). (Muni/Western 4-4, p. 2-20.)

The only fish species found upstream of Seven Oaks Dam are introduced brown trout (*Salmo trutta*) and introduced rainbow trout (*Onchorhynchus mykiss*). These two fish species are found in segments associated with the inflows of Alder Creek and Warm Springs Creek where groundwater is forced to the surface by shallow bedrock. No extant populations of native fish have been found in this segment. (Muni/Western 4-4, p. 2-19.)

Downstream of Seven Oaks Dam (River Segments B through G)

Mr. Robert Thompson, Technical Director and Senior Project Manager with Entrix Environmental Consultants, testified regarding the potential adverse impacts to biological

resources in the Project area below Seven Oaks Dam. Mr. Thompson also testified that while impacts to terrestrial species would occur as a result of construction of new project facilities, overall the impacts to terrestrial species from operations of the Project would be less than significant. (Muni/Western 8-1, p. 20 -21.)

This witness described the project's potential impacts to River Segments B, C and D in the following way: few terrestrial biological resources occupy or utilize Segment B of the River, thus the reduction in flow would not significantly impact terrestrial biological resources. (*Ibid*, p. 18.) In Segment C, Project operations would reduce non-storm day flows within the River affecting approximately 10 acres of alluvial flood plain, producing a significant but mitigable impact to the Santa Ana River Woolly-star. (*Ibid*.) Any impacts to biological resources due to Project construction or operation will be minimized by mitigation measures MM BIO 1- 10 in Table 1 of this decision (see pages 48-57).

Muni/Western provided testimony that there are no construction related impacts in Segments E, F, and G, as the project does not include construction of facilities in this region. (Muni/Western. 8-1, p. 4, p.14.)

Mr. Roy Leidy, senior aquatic ecologist at EIP Associates, testified that viable, persistent, aquatic and riparian habitats and aquatic species are currently restricted to three reaches of the River where perennial streamflows occur between Seven Oaks Dam and the Prado Basin (i.e., the reach of the River potentially affected by operation of the project). The three reaches are:

- 1) 0.16 mile of aquatic and riparian habitat 0.3 miles downstream of the Seven Oaks Dam plunge pool (Segment B);
- 2) two miles of aquatic and riparian habitats downstream of the South Tippecanoe Avenue Bridge (Segment D); and
- 3) 18 miles of aquatic and riparian habitats downstream from the RIX and Rialto Outfall to the head of the Prado Flood Control Basin (Segments F and G).

The three reaches are separated from one another by miles of river channel where water flows intermittently. Mr. Leidy testified that these river reaches do not currently support viable obligate¹³ aquatic resources that can persist over time. (R.T. May 3, 2007, p. 32.)

Mr. Leidy also testified that in the River below Seven Oaks Dam, special status native fishes are restricted to downstream of the Regional Rapid Infiltration and Extraction Facility/Rialto Outfall (RIX/Rialto Outfall). These native fish are unable to migrate upstream to the other two reaches containing perennial water due to intervening river reaches that are frequently dry and to physical barriers to upstream fish passage. (Muni/Western 9-0, pp. 1-2.) Also, according to Mr. Leidy, the special status species listed in Muni/Western 9-32 are only associated with those perennial stream reaches and not those reaches where streamflow is intermittent. (*Ibid*, p. 14.)

8.1 Reducing Muni/Western's Project Impacts to the Biology of the Santa Ana River

At the hearing, Ileene Anderson, Biologist for the Center for Biological Diversity, testified that her study of various resources such as the CDFG's California Natural Diversity Database, museum and university records, as well as consultation with other local sources and experts, led to her conclusion that the cumulative increases in diversions of water from the Santa Ana River will be detrimental to at least seven federally and state listed endangered species by degrading and compromising their habitats. Ms. Anderson testified her assumption is that the Santa Ana River is hydrologically connected; therefore taking water out of the river would affect the amount of water downstream. (R.T. May 3, 2007, p.241; R.T. May 4, 2007, p. 113.)

In his rebuttal testimony, Mr. Leidy presented compelling testimony that focused on riparian resources located in the area between the South Tippecanoe Avenue Bridge and "E" Street. This witness testified that this is an area where there is extensive development of riparian vegetation due to both subsurface and surface flow. However, the sources of this water are Mission Zanja Creek, San Timoteo Creek, seasonal inflow from the joint Warm Springs Creek and East Wind Creek, a golf course adjacent to the section immediately to the north of the river and perhaps, in some years, some groundwater. (R.T. May 4, 2007, pp.90-91.) Mr. Leidy went on to state that none of these sources of water are linked directly to any activity at Seven Oaks Dam with or without the project. They are independent sources of water that come from different directions. (*Ibid*.)

¹³ Plants and animals restricted to a set of parameters or conditions, having no alternative system or pathway.

8.1.1 Reintroduction of riparian resources

In a March 14, 2005 letter from Victoria Whitney, Chief, State Water Board Division of Water Rights, to representatives of Muni/Western, the State Water Board requested a water availability analysis that would address to what extent bypass flows could be used to lessen the project's impacts to the biological resources of the River. (SWRCB-1.) Mr. Leidy testified that consultants for Muni/Western spent almost two years working with CDFG by walking the River doing transects, measuring flows, taking photographs, and monitoring temperatures. Mr. Leidy also testified that the final EIR includes a water availability assessment that addresses those results. (Muni Ex. 4-4, Appendix B.) Of 35 miles of river between Seven Oaks Dam and the Prado flood control basin, 15 miles, or 43 percent, are currently intermittent stream. (R.T. May 3, 2009, p. 32.) Mr. Leidy reiterated that Mr. Robert Beeby testified that 85 percent of the available flood flows occurred in only nine of the years out of the 39-year period evaluated by the consultants. (R.T. May 2, 2007, p. 219.). Muni/Western's consultant and CDFG determined that there is not sufficient water available on a sustained basis to create obligate riparian resources in the Santa Ana River. (R.T. May 3, 2007 pp 33–34.) Therefore, the goal of metering out the water stored behind Seven Oaks Dam to recreate a perennial river to reestablish resources that might have been there historically cannot be achieved, which led to Muni/Western reaching an agreement with the CDFG. (*Ibid.*)¹⁴

8.1.2 Potential benefits of bypass flows from Seven Oaks Dam

The analysis in the EIR (Muni/Western 4-4, Appendix B) demonstrates that locations along the River that are hydrologically losing reaches (such as all of the area below the Seven Oaks Dam to Mill Creek) are characterized by wide alluvial cross-sections over deep alluvium. Without access to groundwater in these losing reaches during the hot months of the growing season, riparian vegetation is dependent upon the narrow saturation zone immediately adjacent to the active channel. Muni/Western's analysis demonstrates greater flow releases from Seven Oaks Dam would not significantly increase either the size of the saturated zone adjacent to the channel or the extent of riparian vegetation. Thus, any benefit to riparian vegetation and migratory bird habitat from additional but intermittent flows will be uncertain. Also, winter

¹⁴ On March 19, 2007, Curt Taucher, Regional Manager, Inland Desert Region, CDFG, sent a letter to Tam Doduc, Chair, State Water Board, to withdraw CDFG's protest against Applications 31165 and 31370. (SWRCB-1.) Mr. Taucher stated in the letter that CDFG and Muni/Western had approved a settlement agreement resolving all the matters that were the subject of CDFG's protest. The settlement included a provision that Muni/Western will deposit \$50,000/year for nine years, to be used by CDFG for the recovery of non-anadromous native fish species, such as the Santa Ana sucker, speckled dace and arroyo chub, known to occur within the Santa Ana River watershed.

flooding may limit the extent and duration of any benefit from bypass. (Muni/Western Ex. 4-4, Appendix B, p. 36.)

The River reach between Mill Creek and “E” Street supports some riparian vegetation due to rising groundwater and surface water inflows and subsurface flows from San Timoteo Creek. Therefore, suitable habitat is present to support Southwestern willow flycatchers (*Epidonax traillii extimus*), Least Bell’s Vireo (*Vireo bellii pusillus*), and arroyo toads (*Bufo californicus*). The confluence of San Timoteo Creek and the Santa Ana River does support the Santa Ana speckled dace. Due to the dry River reaches and the water velocity dissipation barriers found downstream of “E” Street, the Santa Ana sucker cannot reach this location from the RIX/Rialto Outfall. A flow release from Seven Oaks Dam of 50 cfs would be needed to create flow in this reach and to have the potential to provide suitable physical habitat for the Santa Ana sucker and other native fishes. Again, the “flashiness” of the Santa Ana River makes it unlikely that habitat could be sustained.

Muni/Western’s water availability analysis demonstrated that releases of 65 cfs are required to provide perennial flows from E Street to the RIX/Rialto Outfall. Flows of this nature have the potential to provide physical habitat for the Santa Ana sucker and other native fishes. However, sustainable populations could not be supported because 65 cfs is not perennially available. Muni/Western demonstrated additional but intermittent flows in the river segment between “E” Street and the RIX/Rialto Outfall would provide no benefit to aquatic species. Due to the porous substrate in the channel that allows water to rapidly infiltrate, no pools of standing water to potentially provide refugia exist in this river segment during the dry season. (Muni/Western Ex. 4-4, p. 40.) Further, there is no connectivity with upstream river reaches with the potential to support the Santa Ana sucker. Finally, while high flow events could wash the fish downstream; they could not migrate upstream due to the drop structures between “E” Street and the RIX/Rialto Outfall. (*Ibid.*)

8.2 Multi-Species Habitat Conservation Plan

One of the requirements for conservation storage at Seven Oaks Dam is the development of a Multi-Species Habitat Conservation Plan (MSHCP) to fulfill part of the endangered species mitigation requirements for flood control operation of Seven Oaks Dam. Ruth Villalobos, Chief of the Planning Division, Los Angeles District, ACOE, testified that ACOE, Local Sponsors and other interested stakeholders are continuing to develop the MSHCP. However, the MSHCP is not yet completed because of the complexity of the habitat and the numerous agencies and other stakeholders involved in developing the plan. (LS- 1-17, p. 2.)

Ms. Villalobos further testified that the MSHCP will be a detailed plan that will allow for the analysis of impacts of potential water conservation operations on any endangered species. The acceptability of any specific proposed water conservation operation will be evaluated for consistency with the MSHCP. It will be the responsibility of any agency proposing water conservation operations to ensure that all appropriate resource agencies have been consulted to the extent required by law, and that all mitigation requirements necessitated by water conservation operations will be undertaken without interference with mitigation for flood control. (*Ibid.*)

8.3 Conclusion regarding Project's Impacts to Public Trust Resources

Therefore, based on evidence in the hearing record and testimony given at the hearing, the State Water Board finds partial approval of Applications 31165 and 31370 subject to the conditions specified in this order will not have a negative impact on public trust resources.

9.0 PUBLIC INTEREST

The State Water Board is required to allow the appropriation for beneficial purposes of unappropriated water under such terms and conditions as in its judgment will best develop, conserve, and utilize in the public interest the water sought to be appropriated (Wat. Code, § 1253). The benefits of this project include; (1) the capture of high quality water to facilitate water recycling, (2) reduction of liquefaction potential and (3) acceleration of cleanup of contaminated groundwater plumes. Given the combination of the above-noted benefits with

Muni/Western's involvement in a number of water conservation programs, the State Water Board finds the partial approval of Applications 31165 and 31370 is in the public interest.

Muni/Western can put 198,317 afa to reasonable and beneficial use. (Muni/Western 7-1 p.1.) Given that population in the Muni/Western service areas is estimated to increase 64.5 percent by 2025 (Muni/Western 4-3, Table 4.1-5.), Muni/Western's total demand for imported water will also grow. The testimony of Jack Safely demonstrates that the project will not reduce the ultimate total demand for water within the Muni/Western service area, but it will slow the rate by which the demand increases by reducing the demands for water exported from the Delta and from the Colorado River. (Muni/Western 7-1, pp. 2-3.)

Testimony by Bill Dendy, engineer and president, Bill Dendy and Associates, and Steve Macaulay, engineer and vice president, West Yost Associates, also revealed benefits of the project that serve the public interest. First, the project is one of the farthest upstream on the River system to divert water. (May 4, 2007 R. T., p. 9.) Appropriation of this high quality water, as opposed to use of lower quality water, will facilitate water recycling, which is integral to the downstream users in the Santa Ana watershed. (May 2, 2007 R.T., p. 94.)

Second, Dr. Dennis Williams, president and principal geohydrologist, Geoscience Support Services, presented testimony that under the minimum capture the potential area for liquefaction would be reduced by half. (R.T. May 2, 2007, p. 236.) Also, in his written testimony, Dr. Williams stated the project will assist in improving the water quality of the San Bernardino Basin Area (SBBA) by accelerating cleanup of the contaminant plumes. (Muni/Western 6-1, p. 1.)

Mr. Steve Macaulay further testified that Muni and Western are involved directly and indirectly in a number of water conservation efforts and programs. Western is a signatory to the Urban Water Conservation Memorandum of Understanding and is a member of the California Urban Water Conservation Council. In addition, Western is a member agency of Metropolitan Water District, which has extensive, long-term water conservation programs serving all of its 26-member agencies throughout southern California. Western's water conservation program performance is reflected in their most recent Urban Water Management Plan, submitted to the California Department of Water Resources in December 2005. Pages 19 through 23 of that report (Muni/Western 10-7) describe a number of successful water conservation elements and

programs. Western benefits from Metropolitan's conservation incentive programs for commercial, industrial and institutional water customers. Both Western and Muni have aggressive and successful public information programs to increase the public's awareness of the importance of conservation and what users can do to save water. (Muni/Western 10-1, p. 6.)

Mr. John Rossi, Western's General Manager, testified that Western has implemented the full range of water management practices recommended by the California Urban Water Council and that Western budgets over \$100,000 annually for water use efficiency programs to coordinate rebates and incentives through Metropolitan Water District. (Muni/Western 2-1, p.4.)

Mr. Robert Reiter, the court-appointed Watermaster for Muni, testified regarding the potential for a reduction in wastewater flows in Segment F below the RIX/Rialto Outfall (RIX/Rialto), with a potential impact on riparian habitat. To ensure meeting its minimum base flow obligations to Riverside Narrows under the April 17, 1969, judgment in *Orange County Water District v. City of Chino et al.* (Super. Ct. Orange County, 1969, No. 117628) (*Orange County Judgment*), Muni entered into contracts with the Cities of San Bernardino and Colton for minimum annual deliveries of treated wastewater from their respective treatment plants. The total deliveries from the two wastewater treatment plants, 18,450 afa, represent the minimum flows delivered to the Santa Ana River channel at RIX/Rialto that will be maintained through contracts with wastewater agencies. (Muni/Western 11-4, p. 1.)

9.1 Coordination of Permits to Appropriate Water with Existing Judgments and Agreements for the Use of Santa Ana River Water

The State Water Board is aware of the numerous judgments, settlement agreements and memoranda for the Santa Ana River aimed at managing the diversion and use of water among competing claims to the River. These prior legal actions on the River may or may not justify modifying the usual priority of the competing water right applications in this proceeding. The issue of resolving the priorities of the current water right applications relative to other legal users of water and among the pending applications was resolved by a stipulation signed by the applicants and presented to the hearing officer on April 10, 2007.

On May 2, 2007, the State Water Board commenced a hearing to consider four applications to appropriate water from the Santa Ana River. The applicants are:

- Chino Basin Watermaster (Application 31369)
- San Bernardino Valley Municipal Water District and Western Municipal Water District of Riverside County (Applications 31165 and 31370)
- Orange County Water District (Application 31174)
- City of Riverside (Application 31372)

Rights to the use of the water in the Santa Ana River are the subject of several judgments, settlement agreements, and memoranda that affect the potential rights requested in this proceeding. Among these is the *Orange County Judgment* which divides the River into various stream reaches and provides that upper watershed parties are obligated to ensure that certain average minimum flows reach the lower watershed. (Applicants' Joint 1-1.) In addition, the judgment provides that so long as certain average minimum flows reach the lower basin, the upper basin water users have the right to divert, pump, extract, conserve and use all surface and ground water originating in the upper basin without interference from lower basin claimants. (Applicants' Joint 2-2.)

Likewise pertinent is *Western Municipal Water District of Riverside County et al. v. East San Bernardino County Water District* (Super. Ct. Riverside County, 1969, No. 78426). This judgment was also entered on April 17, 1969. This judgment allocates the water in the upper stream reach for the San Bernardino Basin, Colton Basin, and Riverside Basin areas, excepting the Chino Basin, consistent with the *Orange County Judgment*. The relative priority of the Watermaster to divert water from the Chino Basin is derived from the rights recognized to the Inland Empire Utilities Agency under the *Orange County Judgment* and the November 16, 1999, *Memorandum of Understanding to Affirm and Preserve Existing Rights in the Santa Ana River Watershed*. (Stipulation of Applicants, dated April 5, 2007, ¶ 13 and ¶ 3(a).)

Normally, under California appropriative water law, the application filed first in time has a higher priority than an application filed at a later date. (Wat. Code, §§ 1450, 1455, 1610; *Pasadena v. Alhambra* (1949) 33 Cal. 2d 908, 929.) However, taken together, these judgments, settlement agreements, and memoranda may or may not alter the relative priority of the permits that may be issued for the applications pending on the Santa Ana River.

Additionally, exceptions to the rule of “first in time, first in right” can be based on Article X, section 2 of the California Constitution, area of origin protections, and other public policies. (See, e.g., Wat. Code, §§10500 et seq., 11460; see also Archibald, Governor’s Commission to Review California Water Rights, *Allocating Use of Surface Water: The Priority System and its Alternatives* (Appropriative Rights Staff Memorandum No. 2, July 1977) pp. 5-6.) The State Water Board is also required to subject permit approvals to such terms and conditions as in its judgment will best develop, conserve, and utilize in the public interest the water sought to be appropriated. (Wat. Code, § 1253.) The numerous judgments, settlement agreements and memoranda for the Santa Ana River aimed at managing the diversion and use of water among many competing claims present a situation that may or may not justify modifying the usual priority of competing applications for the appropriation of water.

On April 5, 2007 the applicants presented a signed stipulation to the hearing officer to resolve key hearing issues 4 and 5. On April 10, 2007, no party having objected to the stipulation, the hearing officer accepted it as the basis for resolving these key hearing issues concerning the priorities of the application relative to other legal users of water and among the pending applications. (RT, May 2, 2007, 2:21-24; see also 4.0 Hearing Issues, p. 5, *ante*.)^{15, 16}

10.0 CONTAMINATED GROUNDWATER PLUMES

This section contains a discussion of the effects the project will have on groundwater and/or movement of any contaminated groundwater plumes. This section also presents mitigation measures that Muni/Western shall implement in order to minimize or eliminate impacts from the groundwater contaminant plumes.

Under Applications 31165 and 31370, Muni/Western proposes to operate the underground storage portion of the project by conveying up to 200,000 af of water (100,000 af for each

¹⁵ The significance of the City of Redlands, et al., reported right to divert up to 88 cubic feet per second (cfs) in the stipulation is unclear unless the stipulation was to resolve issues other than those presented to the State Water Board in this proceeding. (Stipulation of Applicants dated April 5, 2007, ¶ 15.) The State Water Board does not express any opinion in this decision on the validity or invalidity of any of these water rights.

¹⁶ At the pre-hearing conference, Southern California Edison (SCE) expressed concerns that Applications 31165 and 31370 could interfere with the operation of SCE’s hydroelectric projects and the water rights associated with those hydro projects. On April 11, 2007, Muni/Western and SCE executed a stipulation agreement to resolve SCE’s concerns. At SCE’s request, a term from that agreement is included in the ordering section of this decision.

application) to 12 spreading basins and allowing the water to percolate into the underlying aquifers. (Muni/Western 5-1, pp. 24, 26-28; R.T. May 2, 2007, p. 225.) A map accompanying Application 31165 shows 12 spreading facilities as points of diversion and redirection that have a combined total storage capacity of 419,000 af. (SWRCB-1, Muni/Western 6-118.)

10.1 Description of Groundwater Basins

Muni/Western's service areas include all or portions of the following groundwater basins: Bunker Hill, Lytle Creek, Rialto-Colton, Yucaipa, and San Timoteo. (Muni/Western 6-1, p. 20; Muni/Western 6-118.) With the exception of the Cactus recharge facilities, which are in the Rialto-Colton Basin, Muni/Western's recharge facilities are located in the Bunker Hill and Lytle Creek Basins, which are collectively referred to as the San Bernardino Basin Area (SBBA). The groundwater modeling used to determine impacts from the recharge basins was limited to the SBBA. (Muni/Western 6-1, p. 20, Muni Western 6-118.)

San Bernardino Basin Area

The SBBA has a surface area of approximately 141 square miles and lies between the San Andreas and San Jacinto Faults. The basin is bordered on the northwest by the San Gabriel Mountains; on the northeast by the San Bernardino Mountains; on the east by the Banning Fault and Crafton Hills; and on the south by the San Jacinto Fault and San Timoteo Badlands. (Muni/Western 6-1, p. 20; Muni/Western 6-117.) The SBBA has an estimated total storage capacity of approximately 5,976,000 acre-feet. (Muni/Western 6-1, p. 25.)

The primary water-bearing formations of the SBBA are the unconsolidated sediments of older and younger alluvium and river channel material deposited by the Santa Ana River and its tributaries. The SBBA is divided into upper, middle, and lower water-bearing members, with confining zones between each member. The aquifer system of the SBBA is generally unconfined, with water moving vertically between the multiple layers. The confining members are more accurately described as leaky aquitards of finer grained sediments. The upper and middle water-bearing members provide most of the water to municipal and agricultural wells. The lower water-bearing member is typically not used for water production due to the greater depths and generally lower permeability. (Muni/Western 6-1, p. 21.)

Groundwater flow within the SBBA is generally from the mountains toward the south and west. Recharge to the SBBA occurs close to the mountain front due to the highly permeable river-channel deposits and the artificial recharge operations. (Muni/Western 6-1, p. 22; R.T. May 2, 2007, p. 228.)

Rialto-Colton Basin

The Rialto-Colton Basin has a surface area of approximately 47 square miles and is bounded by the San Gabriel Mountains on the north; the San Jacinto Fault on the east; the Box Springs Mountains on the south; and the Rialto-Colton Fault on the west. The total storage capacity of this basin is estimated at 213,000 acre-feet. The basin consists of four water-bearing units: the river channel; upper; middle; and lower. Groundwater generally moves from east to west in the river channel and upper units, and from northwest to southeast in the middle and lower units. The Rialto-Colton Fault acts as a barrier to groundwater flow along much of its length, especially in its northern reaches where groundwater elevations can reach nearly 400 feet higher within the Rialto-Colton Basin than in the Chino Basin to the west. The San Jacinto Fault displaces water levels about 50 feet in older deposits, but is not a barrier in younger materials, particularly beneath the Santa Ana River. (SWRCB-12, Supplemental information; Muni/Western 6-1, pp. 28 & 29; Muni/Western 6-117 and 6-118.)

Yucaipa Basin

The 39 square mile Yucaipa Basin lies to the east-southeast of the SBBA and is bounded on the north by the San Andreas Fault; on the west by the Crafton Hills; on the south by the Banning Fault; and on the east by the Yucaipa Hills. The total storage capacity of the basin has been estimated to be between 783,000 and 1,230,000 acre-feet. Groundwater flow in the basin is generally from the mountainous areas north and east toward the southwest and west. There are a number of faults in the area that influence the flow direction on the local level. These faults cause offsets in groundwater levels as much as 160 feet. (SWRCB -12, Supplemental Information; Muni/Western 6-1, p. 31; Muni/Western 6-117.)

San Timoteo Basin

The San Timoteo Basin covers an area of approximately 114 square miles and is located southeast of the SBBA and south of the Yucaipa Basin. The Banning Fault marks the northern boundary and the San Jacinto Fault marks the southern boundary of the basin. Groundwater flow, which is generally from east to west toward the SBBA, is affected by local faulting.

Groundwater levels across the Banning Fault drop 100 to 200 feet. In the western part of the basin groundwater levels drop about 75 feet across the Loma Linda Fault. The total storage capacity of the alluvial deposits in the basin is estimated to be about 2,010,000 acre-feet. (SWRCB-12, Supplemental Information; Muni/Western 6-1, pp. 33 & 34; Muni/Western 6-117.)

10.2 Groundwater Contaminant Plumes and Groundwater Modeling

Muni/Western's project area is affected by six major groundwater contaminant plumes: the Redlands-Crafton, Norton Air Force Base, Muscoy-Newmark, Santa Fe, and Rialto-Colton plumes. The major constituents of the plumes are perchlorate and various volatile organic compounds (VOC's), including trichloroethylene (TCE) and tetrachloroethylene (PCE). (Muni/Western 6-1, pp. 28 & 30; Muni/Western 6-127.) Muni/Western used two different groundwater flow models and an analytical method in order to evaluate the effects that increased recharge would have on known contaminant plumes. (Muni/Western 6-1, pp. 40, 63, 64.)

Redlands-Crafton Plume

The Redlands-Crafton plume lies within the SBBA and is located approximately 1.5 miles hydraulically down gradient of the proposed Santa Ana River construction area and the Mill Creek spreading grounds. Project-related groundwater recharge in this spreading basin could affect this plume. (Muni/Western 4-3, p. 3.12-4.) The Redlands-Crafton plume generally contains perchlorate with associated, smaller quantities of TCE, PCE, and dibromochloropropane (DBCP). (Muni/Western 4-4, p. 2-43.)

Norton Air Force Base (Norton) Plume

The Norton plume lies within the SBBA and is located approximately 3 miles down gradient of the City Creek, Patton, and East Twin Creek spreading grounds. Project-related groundwater recharge in these spreading basins could affect this plume. Contaminants of concern include TCE, PCE, 1,2-dichloroethylene (DCE), polychlorinated biphenyls (PCB's), various radionuclides, and metals. (Muni/Western 4-3, p. 3.12-5.)

Muscoy-Newmark Plume

The Muscoy-Newmark plume lies within the SBBA, and project-related groundwater recharge in a number of spreading basins could affect the plume. They include Devil Canyon/Sweetwater

Basins, Badger Basins, Waterman Basins, and east Twin Creeks Spreading Grounds. In addition, deep excavations into shallow contaminated groundwater could potentially impair construction activities. The Muscoy-Newmark plume consists primarily of TCE and PCE and is located north of the City of San Bernardino. The contaminant plume is split by a major outcrop of relatively impermeable bedrock which divides the contaminated groundwater into an eastern branch (the Newark Plume) and a western branch (the Muscoy Plume). (Muni/Western 4-3, p. 3.12-4, and Fig. 3.12-1.)

Santa Fe Plume

The Santa Fe plume lies within the SBBA and contains primarily 1,2-DCE, TCE, and PCE, extending to a depth of 200 feet. The plume is located approximately 1.5 miles south of the Muscoy-Newmark plume and approximately 2 miles east of the Rialto-Colton plume. (Muni/Western 4.3, p. 3.12-7 and Fig. 3.12-1.)

Rialto-Colton Plume

The Rialto-Colton plume lies within the Rialto-Colton Basin and lies beneath a portion of the Lytle Creek construction area and Cactus Spreading and Flood Control Basins, and is located approximately 1.5 miles southwest of the Lytle Basins. The contaminant plume consists primarily of perchlorate and moves with the groundwater in a southeasterly direction. (Muni/Western 4-3, p. 3.12-6; Muni/Western 4-4, p. 2-56.)

10.3 Description of Groundwater Models and Analytical Method

To evaluate potential effects of the project, the largest groundwater contaminant plumes in the SBBA (Redlands-Crafton, Norton, and Muscoy-Newmark) were modeled using the groundwater model MODFLOW (described below) as part of the analysis. (Muni/Western 4-3, p. 3.12-7.) Spreading grounds outside the SBBA were not modeled with MODFLOW. Muni/Western used a USGS groundwater flow model and the analytical Hantush Equation to evaluate the effects of increased recharge in the Rialto-Colton Basin. (Muni/Western 6-1, p. 64.) For the spreading grounds located within the Yucaipa and San Timoteo Basins, the increase in groundwater elevation due to project operations was calculated by using the analytical Hantush Equation. (Muni/Western 4-3, Appendix B, p. B-6-1; Muni/Western 4-4, p. 2-56.)

MODFLOW Groundwater Flow Model

The MODFLOW groundwater flow model developed for the SBBA by the United States Geologic Survey (USGS) was adapted and used to evaluate water level changes for the Project. MODFLOW is a groundwater flow model that accounts for the interaction between surface streams and groundwater. (Muni/Western 4-3, Appendix B, p. B-6-1; Muni/Western 6-1, p. 40.)

The groundwater model consists of two model layers. Layer 1 contains the upper confining layer and upper water-bearing zone, while Layer 2 consists of the middle and lower confining layers and middle and lower water bearing zones. The streams crossing the model are in hydraulic continuity with the aquifers and therefore can be either losing (losing water to the aquifer) or gaining (gaining water from the aquifer). The stream inflow components are generated from surface runoff originating from rain events as well as water gained from aquifers. The stream outflow components include deep percolation to underlying aquifers and flow out of the basin. (Muni/Western 6-1, p. 41; Muni/Western 4-3, Appendix B, p. B-6-2.) The two-layered model covers approximately 524 square miles, which is divided into a total of 43,424 cells. The boundary conditions of the model include the San Gabriel Mountains to the northwest, the San Bernardino Mountains to the northeast, the Crafton Fault to the southeast, and the San Jacinto Fault to the southwest. (Muni/Western 6-1, pp. 41 & 42; Muni/Western 4-3, Appendix B, p. B-6-3.) Aquifer parameters that were input into the model include: transmissivity, storativity, vertical leakance, conductance for groundwater barriers, recharge, and discharge. (Muni/Western 6-1, pp. 42 & 44; Muni/Western 4-2, Appendix B, pp. B-6-3 & B-6-4.)

After all the inputs were entered into the model, the model was calibrated with the standard “history matching” method using both steady state and transient calibration. In this method, a steady-state calibration of the year 1945 was chosen, along with a transient calibration period of years 1945 to 1998. Model-generated groundwater levels were compared with measured levels for wells in the SBBA. Adjustments in hydrogeologic parameters were then made within the acceptable limits until a satisfactory match was obtained. Model-calculated recharge and discharge terms were also compared to estimated and measured recharge and discharge terms. (Muni/Western 6-1, p. 49; Muni/Western 4-2, Appendix B, pp. B-6-8 & B-6-9.) After calibration, the model was run using six scenarios that included a no project condition and various project conditions. (Muni/Western 6-1, pp. 51, 68, 69.) Scenario A represents the maximum potential appropriation by Muni/Western. (Muni/Western 6-1, p. 68.)

Rialto-Colton Model

The Rialto-Colton Basin lies outside the SBBA model area. (Muni/Western 6-118.) In order to evaluate potential water quality impacts of the project within the Rialto-Colton Basin, Muni/Western obtained a copy of a groundwater model of the Rialto-Colton Basin prepared by USGS. (Muni/Western 6-1, p. 64.)

The USGS groundwater flow model was used to simulate groundwater flows in the Rialto-Colton Basin, with particular attention paid to the effects of artificial recharge at the Cactus Spreading and Flood Control Basins and Linden Ponds. (Muni/Western 6-1, p. 29.)

Analytical Method

To evaluate impacts of artificial recharge in areas outside the model area, an analytical method was used to predict groundwater mounding from the recharge areas. (Muni/Western 6-1, p. 63.) The analytical method used was the Hantush equation and was applied to the following artificial recharge areas lying outside the SBBA: the Cactus Spreading Ground in the Rialto-Colton Basin, the Wilson Spreading Ground in the Yucaipa Basin and the Garden Air Creek Spreading Ground in the San Timoteo Basin. (Muni/Western 6-1, p. 63.)

10.4 Modeling Results

Following is a brief discussion of the results of the different groundwater flow models and analytical method. Results from Scenario A (maximum appropriation) were compared to the No Project Scenario. (Muni Western 6-1, pp. 65 & 79; R.T. May 2, 2007, p. 238.)

Redlands-Crafton Plume

Modeling results for Scenario A show that the Redlands-Crafton TCE plume would clean up five years faster than under the No Project condition. (Muni/Western 6-1, p. 1; Muni/Western 6-249 and 6-250; R.T. May 2, 2007, pp. 226, 227, 229, 239.)

Norton Air Force Base Plume

Modeling results for Scenario A show that the TCE plume boundary would dissipate more quickly (by five years) as a result of increased artificial recharge at spreading basins upgradient of the Norton plume. (Muni/Western 6-1, pp. 80 & 81; Muni/Western 6-249 and 6-250; R.T. May 2, 2007, pp. 226, 227, 229, 239.)

Muscoy-Newmark Plume

Modeling results for Scenario A show that the Newmark and Muscoy plume boundaries would dissipate more quickly (by three years) compared to that of the No Project condition.

(Muni/Western 6-1, p. 80; Muni/Western 6-236 and 6-237; R.T. May 2, 2007, pp. 226, 227, 229, 238.)

Santa Fe Plume

Although Muni/Western did not specifically model the Santa Fe plume, they did provide evidence that PCE and TCE plumes (which are contaminants in the Santa Fe plume) in the SBBA would dissipate more rapidly under Scenario A compared to the No Project Scenario. Also, the size of the plumes is smaller under Scenario A than under No Project Conditions.

(Muni/Western 6-248 and 6-252.)

Rialto-Colton Plume

Results from the analytical Hantush Equation show that the maximum groundwater mound height due to recharge from the project was estimated to be 48 feet near the center of the Cactus Spreading Grounds. Areas where a rise in groundwater level is greater than 10 feet cover an extent of approximately 3,400 acres under Scenario A. Changes in groundwater levels attributable to implementation of the project would likely not create significant impacts since they fall within annual and historical ranges. (Muni/Western 4-4, p. 3-63.)

Results from the USGS Rialto-Colton groundwater flow model and particle tracking showed that movement of recharged water was in a southeasterly direction at an average velocity of 240 feet per year. (Muni/Western 4-3, pp. B-2-14 to B-2-15.) The impact of the project appears to increase the velocity of groundwater flows rather than to change the direction of such flows.

(Muni/Western 6-1, p. 90.)

Inferences can be made regarding the possible interactions between project recharge activities and contaminant plumes and contaminant concentration levels in the Rialto-Colton groundwater basin. However, quantifying the magnitude of contaminant plume spreading requires the use of a spatially-distributed physically-based numerical groundwater flow model. (Muni/Western 4-4, p. 2-57.) Therefore, potential impacts from project recharge water on the Rialto-Colton groundwater contaminant plume have not been adequately evaluated. Accordingly, this order does not permit Muni/Western to operate the Cactus Spreading and Flood Control Basins.

Yucaipa and San Timoteo Basin Analytical Method Results

Since there are no known contaminant plumes in the Yucaipa Basin or the San Timoteo Basin, there will be no undesirable contamination impacts from artificial recharge in these areas.

(Muni/Western 6-127; R.T. May 2, 2007, p. 240.)

10.5 Mitigation Measures

Groundwater contaminant plumes in Muni/Western's project area are regulated by the U.S. Environmental Protection Agency, the California Department of Toxic Substances Control, the Santa Ana Regional Water Quality Control Board, and the Hazardous Materials Divisions of the San Bernardino County and Riverside County Fire Departments. In addition, the California Department of Health Services monitors drinking water. (Muni/Western 4-3, p. 3.12-1.)

Mitigation measures presented in the EIR will help prevent impacts to groundwater resulting from increased recharge from expansion of existing projects and future projects.

As a condition of permitting, the State Water Board shall require Muni/Western to follow guidance from existing state and federally mandated projects regarding groundwater contaminant plumes within and outside the SBBA. This includes coordination with appropriate oversight agencies and compliance with policies regarding the remediation of the groundwater contaminant plumes.

Muni/Western shall implement the following mitigation measures, as presented in the EIR, in an effort to minimize or eliminate impacts from the groundwater contaminant plumes in the SBBA: (Muni/Western 4-4, p. 3.12-5.)

MM HAZ-4: Using available data, in conjunction with the integrated surface and groundwater models, Muni/Western will identify groundwater trends, including plume movement, and isolate changes attributable to implementation of the project under this permit. To the extent feasible given existing infrastructure, and consistent with meeting other basin management objectives, Muni/Western will limit adverse plume movement from water spreading authorized under this permit.

MM HAZ-5: Muni/Western will make an alternative water supply available to parties affected by contaminated wells, to the extent and for the duration that the contamination is caused by project operations, or provide treatment for the affected wells, at Muni/Western's discretion. The alternative supply or treatment for affected wells will be available for all times when pertinent water quality standards are exceeded as a result of the project.

11.0 COMPLIANCE WITH THE CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

On January 22, 2007, Muni and Western, as CEQA co-lead agencies, released the *Final Environmental Impact Report, Santa Ana River Water Rights Applications for Supplemental Water Supply* (FEIR). (Muni/Western 4-4.) On March 21, 2007, the respective Boards of Directors of Muni and Western certified the FEIR and approved and adopted the Findings, Statement of Overriding Considerations and Mitigation Monitoring and Reporting Plan. (Muni/Western 4-5.) A Notice of Determination was filed on the same date. (Muni/Western 4-6.)

The California Code of Regulations, title 14 (CEQA Guidelines), section 15231 requires the State Water Board as a responsible agency to conclusively presume that an EIR is adequate unless (1) the EIR is finally adjudicated in a legal proceeding to be inadequate, or (2) a subsequent EIR is necessary pursuant to section 15162. The statute of limitations has now run, and no actions were filed to challenge the environmental analysis performed by Muni/Western. No circumstances exist to require a subsequent EIR. Therefore, the State Water Board is required to presume that the EIR is adequate.

When approving a project, a responsible agency must either: (1) adopt conditions to avoid or mitigate significant adverse environmental effects within the scope of its responsibility; (2) find that another agency has the responsibility and jurisdiction and that such agency can or should avoid or mitigate the adverse effect; or (3) find that specific economic, legal, social, technological or other considerations make infeasible the mitigation measures or project alternatives identified in the EIR, and adopt a statement of overriding considerations. (Pub. Res. Code, §§ 21002.1, 21081; CEQA Guidelines, §§ 15091, 15093.)

The State Water Board is responsible for mitigating or avoiding only the significant environmental effects of those parts of the project that it decides to approve. (CEQA Guidelines, § 15096, subd. (g).) This includes the responsibility to address any significant adverse direct or indirect effects on water resources.

11.1 CEQA Findings

Before approving a project, a responsible agency must make findings under CEQA Guidelines § 15091, and § 15093, if applicable. (CEQA Guidelines, § 15096, subd. (h).) Under § 15091, for every significant effect of the project, a responsible agency must make one of the following findings: (1) Changes or alterations have been required in, or incorporated into, the project which avoid or substantially lessen the significant environmental effect as identified in the final EIR; (2) Such changes or alterations are within the responsibility and jurisdiction of another public agency and not the agency making the finding. Such changes have been adopted by such other agency or can and should be adopted by such other agency; or (3) Specific economic, legal, social, technological, or other considerations, including provision of employment opportunities for highly trained workers, make infeasible the mitigation measures or project alternatives identified in the final EIR. (CEQA Guidelines § 15091, subd. (a).) If approval of the project will cause an unmitigable significant impact, CEQA Guidelines § 15093 requires the approving agency to make a statement of overriding considerations before approving the project. A responsible agency's role in considering alternatives and mitigation measures is limited to only the direct or indirect environmental effects of those parts of the project it decides to carry out, finance or approve. (CEQA Guidelines § 15096, subd. (g)(1).)

11.1.1 Significant mitigable impacts

Table 1 of this decision includes mitigation measures that reduce to less than significant some of the impacts within the State Water Board's purview. These impacts are primarily related to disturbance of riparian habitat and unanticipated cultural resources during construction. Construction and operations will also increase the potential for erosion and sedimentation. The details of the mitigation measures are many and varied, as outlined in Table 1. In general they include surveys to locate sensitive resources, marking and fencing of sensitive areas, employee training, monitoring programs, and salvage and replanting of disturbed plant species.

11.1.2 Significant and Unavoidable Impacts and Cumulative Impacts of the Project¹⁷

Significant and Unavoidable Impacts of the Project

The Project's significant and unavoidable impacts within the State Water Board's purview are:

- (1) Surface water hydrology and water quality will be impacted when the Project significantly decreases river flow on non-storm days in Segments B through F.
- (2) Groundwater hydrology and water quality will be significantly impacted at some wells such that post-Project nitrate and total dissolved solids (TDS) concentrations would exceed water quality objectives (WQO).
- (3) Geology, soils and mineral resources will be significantly impacted by the Project, resulting in strong seismic ground shaking, induced liquefaction, high groundwater conditions, or subsidence.
- (4) Cultural and paleontological resources will be significantly impacted due to Project-induced substantial change in the Francis Cuttle Weir.
- (5) Hazardous materials and groundwater contamination will be impacted when the Project results in contamination of wells by perchlorate, TCE, PCE.

To the extent these potentially significant impacts are within the State Water Board's purview, the Board has responsibility for avoiding or mitigating those impacts. Accordingly, the State Water Board will adopt and include in the permit mitigation measures MM CR-1 through MM CR-4, MM HAZ-1 through MM HAZ-5, MM GEO-1 through MM GEO-8, MM GW-1, MM SW-2 and MM PS-12 (see Table 1), and standard permit terms 100, 203 and 208 to mitigate these impacts. However, these additional mitigations are likely insufficient to ameliorate all the significant and unavoidable impacts of the project.

Significant and Unavoidable Cumulative Impacts of the Project

Muni/Western's EIR identified the following potentially significant and unavoidable cumulative impacts that result from a combination of Muni/Western's project together with other projects also causing related impacts:

¹⁷ The State Water Board is adopting all mitigation measures identified in the EIR that would avoid or substantially reduce the significant adverse impacts of the project. Accordingly, the findings required under CEQA guidelines § 15091(a)(3), which apply to alternatives or mitigation measures that are not adopted, apply in this case only to alternatives, not mitigation measures.

- (1) The Muni/Western project and related projects will affect sensitive species and natural communities in the area.
- (2) The Muni/Western project and related projects will cause a significant adverse change in an historical or archaeological resource, destroy a unique paleontological resource, or disturb human remains.
- (3) In combination with other projects in the area, the Muni/Western project will expose structures to seismic ground shaking and liquefaction.
- (4) In combination with other projects, the Muni/Western project will affect groundwater hydrology and water quality by increasing nitrate and total dissolved solids concentrations above water quality objectives.
- (5) Cumulatively, the Muni/Western project and related projects will impact groundwater contamination both through the transportation of hazardous materials during project construction and possible acceleration of the movement of contaminant groundwater plumes.
- (6) Surface water hydrology and water quality will be cumulatively affected by erosion or degradation of water quality.
- (7) Public utilities, service and transportation will be cumulatively affected by the impairment of groundwater production.

To the extent these potentially significant and unavoidable cumulative impacts are within the State Water Board's purview, the Board has responsibility for avoiding or mitigating these impacts. Accordingly, the State Water Board will adopt and include in the permits the mitigation measures listed in Table 2 of this decision (see pages 58-63).

11.2 Findings regarding Alternatives

In accordance with CEQA guidelines §15091 (a)(3), the State Water Board has reviewed the Project alternatives described in the EIR and makes the following findings:

Alternative 1 – New Local Water Supplies

Finding - This alternative would only attain some of the Project objectives and has many of the same environmental impacts as those of the Project.

Alternative 2 – Enhanced Conservation

Finding - This alternative would not attain most of the Project objectives because it would not meet the objective of delivering additional high quality water instead of imported water supplies, and would not improve operational flexibility because it does not expand the number of water supply sources or expand the ability to move water to different locations within the Muni/Western service area.

Alternative 3 – New Imported Water Supply

Finding - If this alternative were implemented through the acquisition of State Water Project (SWP) supplies, the alternative would not reduce Muni/Western's dependence on imported water and would not deliver local, high quality water. If this alternative were implemented through the construction of a seawater desalination plant, Muni/Western would have to negotiate contracts with other agencies whereby imported SWP water would be exchanged in lieu of water derived directly from desalination.

No Project Alternative

Finding - Under this alternative, and without other new sources of water, Muni/Western will fully utilize existing SWP supplies at an earlier date than under the Project. The rate of population growth could diminish due to constrained water supplies.

The State Water Board finds these alternatives would have the same impact as the Project, or would not attain some of the Project objectives. Therefore, the Project is the environmentally superior alternative.

11.3 Statement of Overriding Considerations

As described above (section 9.0), partial approval of Muni/Western's Applications 31165 and 31370 will make possible the capture of high quality water to facilitate Santa Ana River water recycling, and reduce liquefaction potential and accelerate clean up of contaminated groundwater plumes in the San Bernardino Basin Area. The State Water Board finds these benefits provide the justification to override the potentially significant unmitigable project impacts.

12.0 CONCLUSION

There are no outstanding protests on Applications 31165 and 31370. Water is available for appropriation, and such appropriation is in the public interest and does not interfere with the public trust. In compliance with CEQA, the State Water Board has considered the EIR prepared by the lead agency and has adopted findings and a mitigation or reporting program.

ORDER

IT IS HEREBY ORDERED THAT Application 31165 and 31370 be partially approved and permits issued subject to prior rights and subject to standard permit terms 6, 10, 11, 12, 13, 14, 15, 22, 29A, 30, 63, 100, 117, 203, 208, and the following additional terms and conditions:

1. Permittees are authorized to divert and use water from the Santa Ana River, Bear Creek, Breakneck Creek, Keller Creek, and Alder Creek within the County of San Bernardino.
2. Permittees are authorized to divert water from the points of diversion and rediversion identified in Tables A and B of Decision (*insert number*).
3. Under Application 31165, Permittees are authorized to use the water for municipal, industrial, irrigation, heat control, frost protection and recreational uses within the place of use as shown on the map dated May 31, 1995, and on file with the State Water Board.
4. Under Application 31370, Permittees are authorized to use the water for municipal, industrial, irrigation, heat control, frost protection and recreational uses within the place of use as shown on the map dated May 15, 2001, and on file with the State Water Board.
5. Under Application 31165, the water appropriated shall be limited to the quantity that can be beneficially used and shall not exceed 400 cubic feet per second by direct diversion and 100,000 acre-feet per annum by underground and/or surface storage from January 1 to December 31 of each year. The amount of surface storage at Seven Oaks

Dam shall not exceed 50,000 acre-feet per annum. The maximum rate of diversion to underground storage shall not exceed 400 cubic feet per second. The total amount of water to be taken from the source at the 9 points of diversion listed in Table A of Decision (*insert number*) shall not exceed 100,000 acre-feet per water year of October 1 to September 30. The total rate for water to be taken from the sources for either direct use and/or underground storage shall not exceed 800 cubic feet per second.

6. Under Application 31370, the water appropriated shall be limited to the quantity that can be beneficially used and shall not exceed 1,100 cubic feet per second by direct diversion and 100,000 acre-feet per annum by underground and/or surface storage from January 1 to December 31 of each year. The amount of surface storage at Seven Oaks Dam shall not exceed 50,000 acre-feet per annum. The maximum rate of diversion to offstream storage shall not exceed 1,250 cubic feet per second. The maximum rate of diversion to underground storage shall not exceed 400 cubic feet per second. The total amount of water to be taken from the source at the 11 points of diversion listed in Table B of Decision (*insert number*) shall not exceed 100,000 acre-feet per water year of October 1 to September 30. The total rate for water to be taken from the sources for either direct use, underground storage, and/or offstream surface storage shall not exceed 1,250 cubic feet per second.
7. The total quantity of water taken under both Application 31165 and Application 31370 shall not exceed 198,317 acre-feet per water year of October 1 to September 30. The total amount of water diverted to storage at Seven Oaks Dam under Applications 31165 and 31370 shall not exceed 50,000 acre-feet per water year of October 1 to September 30. The total combined rate for water to be taken from the sources under Applications 31165 and 31370 for either direct use, underground storage, and/or offstream surface storage shall not exceed an instantaneous rate of 1,250 cubic feet per second.
8. Construction work and the application of water to beneficial use shall be prosecuted with reasonable diligence. Actual construction shall begin no later than June 30, 2010 and be completed by October 1, 2020. Water shall be put to beneficial use by December 31, 2059.

9. The State Water Board adopts and incorporates by reference into this permit the mitigation measures and monitoring and reporting requirements applicable to the impacts of the Project on biological and cultural resources, geology, hazardous material and groundwater contamination, groundwater and surface water hydrology, water quality and public services, utilities and transportation identified in the Final EIR, specifically mitigation measures MM BIO-1, MM BIO-2 and MM BIO-6 through MM BIO-10, MM CR 1 through MM CR 4, MM HAZ 1 through MM HAZ 5, MM GEO-1 through MM GEO-8, MM GW-1, MM SW-2 and MM PS-12. Muni/Western must implement the measures to mitigate significant impacts and conduct the required reporting and monitoring of those measures as provided in the Mitigation Monitoring and Reporting Plan adopted on March 21, 2007 by the respective Boards of Directors of Muni and Western. In addition, Muni/Western shall submit an annual report to the State Water Board Deputy Director for Water Rights that includes the results of the Mitigation Monitoring and Reporting Program. The State Water Board reserves jurisdiction to require any reasonable amendments to these measures and requirements to ensure that they will accomplish the stated goal.

10. The State Water Board adopts and incorporates by reference into this permit the mitigation measures and monitoring and reporting requirements applicable to the cumulative impacts of the Project on biological and cultural resources, geology, hazardous material and groundwater contamination, groundwater and surface water hydrology and water quality, and public services, utilities and transportation identified in the EIR, specifically mitigation measures MM Cumulative BIO-1, MM Cumulative CR-1, MM Cumulative CR-2, MM Cumulative HAZ-1, MM Cumulative SW-1 and MM Cumulative GW-1. Muni/Western must implement the measures to mitigate cumulative impacts and conduct the required reporting and monitoring of those measures as provided in the Mitigation Monitoring and Reporting Plan adopted by the respective Boards of Directors of Muni and Western on March 21, 2007. In addition, Muni/Western shall submit to the State Water Board Deputy Director for Water Rights an annual report that includes the results of the Mitigation Monitoring and Reporting Program. The State Water Board reserves jurisdiction to require any reasonable amendments to these measures and requirements to ensure that they will accomplish the stated goal.

11. This permit shall not be construed as conferring upon Permittees right of access to facilities of the U.S. Army Corps of Engineers and the Santa Ana River Mainstem Local Sponsors.
12. This permit is specifically subject to the prior rights of Bear Valley Mutual Water Company, City of Redlands, East Valley Water District, Lugonia Water Company, North Fork Water Company and Redlands Water Company to divert the first 88 cubic feet per second of the natural flow of the Santa Ana River pursuant to pre-1914 appropriative rights, to the extent that such rights may exist.
13. This permit is specifically subject to the prior rights of San Bernardino Valley Water Conservation District under Licenses 2831 and 2832 issued pursuant to Applications 2217 and 4807, and any valid pre-1914 appropriative right confirmed by the Court.
14. Nothing in this permit shall be construed as authorizing any diversions contrary to the provisions of the December 19, 2002 Biological Opinion issued by United States Fish and Wildlife Service for operation of Seven Oaks Dam, as may be revised in the future, including flow releases for downstream over-bank inundation to preserve State and federally listed threatened and endangered species and their habitat.
15. Muni/Western shall only divert water at PODs 5 through 10 in compliance with the terms and conditions of Federal Energy Regulatory Commission (FERC) license Project No. 1933 and 401 water quality certification as well as any future FERC licenses and 401 water quality certifications.
16. Permittees shall not, without the prior written consent of Southern California Edison (SCE), construct, operate or maintain diversion works at points of diversion located upstream of the flood inundation pool of Seven Oaks Dam in a manner that interferes with the operation and maintenance of the hydroelectric works licensed to SCE by the Federal Energy Regulatory Commission (FERC) license for Project No. 1933. Permittees' diversion of water at such points of diversion shall not interfere with SCE's diversion of water for hydroelectric purposes, again as described in the FERC license for Project No. 1933. Nothing in this permit shall be construed to limit Permittees' diversion of water from such points of diversion at times when the quantity of water available for

diversion at such points of diversion exceeds the demand of SCE's facilities to divert water from the Santa Ana River system.

17. This permit shall not be construed as conferring upon Permittees the right of access to Seven Oaks Dam, the points of diversion, the lands necessary for related facilities, or the lands necessary for inundation for water storage. Access to, construction upon, or inundation of National Forest Service lands shall not commence prior to authorization by the Forest Service, in accordance with applicable laws and regulations. Such authorization will require compliance with all applicable federal laws and regulations. Muni/Western specifically recognizes that completion of the applicable legal process does not guarantee such authorization will be granted, the issuance of this water right permit notwithstanding.
18. This permit shall not be construed as conferring upon Permittees the right of access to Seven Oaks Dam, the points of diversion, and lands necessary for related facilities, or the lands necessary for inundation for water storage. Permittees shall not commence construction and operation of water diversion facilities at Seven Oaks Dam without a written access agreement from the Santa Ana River Mainstem Project Local Sponsors.
19. Flow in the Santa Ana River is highly variable from year to year. Because the face value of this permit is based on a rare storm event, this permit shall not be construed as giving any assurance that such an event will occur. The actual amount of water available for appropriation may be much less.
20. Permittees are required to follow guidance from existing state and federally mandated projects regarding groundwater contaminant plumes within and outside the San Bernardino Basin Area. This includes coordination with appropriate oversight agencies and compliance with policies regarding the remediation of the groundwater contaminant plumes.
21. Permittees shall not use the Cactus Spreading and Flood Control Basins under permits issued pursuant to Decision (*insert number*).
22. Prior to issuance of a permit, Muni/Western shall submit a final project map that meets the requirements of California Code of Regulations, Title 23, Chapter 2, Article 7.

23.
 - a. In order to prevent degradation of the quality of water released to the Santa Ana River from storage at Seven Oaks Dam, the State Water Board may modify the permits issued pursuant to this order to set conditions that apply water quality objectives to any release from storage.
 - b. No water shall be released from storage of Seven Oaks Dam for purposes of rediversion by Permittees until Permittees have consulted with the Chief Deputy Director for Water Quality or his or her delegee and the Chief Deputy Director has determined that the releases will be consistent with applicable water quality objectives. The releases shall be consistent with any conditions the Chief Deputy Director determines are necessary to ensure compliance with applicable water quality objectives.
24. In order to prevent degradation of water quality during and after construction of the project, prior to commencement of any construction undertaken after issuance of the permit, Permittees shall file a report pursuant to Water Code Section 13260 and shall comply will all waste discharge requirements imposed by the California Regional Water Quality Control Board, Santa Ana Region, or by the State Water Resources Control Board.
25. Permittees shall install and maintain measuring devices, satisfactory to the State Water Board, which are capable of measuring (1) the instantaneous rate of diversion and the cumulative quantity of water diverted to groundwater storage, and (2) the cumulative quantity of water extracted from groundwater storage. The diversion data shall be posted on Permittees' websites on a weekly basis.

DRAFT

October 7, 2009

CERTIFICATION

The undersigned Clerk to the Board does hereby certify that the foregoing is a full, true, and correct copy of a decision duly and regularly adopted at a meeting of the State Water Resources Control Board held on October 20, 2009.

AYE:

NO:

ABSENT:

ABSTAIN:

Jeanine Townsend
Clerk to the Board

Table 1: Mitigation Measures

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| <p>MM BIO-1</p> | <p>Muni/Western will minimize disturbance to native habitats and listed and non-listed sensitive species by the implementation of the following measures at construction sites prior to and during construction. Where ground disturbance is required, the Muni/Western program will include the following:</p> <p>(1) Clearly marking and delineating the limits of the staging areas as well as the construction corridors/zones in the field and graphically on all final construction drawings and blueprints. Personnel and equipment will be prohibited in native habitats outside the construction limits.</p> <p>(2) Biologically sensitive areas, including individuals or colonies of listed and non-listed sensitive plant species and wildlife species, will be identified and delineated in the field prior to ground disturbance (see MM BIO-3) and will be clearly marked graphically on all final construction plans or blueprints so they will be avoided to maximum extent feasible.</p> <p>(3) Use methods to minimize the construction corridor width to the maximum extent feasible in sensitive habitats, such as transporting and stockpiling excavated materials in disturbed area of the right-of-way (ROW), or into other parts of the ROW by truck or conveyor belt.</p> <p>Employee Training Implementation of an employee training program. Muni/Western’s program will include an initial meeting with all personnel presented by a qualified biologist familiar with all affected species, habitats, and permit conditions. The employee training program will include a discussion of each species, all applicable laws, the permit conditions, and the potential penalties for violating permit conditions. The employee training program will be conducted before construction activities begin. Regular updates will occur during weekly tailgate meetings with construction personnel, and newly hired personnel will be informed of the permit conditions as well as the habitat and species issues before working on the Project site.</p> <p>On-Site Monitoring Biological monitoring of habitat clearing activities and removal of sedentary animals, both common and sensitive, within the ROW prior to clearing. This will require a qualified biologist to be at the location of habitat removal before clearing to attempt to remove animals where visible and, during removal activities, to ensure that no inadvertent impacts to adjacent habitats occur. Weekly inspections of the ROW perimeter near work areas will also reduce the potential for inadvertent impacts to adjacent habitat.</p> <p>Best Management Practices (BMPs) Dust control. All areas of mechanical ground disturbance, including dirt access roadways, will be consistently moistened to reduce the creation of dust clouds. The frequency of watering will be consistent with the desired goal and in accordance with regional standards and BMPs. Erosion control. Devices such as straw bales and “v” ditches will be installed in areas where construction activities may directly or indirectly cause erosion or sediment deposition on adjacent habitats. Routine removal of trash from construction areas. All refuse, including non-construction materials such as paper and miscellaneous food packaging materials, will be removed from the ROW to prevent littering of the adjacent habitat areas outside of the ROW. At a minimum, site clean-ups should occur weekly.</p> |
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| <p>MM BIO-1 (continued)</p> | <p>Listed Species Protection Measures</p> <p>In areas where the San Bernardino Kangaroo Rat (SBKR) is present, either within or adjacent to the ROW, Muni/Western will install exclusionary fencing where appropriate to reduce the potential for SBKR entering the ROW. Specification for the fencing will be particular to the goal of the SBKR exclusion and will be approved by the United States Fish and Wildlife Service (USFWS). Muni/Western may not install fencing in certain areas such as boulder-strewn washes where fence construction may cause substantial habitat disturbance. Following the installation of fencing, the animals within the ROW will be trapped and released within adjacent suitable habitat outside the ROW. These methods will be approved by the USFWS.</p> <p>In areas where the SBKR is present, either within or adjacent to the ROW, Muni/Western will limit construction activities to daylight hours (Approximately 7:00 A.M. to 6:00 P.M.). During night hours, no activities that would unnaturally increase the light or noise within adjacent occupied habitat will occur.</p> <p>In areas where the SBKR, coastal California gnatcatcher CAGN, least Bell's vireo, or southwestern willow flycatcher are present either within or adjacent to the ROW, Muni/Western will avoid or reduce construction activities in the vicinity of occupied habitat during the breeding season. Avoidance will take place from March 1 through June 30. In certain areas, avoidance of southwestern willow flycatcher will continue through July 31. Where complete avoidance is not possible, construction activities will be conducted in a manner that attempts to minimize disturbance during early morning hours and avoids the most sensitive breeding months of April and May.</p> <p>In areas where preconstruction sensitive species surveys and other seasonally limited activities such as seed collection and plant propagation are needed, Muni/Western will prepare a calendar of when such activities need to be accomplished and incorporate this into design and construction schedules to ensure that the surveys can be conducted in the appropriate season without causing delays. (Draft EIR page 3.3-37 through 3.3-39; Final EIR Section 2.4)</p> |
| <p>MM BIO-2</p> | <p>Muni/Western will develop a Habitat Revegetation, Restoration, and Monitoring Program (Program), obtaining input from CDFG, and USFWS, for implementation I all habitat areas directly affected by construction activities. The Program will include the following measures:</p> <p>Invasive Species Control</p> <p>Where appropriate and feasible, the area to be treated will be treated to kill invasive exotics species and limit their seed production before initiating any earthmoving activity with the objectives of (1) preventing invasive species from spreading from the disturbance area, and (2) removing weed sources from the salvaged topsoil. Herbicides will be used only by a licensed herbicide applicator and may require notification to property owners or resource agencies. The treatment will be completed before earthmoving in order for this mitigation to have its intended effect (e.g., the treatment would need to occur before target species set seed).</p> <p>Topsoil Salvage and Replacement</p> <p>In areas where vegetation and soil are to be removed, the topsoil will be salvaged and replaced, where practicable. This may be accomplished using two lifts, the first to salvage the seed bank, and the second to salvage soil</p> |

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| <p>MM BIO-2 (continued)</p> | <p>along with soil biota in the root zone. Soil will be stockpiled in two areas near the Project site, with the seed bank labeled to identify it. Topsoil will be replaced in the proper layers after final reconfiguration of disturbed areas. Where presence of extensive deposits of boulders and cobbles limit the opportunity to salvage topsoil and make the above-mentioned procedure infeasible, Muni/Western will salvage available surface material and stockpile it for replacement on the surface of the restored area. Stockpiles will be covered if the soil is to be left for an extended period to prevent losses due to erosion and invasion of weeds.</p> <p>Habitat Rehabilitation and Revegetation</p> <p>Muni/Western will develop and implement plans and specifications for replanting areas disturbed by the Project. Replanting will be with native species propagated from locally collected seed or cuttings, and, if applicable, will include seed or sensitive species that would be impacted during construction activities.</p> <p>Monitoring procedures and performance criteria will be developed by Muni/Western to address revegetation and erosion control. The performance criteria will consider the level of disturbance and the condition of adjacent habitats. Monitoring will continue for 3-5 years, or until performance criteria have been met. Appropriate remedial measures, such as replanting, erosion control or weed control, will be identified and implemented if it is determined that performance criteria are not being met. (Draft EIR page 3.3-39 through 3.3-40; Final EIR Section 2.4)</p> |
| <p>MM BIO-3</p> | <p>Colonies of state-or federally-listed plants will be clearly marked, mapped, and recorded along with the numbers of individuals in each colony and their respective condition. Locations of listed animal species will also be marked, mapped, and recorded. To the maximum extent feasible, construction areas and access roads will be adjusted to avoid loss of individual listed plants and animals and damage to habitats supporting these species. Individuals of listed wildlife species in the ROW, other than birds and other mobile species, will be captured if possible by biologists with the appropriate permits and relocated to suitable habitats outside the ROW. (Draft EIR page 3.3-40)</p> |
| <p>MM BIO-4</p> | <p>Where impacts to listed plant species are unavoidable, Muni/Western will develop and implement, together with the listing agency, a salvage, propagation, replanting, and monitoring program that would utilize both seed and salvaged plants constituting a representative sample of each colony of that species that would be affected. The program will include measures to perpetuate the genetic lines represented to the maximum extent feasible. The program will be approved by the appropriate resource agencies prior to its implementation. Activities involving handling of state-or federally listed plant species may require permits as well as a memorandum of understanding from the USFWS or CDFG.</p> <p>The Muni/Western salvage, propagation, replanting, and monitoring program will incorporate provisions for recreating suitable habitat and measures for re-establishing self-sustaining colonies of listed plant species, should they be affected on the various project sites. The program will include provisions for monitoring and performance criteria, including an annual assessment of progress, and provisions for remedial action if performance criteria are not being met. (Draft EIR page 3.3-40)</p> |

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| <p>MM BIO-5</p> | <p>Prior to ground disturbance or other activities, qualified wildlife biologists will survey all proposed construction, staging, stockpile, and access areas for presence of non-listed sensitive wildlife species. Preconstruction surveys will take place during the appropriate season and in accordance with established protocols (if required). These surveys will be conducted in all construction areas that occur in native habitats. In the event that non-listed sensitive wildlife species are observed in the impact area during these pre-project surveys, Muni/Western will implement the following measures: Locations of non-listed sensitive animals found during the surveys all also be marked, mapped, and recorded. Locations of burrowing animals will be avoided where feasible. Individuals of non-listed sensitive wildlife species in the ROW, other than birds, will be captured and relocated to suitable habitat outside the ROW. Where nesting of non-listed sensitive bird species is found to occur within the ROW, vegetation clearing will be conducted outside of the nesting season. (Draft EIR page 3.3-41)</p> |
| <p>MM BIO-6</p> | <p>Prior to ground disturbance or other activities, qualified botanists will survey all proposed construction, staging, stockpile, and access areas for presence of non-listed sensitive plant species. Preconstruction surveys will occur during appropriate season and in accordance with established protocols (if required). These surveys will be conducted in all construction areas that occur in native habitats. In the event that non-listed sensitive plant species are observed in the impact area during pre-Project surveys, Muni/Western will implement the following measures: (a) Colonies will be clearly marked, mapped, and recorded along with the numbers of individuals in each colony and their respective condition. To the extent feasible, construction areas and access roads will be configured to avoid or minimize loss of individual plants and damage to occupied habitats. (b) Where impacts to non-listed sensitive plant species are unavoidable, Muni/Western will develop and implement a salvage, propagation, replanting, and monitoring program that will use both seed and salvaged plants constituting an ample and representative sample of each colony (Draft EIR page 3.3-42.)</p> |
| <p>MM BIO-7</p> | <p>To reduce impacts on biological resources, Muni/Western will realign pipelines to avoid sensitive resources and habitat to the maximum extent feasible. Specifically, Muni/Western will realign Phase II of the Plunge Pool Pipeline northward and place it adjacent to Greenspot Road. (See Draft EIR Figure 3.3-7). This will put the project-related disturbance at the edge of the habitat and avoid bisecting the intermediate to mature RAFSS habitat along the western portion of the alignment. If it is infeasible to implement MM BIO-7, then the residual impact could be compensated by implementation of MM BIO-8, which is intended to compensate for permanent or long-term losses of sensitive RAFSS habitat as a result of installation of permanent facilities or long-term construction impacts that cannot be fully mitigated by MM BIO-1, MM BIO-2, and MM BIO-7 (Draft EIR page 3.3-44)</p> |

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| <p>MM BIO-8</p> | <p>To compensate for permanent long-term and temporal losses of RAFSS habitat value, Muni/Western will acquire, for every 1 acre impacted, a minimum of 1 acre of good quality habitat of similar or greater habitat value than the RAFSS area impacted by the Plunge Pool pipeline and dedicate it in perpetuity as a habitat conservation easement area, or other appropriate designation, and provide funding for its future management as native habitat in perpetuity. The acquired RAFSS habitat area would ideally be contiguous with existing habitat already set aside in the WSPA or other dedicated RAFSS habitat. If good quality habitat in such a locality is not available for purchase, availability of other RAFSS habitat will be investigated, with the objective of obtaining good quality habitat near the Project area. Implementation of this mitigation measure will be subject to the requirement that such long-term mitigation and reporting plans for such acquisitions are to be approved by the Chief of the Division of Water Rights of the State Water Resources Control Board prior to construction of the Plunge Pool Pipeline. (Draft EIR page 3.3-44; Final EIR Section 2.4)</p> |
| <p>MM BIO-9</p> | <p>Muni/Western will monitor and remove invasive non-native species establishing in the channel and adjacent RAFSS habitats between Seven Oaks Dam and Mill Creek. Target species include species of tamarisk or salt cedar (<i>Tamarix</i> spp.), fountain grass (<i>Pennisetum setaceum</i>), and giant reed (<i>Arundo donax</i>). These species establish in habitats suitable to SBKR and Santa Ana River woolly-star and have the potential to spread further into adjacent suitable habitat areas. Initial control will be established using a combination of physical removal and herbicidal treatment using appropriate environmental safeguards. Herbicides will be used pursuant to manufacturer's instructions and standard measures will be taken to avoid impacts to water quality. Two to several follow-up treatments would be anticipated during the first year with follow-up monitoring and treatments at least once annually in the ensuing years. (Draft EIR page 3.3-61; Final EIR Section 2.4)</p> |
| <p>MM BIO-10</p> | <p>Muni/Western will develop a program, in coordination with MSHCP agency participants, to selectively restore SBKR and Santa Ana River woolly-star habitat by using habitat manipulation, either by mechanical means or high pressure water, to remove vegetation and leave freshly deposited sand and silt, simulating the habitat-renewing aftermath of natural flooding. This will be done using an adaptive management approach with input from Multispecies Habitat Conservation Plan (MSHCP) stakeholders. If the high pressure water method is used, water will be piped. A high-pressure nozzle will be directed at localized areas of habitat determined to be suitable for SBKR and Santa Ana River woolly-star after renewal. The nozzle will be hand operated or operated from a light vehicle. Treatments will be accomplished in a randomized block design to allow experimental testing of variables such as duration and intensity of spray, addition of clean stand, season of disturbance, application of seed vs. allowing natural dispersal, etc. A rigorous monitoring program funded by Muni/Western will be established to enable the differences among experimental treatments to be determined. The primary indicator of success will be related to development of habitat characteristics identified with pioneer to intermediate RAFSS habitat within the SBKR and Santa Ana River woolly-star populations have been</p> |

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| <p>MM BIO-10 (continued)</p> | <p>documented. These characteristics are documented in the literature and will be specified as part of the Muni/Western Program. The program will be adjusted appropriately as results from earlier efforts become available. The design and implementation of the ongoing effort will be funded by Muni/Western and conducted by representatives of Muni/Western with input from the USFWS and CDFG. A complete description of this method is also included in Appendix E7 of the Draft EIR, Section 2.0. Muni/Western commit to achieving a mitigation performance of restoring 10 acres of intermediate- to late-stage RAFSS habitat to the early or intermediate stage RAFSS habitat during the first twenty years of Project implementation (Draft EIR pages 3.3-61 and 3.3-62; Final EIR Section 2.4)</p> |
| <p>MM CR-1</p> | <p>In the event of an unanticipated archaeological or paleontological resource discovery during construction, all ground disturbances within 150 feet of the discovery will be halted or redirected to other areas until the discovery has been documented by a qualified archaeologist or paleontologist,, and its potential significance evaluated consistent with CEQA. Resources considered significant will be avoided by Project design. If avoidance is not feasible, the resource will be subject to a data recovery mitigation program, as appropriate. If human remains are discovered the County Coroner will be contacted, and all procedures required by the California Health and Safety Code Section 7050.5, State CEQA Guidelines Section 15064.5(e) and PRC Section 5097.98 will be followed. (Draft EIR page 3.9-19)</p> |
| <p>MM-CR-2</p> | <p>Proposed construction of the Plunge Pool Pipeline will avoid physical impacts to the Francis Cuttle Weir Dam to the extent feasible. In the event that any portion of the Francis Cuttle Weir Dam would be modified or demolished, a qualified architectural historian will prepare a historic recordation of the Francis Cuttle Weir Dam, in the context of the Conservation District's groundwater spreading system. The recordation will conform to the standards of either the Historic American Buildings Survey (HABS) or the Historic American Engineering Record (HAER). (Draft EIR page 3.9-20)</p> |
| <p>MM CR-3</p> | <p>Prior to construction activities along the segment of the Plunge Pool Pipeline, Phase I, align north of Greenspot Road, the location of the North Fork Canal will be precisely mapped on engineering design plans to identify where the canal falls within the construction corridor. Temporary fencing will be placed 5 feet south of the canal along the portion of the canal that falls within the construction corridor to provide a small buffer area, and no heavy construction equipment or vehicles will be allowed north of the fencing. (Draft EIR page 3.9-21)</p> |
| <p>MM CR-4</p> | <p>If it is necessary to install the Morton Canyon Connector II Pipeline through the "Hole in the Wall" within the retaining wall of Greenspot Bridge, construction activities will be confined to previously disturbed sections only and the wall will be restored to pre-Project conditions. Prior to construction, a qualified architectural historian will review the final construction designs of the Morton Canyon Connector II Pipeline to verify avoidance of significant impacts to any Greenspot Bridge feature. (Draft EIR page 3.9-24)</p> |

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| MM HAZ-1 | <p>Muni/Western will direct the contractor to wash out concrete trucks in a designated area where the material cannot run off into a stream or percolate into the groundwater. This area will be specified on all applicable construction plans and be in place before any concrete is poured.</p> <p>Muni/Western will direct the contractor to construction vehicles in a manner that contains fluids, such as lubricants, within an impervious area to avoid spill-related water quality impacts. (Draft EIR page 3.12-12)</p> |
| MM HAZ-2 | <p>Muni/Western will direct the contractor to inspect and, as necessary, service all equipment before it enters the construction site and regularly thereafter, and before working immediately adjacent to the Santa Ana River or any other drainage or creek to avoid equipment leak-related water quality impacts.</p> <p>Muni/Western will direct the contractor to repair any leaks or hoses/fittings in poor condition before the equipment begins work. (Draft EIR page 3.12-12)</p> |
| MM HAZ-3 | <p>Muni/Western will direct the contractor to prepare a spill prevention and contamination plan prior to equipment use on the site. Muni/Western will direct the contractor to follow the spill prevention plan during Project construction to prevent spill-related water quality impacts. This plan will include, but not necessarily be limited to:</p> <ul style="list-style-type: none"> a. Specific bermed equipment maintenance and refueling areas. b. Bermed and lined hazardous material storage areas on site that are covered during the rainy season. c. Hazardous material spill cleanup equipment on site (e.g., absorbent pads, shovels, and bags to contain contaminated soil). d. Workers trained in the location and use of cleanup equipment. (Draft EIR page 3.12-12). |
| MM HAZ-4 | <p>Using available data, in conjunction with the integrated surface and groundwater models, Muni/Western will identify groundwater trends, including plume movement and isolate changes attributable to implementation of the Project. To the extent feasible given existing infrastructure, and consistent with meeting other basin management objectives, Muni/Western will direct Project water spreading to limit adverse plume movements. (Draft EIR page 3.12-14)</p> |
| MM-HAZ-5 | <p>Muni/Western will make an alternative water supply available to parties affected by contaminated wells, or provide treatment for affected wells, at Muni/Western’s discretion. The alternative supply or treatment for affected wells will be made available for all times when pertinent water quality standards are exceeded as a result of the Project. (Final EIR section 2.3.2).</p> |

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| MM GEO-1 | <p>Before beginning construction, a sedimentation and erosion control plan will be prepared by Muni/Western and submitted to the Santa Ana Regional Water Quality Control Board (SARWQCB) for approval. In addition, a Storm Water Pollution Prevention Plan (SWPPP) will be prepared by Muni/Western and submitted to the SARWQCB for approval prior to construction. Where possible, erosion control measures will be implemented by Muni/Western before beginning work in the rainy season. To minimize short-term impacts associated with erosion and off-site siltation of the SAR, standard erosion and sediment control features will be used during and immediately after grading and excavations.</p> |
| MM GEO-2 | <p>Muni/Western will direct the contractor to install, prior to de-watering activities, energy dissipation devices at discharge points to prevent erosion. Sedimentation basins (such as straw bales lined with filter fabric) will be used at dewatering discharge points to prevent excess downstream sedimentation. These basins will be constructed during dewatering and regularly maintained during construction, including after storm events, to keep them in good working order.</p> |
| MM GEO-3 | <p>Muni/Western will implement recommendations established in a site-specific geotechnical report, prepared by a qualified engineer or engineering geologist. The report recommendations will be based on comprehensive evaluation of slope stability, seismic, and soil conditions that may affect construction of the pipelines and related facilities. Recommendations will be consistent with provisions of California Code of Regulations, Title 8, Construction and Safety Orders. Project grading and excavations will be observed by a geotechnical engineer, engineering geologist, or other qualified representative, to verify compliance with recommendations of the geotechnical report. The geotechnical investigation will be completed in accordance with:</p> <ul style="list-style-type: none"> (1) CDMG Special Publication 117, <i>Guidelines for Evaluating and Mitigating Seismic Hazards in California</i> (CDMG 1997). (2) Southern California Earthquake Center, Recommended Procedures for Implementation of DMG Special Publication 117 Guidelines for Analyzing and Mitigating Liquefaction in California (SCEC1999). |
| MM GEO-4 | <p>Muni/Western will implement seismic-related recommendations contained in a site-specific geotechnical report, as discussed in MM GEO-3, to minimize seismically induced damage to the pipeline.</p> |
| MM GEO-5 | <p>A water flow shut-off mechanism will be installed by Muni/Western at the Plunge Pool Pipeline Intake Structure to terminate flow immediately following a large earthquake in the vicinity of the site.</p> |
| MM GEO-6 | <p>Muni/Western will complete emergency repairs to the pipeline and/or related facilities, in the event of seismically induced damage. MM GEO-1 and MMGEO-2 will be applied to reduce erosion related impacts associated with soil disturbance during emergency repairs.</p> |

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| MM GEO-7 | Muni/Western will implement a groundwater level monitoring program using data from Index Wells (see Figure 3.4-5). This information will be used in conjunction with forecasts of groundwater levels derived from Muni/Western integrated surface and groundwater models to identify trends in groundwater levels and identify changes attributable to the Project. To the extent feasible given existing infrastructure, and consistent with meeting other basin management objectives, Muni/Western will direct Project water spreading to limit high groundwater conditions in the vicinity of Devil Canyon, Lytle Creek, Mill Creek, and areas in the forebay and intermediate area of the SBBA. |
| MM GEO-8 | Muni/Western will implement a groundwater level monitoring program using data from Index Wells. This information will be used in conjunction with forecasts of groundwater levels derived from Muni/Western integrated surface and groundwater models to identify trends in groundwater levels and isolate changes attributable to the Project. To the extent feasible given existing infrastructure, and consistent with meeting other basin management objectives, Muni/Western will direct Project water spreading to limit potential for subsidence in the Pressure Zone area of the SBBA. |
| MM GW-1 | Using available reliable data, Muni/Western will, on an annual basis, evaluate impacts of the Project on TDS and nitrate concentrations in the SBBA. To the extent feasible given existing infrastructure, and consistent with meeting other basin management objectives, Muni/Western will direct Project water spreading to reduce significant TDS and nitrate impacts. |
| MM GW-2 | Using available data, Muni/Western will, on an annual basis, evaluate impacts of the Project on nitrate concentrations in the SBBA. To the extent feasible given existing infrastructure, and consistent with meeting other basin management objectives, Muni/Western will direct Project water spreading to reduce significant nitrate impacts. |
| MM SW-1 | Because anaerobic conditions are a problem associated with current operations at Seven Oaks Dam, it is anticipated that the operations of the dam (San Bernardino, Riverside, and Orange County Flood Control Districts, known as the 'Local Sponsors') will implement a program (such as water quality monitoring and aeration) to avoid and reverse anaerobic conditions so that water quality objectives are not exceeded. In those years when the Project results in seasonal water conservation storage behind Seven Oaks Dam, Muni/Western will participate in such a preventative program and provide funding, proportional to the volume of seasonal storage behind Seven Oaks Dam. |
| MM SW-2 | An energy dissipation structure, a device to slow fast moving flows so as to prevent erosion, will be placed at the terminus of the pipeline delivering water to Lytle Basins channel to ensure that water from the Project does not scour or erode the channel. |

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| MM PS-12 | <p>Per the requirements of the Seven Oaks Accord, to avoid a significant effect on groundwater levels at one or more index wells located outside the Pressure Zone, Muni/Western will spread sufficient water to maintain static groundwater levels at the affected index wells.</p> <p>To implement this mitigation measure, Muni/Western will use a groundwater monitoring program based on information derived from the index wells. This information will be used in conjunction with forecasts of groundwater levels derived from Muni/Western integrated surface and groundwater models to identify trends in groundwater levels and isolate the share of change attributable to the Project. Remedial action will be implemented prior to an actual 10-foot reduction being reached, to avoid the significant impact.</p> |
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Table 2: Project’s Cumulative Impacts and Mitigation Measures

| Cumulative Impact | Mitigation Measure to be Incorporated into Permit |
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| <i>Biological Resources</i> | |
| <p>Cumulative Impact BIO-3 The Project and related projects would affect sensitive species.</p> | <p>The EIR identified project-specific MM-BIO-1 through MM-BIO-8 as mitigating cumulative impacts to sensitive species. However, the residual cumulative impacts to sensitive species are significant and unavoidable.</p> |
| <p>Cumulative Impact BIO-4 The Project and related projects would have significant cumulative effects on riversidean alluvial fan sage scrub (RAFSS), a sensitive natural community.</p> | <p>The EIR identified project-specific MM-BIO-1, MM-BIO-2, MM-BIO-7 and MM-BIO-8 as being applicable to reducing cumulative impacts to sensitive natural communities. These measures include the same actions as described under Cumulative Impact BIO-3, as well as relocating the Plunge Pool Pipeline to minimize effects to RAFSS and its associated wildlife species or purchasing and preserving RAFSS habitat. The residual cumulative impacts to RAFSS are significant and unavoidable.</p> |
| <p>Cumulative Impact BIO-6 The Project and related projects would have significant cumulative effects on sensitive natural communities and habitat of sensitive species downstream of Seven Oaks Dam.</p> | <p>The EIR identified Project specific MM-BIO-9 and MM-BIO-10 as reducing impacts to sensitive natural communities and habitat of sensitive species downstream of Seven Oaks Dam. The residual cumulative impacts to sensitive natural communities and sensitive species habitat would be significant and unavoidable.</p> |
| <p>Cumulative Impact BIO-7 Project and related projects would have significant indirect effects on biological resources related to growth and development in service areas.</p> | <p>MM Cumulative BIO-1: The San Bernardino General Plan continues a number of policies in the Natural Resources Element designed to require review of biological impacts for each development project in coordination with the development and enforcement of Habitat Conservation Plans, and development of monitoring programs. The Riverside County General Plan Draft Program EIR identifies policies from the Multipurpose Open Space Element of the County of Riverside General Plan as well as additional measures to reduce impacts to biological resources associated with growth. Policies are designed to require review of biological impacts for each development project, avoidance of habitat fragmentation, and use of constructed wetlands to treat water before it enters the natural stream system.</p> |

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| | Residual impacts: despite General Plan policies, significant unavoidable cumulative biological impacts would still occur in San Bernardino and Riverside Counties. |
| Cultural Resources | |
| <p>Cumulative Impact CR-1 The Project and related projects could cause a significant adverse change in the significance of a historical or archaeological resource, destroy a unique paleontological resource, or disturb human remains.</p> | <p>MM Cumulative CR-1: Individual review of each of the related projects under CEQA would likely result in the identification of any significant cultural resource impacts and provide mitigation to reduce or avoid impacts. It is not certain that all significant cumulative impacts could be successfully mitigated, given the potentially large amount of ground disturbance involved with the Project and related projects. Residual impacts: potential cumulative impacts on cultural resources would remain significant.</p> |
| <p>Cumulative Impact CR-2 The Project and related projects would have indirect significant impacts related to growth and development in the service areas.</p> | <p>MM-Cumulative CR-2: The Natural Resources Element of the San Bernardino County General Plan contains a number of policies to mitigate impacts to cultural resources. Generally, these policies require cultural resource field surveys with all project submittals; the preparation of cultural resource overlays for all existing Planning Areas not covered by an overlay map; preliminary cultural resource reviews by the Archaeological Information Center; the cataloging of artifacts discovered as a result of a cultural resource investigation; and notification of the Native American Heritage Commission if projects require the excavation of Native American archaeological sites. The Multipurpose Open Space Element of the Riverside County General Plan also contains relevant policies that would mitigate impacts to cultural resources. The Riverside County General Plan Draft Program EIR identifies additional mitigation measures including compliance with State Health and Safety Code Section 7050.5 that requires disturbance of an area to cease where human remains have been encountered until the Riverside County Coroner has made a determination of the origin and disposition; avoidance of cultural resources where possible, where avoidance of cultural resources is not possible, the planting of deterrent plant species such as prickly pear cactus shall be completed to minimize public availability to the site; and additional measures if avoidance and/or preservation of cultural resources is not possible, such as having a participant-observer present from</p> |

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| | <p>the appropriate Indian Band or Tribe during archaeological testing or excavation of a project site.</p> <p>Residual impacts: significant cumulative impacts to cultural resources could still occur given the potentially large amount of ground disturbance related to growth and development.</p> |
| <p>Hazardous Materials and Groundwater Contamination</p> | |
| <p>Cumulative Impact HAZ-1 The Project in combination with related projects could create a significant hazard to the environment through the routine transport, use, and disposal of hazardous material and waste used during grading and construction. Such hazards could occur through upset and accident conditions involving the cumulative release of construction equipment-related hazardous materials into the environment, resulting in significant impacts.</p> | <p>Project-specific MM HAZ-1, MM HAZ-2 and MMHAZ-3 would reduce Project impacts due to hazardous spills. Because other projects would be subject to environmental compliance regulations, it is anticipated that related projects would implement mitigation measures similar to the Project making the residual impacts less than significant.</p> |
| <p>Cumulative Impact HAZ-2 Implementation of the Project and related projects may cause perchlorate, TCE, and PCE plumes to affect wells that would not be affected under No Project conditions. Additionally, operations of the Project and related projects may expand the footprint of the perchlorate plume. This is a significant impact.</p> | <p>Mitigation measure: MM-HAZ-4: Residual cumulative impacts would be significant and unavoidable.</p> |
| <p>Cumulative Impact HAZ-3 The Project and related projects would have significant indirect effects related to growth and development in the service areas.</p> | <p>Mitigation measure MM Cumulative HAZ-1. The San Bernardino County General Plan includes policies to reduce impacts related to hazardous materials. Specifically, the Hazardous Waste/Materials section of the Man-made Hazards Element includes policies HW-1 through HW-26. In general, these measures establish an effective and expeditious permitting process for siting hazardous waste facilities that includes extensive public participation; ensures the protection of public health and safety when siting needed hazardous waste facilities; develops uniform set of criteria for the siting of hazardous waste facilities in the County, including a requirement that facilitates the siting only in areas with a zoning overlay of Specified Hazardous Waste Facility; and ensures</p> |

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| | <p>coordination among agencies and County departments in the review of all hazardous waste applications within the County.</p> |
| <p>Surface Water Hydrology and Water Quality</p> | |
| <p>Cumulative Impact SW-1 Construction of the Project, in combination with other identified activities, could result in substantial additional sources of erosion, sedimentation, and turbidity for runoff entering the Santa Ana River, a significant impact.</p> | <p>Implementation of MM-GEO-1 would reduce construction related impacts to erosion and water quality in the Santa Ana Construction Area. MM-GEO-1 requires a sedimentation and erosion control plan and a Storm Water Pollution Prevention Plan is prepared before construction. Implementation of the mitigation measures will minimize impacts to the Santa Ana River Construction Area to a less than significant level.</p> |
| <p>Cumulative Impact SW-4 Use of Seven Oaks Reservoir for seasonal water conservation storage under the Project and temporary water storage per the Biological Opinion could substantially degrade water quality as a result of impoundment of flows. This would be a significant impact.</p> | <p>Project-specific mitigation measure, MM SW-1 would reduce the risk of anaerobic conditions of anaerobic conditions in Seven Oaks Reservoir. MM-SW-1 requires participation in a program to avoid and reverse anaerobic conditions in the reservoir.</p> |
| <p>Cumulative Impact SW-8 Combined diversions per the project and the San Bernardino Valley Water Conservation District (Conservation District) Application would significantly decrease non-storm flow from Cuttle Weir to the Mill Creek confluence.</p> | <p>This cumulative impact is not applicable because the Conservation District withdrew its Application.</p> |
| <p>Cumulative Impact SW-11 The Project and related projects would have significant indirect effects related to growth and development in the service areas.</p> | <p>MM Cumulative SW-1 The San Bernardino General Plan contains a number of policies in the Water section of the Natural Resources Element designed to coordinate and manage water resources throughout the County. However, with regard to water resources in San Bernardino County, significant unavoidable impacts would still occur. The Riverside County General Plan addresses localized flooding risks in the Safety Element of the proposed Riverside County General Plan. Additionally, the proposed Riverside County General Plan Draft Program EIR contains measures to further mitigate flooding impacts including use of FEMA documents to minimize flood hazards, prohibition by the County of the alteration of floodways and channelization where possible, and the requirement that the 10 –year</p> |

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| | <p>flood flows be contained within the tops of curbs and the 100-year flood flows within the street rights-of-way. These policies would mitigate impacts related to surface water in Riverside County.</p> <p>Residual impacts: Significant cumulative impacts to surface water resources related to water demand and generation of urban contaminants could still occur in San Bernardino County.</p> |
| <i>Groundwater Hydrology and Water Quality</i> | |
| <p>Cumulative Impact GW-3 At some wells, implementation of the Project, in combination with related projects, would increase nitrate concentrations to the point where they would exceed Water Quality Objectives (WQOs).</p> | <p>Mitigation measure: MM GW-1 Residual cumulative nitrate impacts are significant and unavoidable.</p> |
| <p>Cumulative Impact GW-4 At some wells, implementation of the Project, in combination with related projects, would increase Total Dissolved Solids (TDS) concentrations to the point where they would exceed WQOs.</p> | <p>Mitigation measure: MM GW-1 Residual cumulative TDS impacts would be significant and unavoidable.</p> |
| <p>Cumulative Impact GW-5 The Project and related projects would have significant indirect effects related to growth and development in the service areas.</p> | <p>MM Cumulative GW-1 The San Bernardino County General Plan contains a number of policies in the Water section of the Natural Resources Element designed to coordinate and manage water resources throughout the County. The Riverside County General Plan contains a number of policies in the multipurpose Open Space Element and Land Use Element designed to avoid overdraft and groundwater contamination. Residual impacts are significant unavoidable cumulative groundwater impacts would still occur in San Bernardino County,</p> |
| <i>Geology, Soils, and Mineral Resources</i> | |
| <p>Cumulative Impact GEO-1 In the Santa Ana River Construction Area, the Project, in combination with related projects, would expose structures to seismic ground shaking, ground failure and liquefaction, a significant impact.</p> <p>In the Devil Canyon Area, a significant impact related to placing structures in areas prone to unstable soil or slope</p> | <p>Santa Ana River Construction Area Mitigation measures: MM GEO-4, GEO-5, and GEO-6. Residual impacts are significant and unavoidable.</p> <p>Devil Canyon Construction Area: Mitigation measures: MM GEO-4, GEO-5, and GEO-6 Residual impacts are significant and unavoidable.</p> |

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| <p>conditions and seismically induced ground failure, also applies to the Devil Canyon Construction Area. Besides the Project, in this area the Inland Feeder will be constructed. Because of the large size of the pipelines, rupture as a result of seismic activity could result in the release of large quantities of water, indirectly causing damage to nearby structures and creating erosional gullies and substantial erosion.</p> <p>San Bernardino Basin Area Geology, soils, and mineral resources in the Muni/Western service area could be affected by the Project, Wash Plan, Master Plan, Restoration Project, Conservation District Application, Pilot Dewatering Program, Riverside-Corona Feeder, and the North Lake Area and South Lake Area Project.</p> | |
| <p>Cumulative Impact GEO-2 Project-related groundwater recharge, in combination with recharge from related projects, could result in shallow groundwater conditions and increase the area susceptible to liquefaction during certain seismic events.</p> | <p>Mitigation measure: MM GEO-7 This mitigation measure may not reduce to a level of less than significant, the elevated groundwater and liquefaction potential of all projects. Residual cumulative impacts would be significant and unavoidable.</p> |
| <p>Cumulative Impact PS-3 Change in the pattern of groundwater recharge from operations of the Project and related projects could lower average groundwater levels at wells outside the Pressure Zone, thus impairing groundwater production.</p> | <p>Mitigation measures MM PS-12 Evaluation of groundwater levels and selective groundwater spreading would reduce groundwater level changes of the Project. It is uncertain whether related projects would implement measures to avoid groundwater level impacts on production wells. Residual cumulative impacts would be significant and unavoidable.</p> |

TABLE A

Application 31165: Locations of Points of Diversion (POD) and Points of Rediversion (POR)

| By California Coordinate System of 1983, Zone 5 | Source | 40-acre subdivision of public land survey or projection thereof | Section | Township | Range | Base and Meridian |
|---|-----------------|--|---------|----------|-------|-------------------|
| POD & POR #1: Seven Oaks Dam North 1,866,500 ft. and East 6,835,000 ft. | Santa Ana River | NE ¹ / ₄ of NW ¹ / ₄ | 4 | 01S | 02W | SB |
| POD #2: North 1,882,500 ft. and East 6,859,600 ft. | Bear Creek | SE ¹ / ₄ of NE ¹ / ₄ | 19 | 01N | 01W | SB |
| POD #3: North 1,882,400 ft. and East 6,859,700 ft. | Santa Ana River | SE ¹ / ₄ of NE ¹ / ₄ | 19 | 01N | 01W | SB |
| POD #4: North 1,880,900 ft. and East 6,858,100 ft. | Breakneck Creek | NW ¹ / ₄ of SE ¹ / ₄ | 19 | 01N | 01W | SB |
| POD #5: North 1,877,700 ft. and East 6,846,200 ft. | Keller Creek | NW ¹ / ₄ of NE ¹ / ₄ | 26 | 01N | 02W | SB |
| POD #6: North 1,876,700 ft. and East 6,846,700 ft. | Santa Ana River | SW ¹ / ₄ of NE ¹ / ₄ | 26 | 01N | 02W | SB |
| POD #7: North 1,877,100 ft. and East 6,843,600 ft. | Alder Creek | NW ¹ / ₄ of NW ¹ / ₄ | 26 | 01N | 02W | SB |
| POR #8: North 1,865,800 ft. and East 6,837,100 ft. | | SE ¹ / ₄ of NE ¹ / ₄ | 4 | 01S | 02W | SB |
| POD & POR #9: North 1,864,900 ft. and East 6,835,000 ft. | Santa Ana River | SE ¹ / ₄ of NW ¹ / ₄ | 4 | 01S | 02W | SB |
| POD & POR #10: North 1,862,800 ft. and East 6,834,000 ft. | Santa Ana River | SW ¹ / ₄ of SW ¹ / ₄ | 4 | 01S | 02W | SB |

TABLE B

Application 31370: Locations of Points of Diversion (POD) and Points of Rediversion (POR)

| By California Coordinate System of 1983, Zone 5 | Source | 40-acre subdivision of public land survey or projection thereof | Section | Township | Range | Base and Meridian |
|---|------------------------|---|-----------|------------|------------|-------------------|
| POD & POR #1: Seven Oaks Dam North 1,866,500 ft. and East 6,835,000 ft. | Santa Ana River | NE¹/₄ of NW¹/₄ | 4 | 01S | 02W | SB |
| POD #2: North 1,882,500 ft. and East 6,859,600 ft. | Bear Creek | SE¹/₄ of NE¹/₄ | 19 | 01N | 01W | SB |
| POD #3: North 1,882,400 ft. and East 6,859,700 ft. | Santa Ana River | SE¹/₄ of NE¹/₄ | 19 | 01N | 01W | SB |
| POD #4: North 1,880,900 ft. and East 6,858,100 ft. | Breakneck Creek | NW¹/₄ of SE¹/₄ | 19 | 01N | 01W | SB |
| POD #5: North 1,877,700 ft. and East 6,846,200 ft. | Keller Creek | NW¹/₄ of NE¹/₄ | 26 | 01N | 02W | SB |
| POD #6: North 1,876,700 ft. and East 6,846,700 ft. | Santa Ana River | SW¹/₄ of NE¹/₄ | 26 | 01N | 02W | SB |
| POD #7: North 1,877,100 ft. and East 6,843,600 ft. | Alder Creek | NW¹/₄ of NW¹/₄ | 26 | 01N | 02W | SB |
| POR #8: North 1,865,800 ft. and East 6,837,100 ft. | | SE¹/₄ of NE¹/₄ | 4 | 01S | 02W | SB |
| POD & POR #9: North 1,864,900 ft. and East 6,835,000 ft. | Santa Ana River | SE¹/₄ of NW¹/₄ | 4 | 01S | 02W | SB |
| POD & POR #10: North 1,864,900 ft. and East 6,834,600 ft. | Santa Ana River | SE¹/₄ of NW¹/₄ | 4 | 01S | 02W | SB |
| POD & POR #11: North 1,863,500 ft. and East 6,834,000 ft. | Santa Ana River | NW¹/₄ of SW¹/₄ | 4 | 01S | 02W | SB |
| POD & POR #12: North 1,862,800 ft. and East 6,834,000 ft. | Santa Ana River | SW¹/₄ of SW¹/₄ | 4 | 01S | 02W | SB |

TABLE B (continued)

Application 31370: Locations of Points of Rediversion (POR)

| By California Coordinate System of 1983, Zone 6 | 40-acre subdivision of public land survey or projection thereof | Section | Township | Range | Base and Meridian |
|--|---|-----------|------------|------------|-------------------|
| POR #13: Lake Mathews Dam North 2,256,420 ft. and East 6,198,550 ft. | SE¹/₄ of NW¹/₄ | 12 | 04S | 06W | SB |
| POR #14: Diamond Valley Lake Dam North 2,188,680 ft. and East 6,313,210 ft. | NE¹/₄ of NW¹/₄ | 11 | 06S | 02W | SB |
| POR #15 Lake Skinner Dam North 2,157,870 ft. and East 6,311,180 ft. | SW¹/₄ of SE¹/₄ | 3 | 07S | 02W | SB |

Appendix H

City of Riverside's Recycled Water Rates

SCHEDULE WA-10

RECYCLED WATER SERVICE

APPLICABILITY:

Applicable to all retail recycled (reclaimed, non-potable) water service for irrigation, commercial or industrial use.

TERRITORY:

City of Riverside and contiguous area.

RATES:

A. Basic Area (Inside City)

| <u>Quantity Rates</u> (to be added to Customer Charge) | <u>Per 100 Cubic Feet</u> |
|--|-------------------------------|
| Existing Customers Commodity Charge per month | \$0.30 |
| Future Customers Commodity Charge | Contract Rate |
| <u>Customer Charge</u> | <u>Per Meter, Per Month</u> |
| 1. Existing Customers | |
| All meter sizes through | |
| 4-inch | \$178.93 |
| 6-inch | 357.87 |
| 8-inch | 572.59 |
| 10-inch | 825.24 |
| 2. Future Customers | |
| All meter sizes | Contract Rate |

B. Surcharge Area Outside City

Charges shall be the amount computed at the Quantity Rates for Future Customers and the Customer Charge set forth in the Basic Area of this schedule multiplied by 1.5.

SPECIAL CONDITIONS

1. Obligation to Supply Recycled Water

The Water Utility will provide recycled water service under this schedule only when and where such recycled water is available and can be supplied at a reasonable cost in accordance with Water Rule 18.

In determining reasonable cost, the Water Utility may consider all relevant factors, including but not limited to, the present and projected costs of supplying recycled water. Grants or subsidies may be used to reduce total development costs.

2. Continuity of Service and Water Quality

There is no guarantee of continuous service nor uniform quality of recycled water; therefore, the Customer must have a separate service connection for potable water.

3. Applicability of Rules and Regulations

The applicability and provision of recycled water service under this schedule is subject to rules and regulations adopted from time to time by the Board of Public Utilities, including without limitation Water Rule 18 (Recycled Water Rules).

4. Water Conservation and Reclamation Surcharge

The rates and charges above are subject to a surcharge (Water Conservation and Reclamation Surcharge) as adopted via City Council Resolution No. 20695 on May 25, 2004 and such surcharge as is in effect from time to time. The Water Conservation and Reclamation Surcharge will be applied to the Customer's total water usage charge including without limitation the quantity rates, customer and minimum charge for the applicable billing period.

5. Definitions

a. **Contract Rate.** The Contract Rate shall mean the Commodity Charge for Recycled Water as established under individual recycled water contracts with Future Customers approved by the Board of Public Utilities and approved by the City Council. The Contract Rate shall be calculated to provide for the Utilities recovery of all City funded costs associated with the production, additional treatment,

transmission and distribution of recycled water to individual Future Customers, and the general fund transfer.

b. Existing Customers. Existing Customers shall mean those Customers of the Water Utility with a recycle water connection(s) to the City's Off-Site Facilities (as defined in Water Rule 18) and receiving water from the City, as of June 1, 2004.

c. Future Customers. All customers, except for Existing Customers, requesting recycled water from the Water Utility.

ENERGY COST ADJUSTMENT FOR PUMPING WATER:

The Quantity Rates shall be subject to an energy cost adjustment relating to increases and decreases in the cost of electric power for pumping water. This energy cost adjustment shall apply to each one hundred cubic feet (CCF) of sales to which Quantity Rates apply. Determination of the adjustment factor shall be made at the beginning of each quarter, with the initial adjustment beginning February 1, 1983. The energy cost adjustment shall be calculated by dividing the CCF of metered water sold in each quarter into the total dollar amount of fuel cost adjustments plus any base rate increases imposed by power suppliers for pumping water during that quarter:

- A. Fuel cost adjustment charges by Southern California Edison Company.
- B. Fuel cost surcharge charges by City of Riverside.
- C. Base rate increase charges by Southern California Edison Company.*
- D. Base rate increase charges by City of Riverside. *

$$\frac{\$(A+B+C+D)}{\text{CCF (Metered Sales)}} = \$.0000 \text{ per CCF}$$

The resultant shall be the energy cost adjustment factor for pumping water and shall be expressed in terms of cents per CCF carried out to the nearest \$0.0001. This factor shall be divided by 0.885 to allow for the 11.5% of gross revenue payable to the City General Fund. The resultant shall then become the energy cost adjustment to be multiplied by all CCF increments reported in billings to Customers. The resultant amount in each case, expressed to the nearest \$.01, shall constitute the adjustment to be added to the Customer's bill.

* (Over base rates in effect February 1, 1983)

Appendix I

City of Riverside's Recycled Water Rules

City of Riverside Public Utilities Department Water Rule #18

Recycled Water Rules

A. INTRODUCTION

1. Goal

The Goal of the City of Riverside is to encourage the use of recycled water in new and existing development. Recycled water will be used for land irrigation, impoundments, and commercial and industrial purposes where said use is consistent with regulatory requirements, the preservation of public health and welfare, and the environment. Recycled water will be utilized whenever and wherever financially and technically feasible, when the City can deliver recycled water at a price less than or equal to the cost of potable water, or when deemed in the best interest of the City.

These Recycled Water Rules (Rules) have been adopted to promote the reuse of water resources and to provide for the maximum public benefit from the use of the City's recycled water. Use of recycled water is necessary in order to minimize purchase of expensive imported potable water and to conserve high quality groundwater. Recycled water shall be used in accordance with the standards of treatment and water quality requirements set forth in the California Code of Regulations, Titles 17 and 22, to protect the public health.

2. Scope

The provisions of these Rules shall govern the requirements for recycled water use, the commencement and termination of recycled water service, and the conditions and regulations of such service within the City's jurisdiction. These Rules shall be interpreted in accordance with the purpose, policy and intent of these Rules and the definitions as set forth in Section 2 herein. The provisions of these Rules shall apply to the use of all recycled water delivered by the City. To comply with applicable Federal, State, and local regulatory agency requirements, provisions are made in these Rules for the regulation of recycled water use.

These Rules pertain only to the transmission and distribution of effluent from the Riverside Water Quality Control Plant. The PWD retains full control and responsibility for operating the Riverside Water Quality Control Plant and for producing effluent which

meets the Regional Water Quality Control Board and State Department of Health Services requirements.

B. DEFINITIONS

1. Definitions

Unless the context specifically indicates otherwise, the meaning of the terms used in these Rules shall be as follows:

Agricultural Use - Recycled water used for the production of crops and/or livestock and the preparation of these products for market.

Air-gap Separation - A physical separation of at least double the diameter of the supply pipe between the free flowing discharge end of a potable water supply pipeline and an open or non-pressure receiving vessel, measured vertically above the overflow rim of the vessel. In no case shall the air gap be less than one inch.

Applicant - Any person, group, firm, partnership, corporation, association, or agency who applies for recycled water service under the terms of these Rules. An approved applicant becomes a user.

Application Rate - The rate at which recycled water is applied to a use area.

Approved Use Area - A site, with well-defined boundaries, designated in a user permit issued by the PUD to receive recycled water for an approved use and acknowledged by any and all applicable regulatory agencies.

As-Built Drawings - Record drawings that depict the completed recycled water service facilities as constructed or modified.

Automatic System - Automatic controllers, timers, valves, and associated equipment used to program irrigation systems for the application of recycled water.

Backflow - A flow condition, caused by a differential in pressure, that causes the flow of water or other liquids, gases, mixtures or substances into the distributing pipes of a water supply from any source or sources other than an approved water supply source. Backsiphoning is one cause of backflow. Backpressure is another cause.

Backup Facility Capacity Charge - A charge for water supply facilities including but not limited to production, transmission and storage facilities.

Board - The City of Riverside Board of Public Utilities.

City - The City of Riverside or designated employees of Public Utilities Department or Public Works Department as contained in the Interdepartmental Agreement.

Commercial Use - Any building for office or commercial uses with water requirements which include, but are not limited to, landscape irrigation, toilets, urinals and decorative fountains.

Commodity Charge - A charge imposed by the PUD for all recycled water used, whether such water use is estimated or is actually metered.

Cross-Connection - Any unprotected and/or unapproved connection or potential connection between any part of a water system used or intended to supply water for drinking purposes and any source or system containing water or substance that is not or cannot be approved as safe, wholesome and potable for human consumption.

Customer Service Valve - Valve at the terminus of the service connection, after the meter, which is the point of connection with the user's onsite facilities and may be operated by the user, per standard drawing detail.

Direct Beneficial Use - The use of recycled water which has been transported from the point of treatment to the point of use without an intervening discharge to waters of the State.

Distribution System Fee - A charge for facilities which comprise the distribution grid system including recycled water mains, valves and appurtenances which have been, or will be installed by or for the PUD.

Project Report - A report submitted detailing recycled water use area, plans, specifications and methods to be used by the Program Specialist for assuring that installation and operation of the system will not result in cross-connections.

Hose Bib - An outdoor faucet or similar device to which a common garden hose can be readily attached.

Industrial Process Water - Water for any industrial facility with requirements which include, but are not limited to rinsing, washing, cooling, circulation or construction.

Inspector - Any person authorized by the City to perform inspection of either onsite or offsite facilities prior to construction, during construction and during operation.

Interdepartmental Agreement - An agreement between the Department of Public Utilities and Department of Public Works outlining the responsibilities of each department pertaining to recycled water.

Irrigation Use - An approved use of reclaimed (or recycled) water for landscape irrigation as defined for reclaimed water under Title 22, Division 4, Chapter 3, Article 4 of the California Code of Regulations.

Landscape Impoundment - A body of water containing (all or part) recycled water which is used for aesthetic or irrigation purposes and which is not intended for public contact or ingestion.

Non-Potable Water - Recycled wastewater and groundwater not meeting Federal, State and local drinking water standards.

Non-Potable Water Policy - Policy that covers not only recycled water but also groundwater that do not meet Federal, State or local drinking water standards.

NPDES Permit - National Pollutant Discharge Elimination System permit granted to the Riverside Water Quality Control Plant by the California Regional Water Quality Control Board, Santa Ana Region.

Offsite Facilities - Facilities under the control of the PUD, including recycled water pipelines, reservoirs, valves, connections, and other appurtenances beginning at the PUD service connection meter at the RWQCP and ending at the point of connection with the customer's facilities.

Onsite Facilities - Facilities under the control of the applicant, owner or customer including but not limited to residential or commercial landscape irrigation systems, and agricultural irrigation systems, beginning at the water service meter or meters.

Owner - Any holder of legal title, contract purchaser, or lessee under a lease with an unexpired term of more than one (1) year, of property for which recycled water service has been requested or established.

Potable Water - Water which conforms to the latest Federal, State and local drinking water standards.

Program Specialist - The designated individual(s) possessing current certification issued by the California-Nevada American Water Works Association for a Cross-Connection Control Program Specialist - Grade II.

PUD - shall mean the Public Utilities Department of the City of Riverside.

PWD - shall mean the Public Works Department of the City of Riverside.

Quick Coupler Connection - An outdoor piping outlet to which a special piping attachment can be added to allow a common garden hose attachment to be used.

Reclaimed Water - As defined in Title 22, Division 4, Chapter 3, Environmental Health of the California Code of Regulations (Code) means water which, as a result of treatment of domestic/industrial wastewater is suitable for direct beneficial use or a controlled use that otherwise would not occur; such treatment of wastewater having been accomplished in accordance with the criteria for assurance of reliability, as set forth in the Code.

Recycled Water - Substitute term for reclaimed water as defined in Section 13050 of the California Water Code.

Recycled Water User Permit - A permit issued by the PUD to a recycled water service applicant after the satisfactory completion of the service application procedures set forth in these Rules. This permit constitutes a service agreement that legally binds the user to all conditions in these Rules and to any and all Regulatory Agency requirements.

Recreational Impoundment - A body of reclaimed water used for recreational activities including, but not limited to, fishing, boating and/or swimming. Allowable uses will depend on treatment level of the reclaimed water.

Reduced Pressure Principle Assembly - An assembly incorporating two or more check valves and an automatically operating differential relief valve located between the two check valves, a tightly closing shut-off valve on each side of the check valve assembly, and equipped with necessary test cocks for testing.

Regional Board - The California Regional Water Quality Control Board, Santa Ana Region.

Regulatory Agencies - Those public agencies legally constituted to protect the public health and water quality, such as the Federal EPA, California Department of Health Services, California Regional Water Quality Control Board, Riverside County Health Department, Department of Fish and Game, U.S. Army Corps of Engineers, and Riverside County Flood Control and Water Conservation District.

Riverside Water Quality Control Plant (RWQCP) - City of Riverside Wastewater Treatment Plant located at 5950 Acorn Street.

Security Deposit - Monies required to be deposited with the PUD for the purpose of guaranteeing payment of monthly bills rendered for recycled water service.

Service - The furnishing of recycled water to a user.

Service Connection Fee - A charge imposed by and paid to the PUD to cover the installation costs of recycled water facilities to be paid for by the user/applicant as a condition prior to service.

Shall - means mandatory.

Supervisor - The Onsite Recycled Water Supervisor who shall be a qualified person designated by a recycled water user and approved by the PUD. This person shall be knowledgeable in the construction and operation of recycled water and irrigation systems and in the application of the Federal, State and local guidelines, criteria, standards, rules and regulations governing the use of recycled water.

Tertiary Effluent - secondary effluent which has been disinfected and filtered for purposes of removing a high percentage of pathogens and suspended solids. Allowable uses include body contact and irrigation of human food crops.

Title 17 and Title 22 - Title 17 and Title 22 of the California Code of Regulations.

User - Any person, persons or firm (includes any public utility, municipality or other public body or institution) issued a recycled water user permit by the PUD. The user and owner may be one and the same.

Violation - Noncompliance with any condition or conditions of these regulations and/or a user permit by any person, action or occurrence, whether wilfully or by accident.

Water Utility - The City of Riverside Public Utilities Department, Water Division.

C. GENERAL PROVISIONS

1. Administration

Except as otherwise provided herein, the City shall administer, implement and enforce the provisions of these Rules. Any powers granted or duties imposed upon the City may be delegated by the City to persons acting in the beneficial interest of or in the employ of the City.

2. Notice

Unless otherwise provided herein, any notice required to be given by the City under these Rules shall be in writing and served in person or by first class, registered or certified mail. Notice shall be deemed to have been given at the time of deposit, postage prepaid, in a facility regularly serviced by the United States Postal Service.

3. Confidentiality

Information and data on a user obtained from reports, questionnaires, permit applications, permits, sample data, and monitoring programs and from inspections shall be available to the public or other governmental agency without restriction unless the user specifically requests and is able to demonstrate to the satisfaction of the City that the release of such information would divulge information, processes or method of productions entitled to protection as trade secrets of the user.

4. Severability

If any section, subsection, sentence, clause or phrase of these Rules is for any reason held to be invalid or unconstitutional, such decision shall not affect the remaining portions of these Rules. The Board hereby declares that it would have approved said regulations by

section, subsection, sentence, clause or phrase thereof irrespective of the fact that any one or more sections, subsections, sentences, clauses or phrases be declared invalid or unconstitutional.

5. Amendments

These Rules may be amended by the Board at any regular or special meeting for cause determined by the Board or PUD staff and without the approval of any user and will be administered as such. Insofar as these Rules support portions of Titles 17 and 22, any amendments to those documents are also immediately incorporated in these Rules.

6. Service Area

The regulations set forth herein pertain to recycled water service to lands and/or improvements lying within the legal boundaries of the Water Service Area of the City, unless otherwise stated.

7. Protection of Public Health

The City reserves the right to take any action with respect to the operation of the recycled water system and at such time as it deems proper to safeguard public health.

8. Liability

The City assumes no responsibility for the maintenance and operation of any onsite recycled water system beyond that which it retains with respect to violations of the regulatory agency requirements. The owner assumes all liability and responsibility of every other kind to the end that the City shall be kept whole and blameless at all times in any claim resulting from matters involving quantities, quality, time or occasion of delivery, or any other phase of the maintenance, operation and service of the owner's onsite facilities.

9. Time Limits

Any time provided in any written notice or any provision of these Rules may be extended only by a written directive of the PUD and upon showing of good cause.

10. Damage to City's Equipment or Facilities

No person shall enter, break, damage, destroy, uncover, deface or tamper with any temporary or permanent structure, equipment or appurtenance which is part of the City's recycled water, sewerage or storm drain system.

Any recycled water user who causes damage to the City's facilities, detrimental effects on treatment processes or any other damages including the imposition of fines by the State, Federal or other regulatory agencies on the City, shall be liable to the City for all damage

occasioned thereby including, without limitation, administrative expenses. An administrative fee of 90 percent of City's costs shall be added to these charges and shall be payable within 30 days of invoicing by the City.

D. COMMENCEMENT OF SERVICES

1. General

No person shall make connection to the recycled water facilities of the PUD without a recycled water user permit issued by the PUD.

2. Application

Persons desiring to obtain recycled water service shall make application for a recycled water user permit by providing such information as the PUD deems appropriate to evaluate the request including, but not limited to:

a. Name, address and contact phone number for:

1. Applicant
2. Owner of property to be served
3. Onsite recycled water supervisor
4. System operator

b. Legal description of property to be served.

c. Map showing use area and location.

d. Onsite usage plan.

e. Scaled drawing delineating the subject service area, identifying location and size of all service connecting and delineating areas in which recycled water service is to be specifically excluded.

f. Anticipated use and application rate.

g. Signed application for recycled water user permit/waste discharge requirements.

Persons required to obtain recycled water service shall also make application for a recycled water user permit following the same procedure, within two weeks after notification by the City.

3. Application Procedure

- a. An application for a permit shall be made in writing, signed by the applicant, owner, and customer, if they are not one and the same.
- b. By signing the application, the owner/applicant will agree to comply with the requirements of any and all applicable Federal, State and local statutes, ordinances, regulations and other requirements. Current requirements will be available at the PUD office upon request.
- c. Upon receipt of an application, the PUD or its designated representative will review the application and may prescribe requirements in writing to the applicant as to the design of the facilities, the manner of construction, the manner of connection, the method of operation, the financial responsibility and the conditions of service.

4. Permit/Agreement

- a. The PUD shall issue a recycled water user permit upon review of the Project Report, approval of an application for recycled water service and completion of a recycled service agreement. The permit shall entitle the applicant to receive recycled water service upon the terms and conditions of these Rules.
- b. The permit/agreement shall include the following:
 1. Name and address of applicant;
 2. A drawing of the proposed system showing the location and size of all valves, pipes, outlets and appurtenances;
 3. A statement that no changes in the proposed system will be undertaken without application and approval of an amended permit;
 4. A statement recognizing potential penalties for violation of City rules and regulations; and
 5. Outline of the rate provisions, terms and conditions of service.
- c. A recycled water user permit will remain in effect unless:
 1. A change of ownership occurs;
 2. A change of user occurs;
 3. Use of recycled water changes; or
 4. A use violation has occurred which results in a service turn off.

5. Project Report

The applicant shall submit a report dealing with specific aspects of the project:

- a. Detailed description of the intended area of use describing the following:
 - 1.Type, location and number of facilities within the project area intending to use the dual plumbed systems.
 - 2.The estimated daily average number of people to be served by each facility.
 - 3.The specific boundaries of the area to be served including a scaled map showing the location of each facility intending to use the dual plumbed systems.
 - 4.The individual(s) responsible for the operation of dual systems at each facility.
 - 5.The specific use for recycled water at each facility.
- b. Plans and specifications describing the following:
 - 1.Proposed piping systems to be used or installed.
 - 2.Piping locations of both the recycled and potable systems.
 - 3.Type and location of each outlet or plumbing fixture that will be accessible to the public.
 - 4.The assemblies and methods to be used at each service connection to prevent backflow of recycled water into the offsite water distribution system.
- c. A description of preventing the installation of a cross-connection.
 - 1.A method to be used by PUD to assure that the installation and operation of the dual plumbing system will not result in cross-connections between the recycled water system and the potable water system.
 - 2.A description of the testing method to be used by the Program Specialist to verify the lack of cross-connections every four years.

A new application and Project Report must be submitted to reinstate a permit canceled due to any of the above criteria.

E. FEES / DEPOSITS / RATES

1. Fees and Charges

The applicant/owner shall be responsible for the installation of onsite facilities and shall reimburse the PUD for actual costs of labor, material and equipment associated with the service connection as prescribed and designed by the PUD, and necessary offsite and onsite inspection services, and plan check fees as prescribed in the City's domestic Water Rules.

Annual Inspection and Shutdown Verification Testing Fees - Annual inspection and shutdown verification tests will be performed by the PUD for a fee associated with the actual cost of providing the service, or the customer may employ the services of a Cross-Connection Control Program Specialist possessing a valid certification from the California-Nevada American Water Works Association and acceptable to the PUD.

Commodity Charge - The rate for recycled water service shall be determined for each separate recycled water application/project based on the actual cost of service including any necessary offsite or onsite capital facilities financed by the PUD, appropriate cost of capital charges associated with Operations and Maintenance costs, administration and general expense, and fees/charges from other regulatory agencies.

2. Security Deposit

The PUD may require that an applicant, owner or user post a security deposit. Such amount shall not be less than the estimated cost of recycled water service for a two-month period, or such other amount determined by the PUD. Upon termination of the service, the security deposit will be applied to any outstanding charges on the account. Any resulting credit balance shall be refunded to the user.

F. CONDITIONS OF SERVICE

1. General

No person shall use or make a connection to the City's recycled water facilities without first obtaining a Recycled Water User Permit. Such permit shall be in addition to any and all permits and conditions required by Federal, State, or local regulatory agencies.

Service will be provided within the City's Water Service Area which is contiguous to existing recycled water distribution lines for the uses specified herein. Service will be provided to property not contiguous to existing distribution lines if the distribution line is extended to the applicant's property as provided below.

2. Service Connection

- a. The PUD reserves the right to determine the size of the service line(s), the service location and conditions of backflow prevention assembly(s) for potable water service protection, in accordance herewith, and any and all other appurtenances to the service. The service line(s) shall be installed to a curb line or within a public right of way, abutting upon a public street, highway, alley, easement, lane or road (other than a freeway) in which are installed recycled water mains of the City.
- b. The PUD reserves the right to limit the area of land to be supplied by one service connection to one ownership. A service connection shall not be used to supply adjoining property of a different owner unless approved by the PUD.
- c. All recycled water use shall be metered, and all recycled water used on any premises where a recycled water meter is installed must pass through said meter. Users shall be held responsible and charged for all recycled water passing through the meters, unless otherwise specified.
- d. When property provided with a service connection is subdivided, such connection shall be considered as serving the lot or parcel of land that it directly or first enters. Additional mains and/or recycled water service lines will be required for all subdivided areas in accordance with these Rules.

3. Limitations of Service

- a. The City shall not be liable for any damage by recycled water, or otherwise resulting from inadequate capacity, defective plumbing, broken or faulty services, or recycled water mains; or any conditions beyond the control of the City. All applicants for recycled water service shall accept such conditions of pressure, as provided by the distribution system at the location of the service connection and to hold the City harmless from all damage arising from low pressure or high pressure conditions, or from interruptions of service.
- b. The City is not responsible for any condition of the recycled water itself, or any substance that may be mixed with or be in recycled water as delivered to any user, except as required by Title 22.
- c. All recycled water service will be on an interruptible basis, depending on the quantity and quality of the recycled water available, in accordance with the terms of the individual service agreement between the City and the user.

4. Relocation of Recycled Water Service Line

Should a service installed pursuant to the request of the applicant, owner, or customer be of the wrong size or installed at a wrong location or depth, the cost of relocation or removal shall be paid by the applicant, owner or customer. All services provided prior to final street improvements shall be considered temporary and the costs for all repairs or

changes required to be performed by the PUD shall be paid by the applicant, owner or customer.

5. Scheduling Recycled Water

The City reserves the right to control and schedule the use of recycled water if, in the opinion of the City, scheduling is necessary for purposes including, but not limited to, the maintenance of an acceptable working pressure in the recycled water system and providing for reasonable safeguards in relation to public health.

6. Emergency Connections to Potable Water System

If, in the opinion of the City, an emergency exists whereby recycled water is not available, the Program Specialist may approve a temporary supply from the potable water system, delivered through an approved air-gap separation to the recycled water piping which complies with the requirements of Sections 7602(a) and 7603(a) of Title 17.

G. SERVICE CONTINUATION

1. General

All offsite recycled water facilities and all onsite recycled water facilities shall be designed and constructed according to the requirements, conditions, and standards as adopted and revised by the Board from time to time, which documents are open for inspection in the UD office, and by this reference are incorporated herein.

2. Offsite Recycled Water Services

Operation and surveillance of all of the City's offsite recycled water system facilities, including, but not limited to recycled water pipelines, reservoirs, valves, connections, supply interties, and other appurtenances beginning at the PUD service connection meter at the RWQCP and ending at the point of connection with the customer's facilities, shall be under the management and control of the PUD. No other persons except authorized employees of the PUD shall have any right to enter upon, inspect, operate, adjust, change, alter, move, or relocate any portion of the foregoing, or any of the City's property. If such should occur, all charges and penalties shall be applicable and collected. Such action may also be in violation of any and all applicable Federal, State, and local statutes, ordinances, regulations, and other requirements and subject to a service turn-off.

3. Onsite Recycled Water Services

a. The operation and maintenance of onsite recycled water distribution facilities are the responsibility of the applicant, owner, or customer.

b. The operation and maintenance of all onsite recycled water system facilities, including but not limited to landscape irrigation systems, agricultural irrigation systems,

systems utilized in relation to use of recycled water for industrial process or construction purposes, or recreational impoundment systems using the City's recycled water, shall be under the management of a Supervisor designated by the applicant, owner, or customer and approved by the PUD. Designated duties of the Supervisor include the responsibility for the cross-connection control program on the water user's premises. This Supervisor shall review the installation and revision of pipelines and equipment to assure that there are no cross-connections. The PUD may, from time to time, require that a Supervisor obtain instruction in the use of recycled water, such instruction being provided by or approved by the PUD. The Supervisor shall report to the City and local health department any incident of backflow of recycled water into the potable water system within 24 hours of the incident.

c. The PUD shall monitor and inspect the onsite recycled water system, and for these purposes shall have reasonable access. Where necessary, keys and/or combinations shall be issued to the PUD to provide such access.

d. The applicant, owner, or customer shall have the following responsibilities in relation to operation of onsite facilities:

1. To make sure that all operations personnel are trained and familiarized with the use of recycled water.

2. To furnish their operations personnel with maintenance instructions, irrigation schedules, and as-built drawings to ensure proper operation in accordance with the onsite facilities design and these Rules.

3. To prepare and submit to the City one (1) set of as-built drawings on mylar.

4. To notify the PUD of any and all updates or proposed changes, modifications, or additions to the onsite facilities, which changes shall be approved by the PUD and shall be designed and constructed according to the requirements, conditions, and standards set in these Rules. Changes, modifications or additions must be submitted to the PUD for plan check and approval prior to construction. The construction shall be inspected by the PUD, and revised as-built drawings and controller charts shall be approved by the PUD.

5. To operate and control the system in order to prevent direct human consumption of recycled water and to control and limit runoff. Operation and control measures of specific prohibitions shall include but not be limited to the following:

(a) Runoff Conditions - Conditions that directly or indirectly cause a runoff outside of the approved use area, whether by design, construction practice, or system operation, are strictly prohibited. Sprinkler head alignment shall not allow spray to be directed outside the boundaries of the approved use area.

(b) Windblown Spray Conditions - Conditions that directly or indirectly permit windblown spray to pass outside of the approved use area, whether by design, construction practice, or system operations, are strictly prohibited.

(c) Unapproved Uses - Use of recycled water for any purposes other than those explicitly approved in the currently effective user permit issued by the PUD and without the prior knowledge and approval of the appropriate regulatory agencies is strictly prohibited.

(d) Cross-Connections - Cross-connections, as defined herein and by Title 17, resulting from the use of recycled water or from the physical presence of recycled water service, whether by design, construction practice, or system operation, are strictly prohibited. A detected cross-connection will result in an immediate termination of both the potable water service and the recycled water service until the cross-connection is located and eliminated to the satisfaction of the PUD Program Specialist.

(e) Hose Bibs - Use or installation of hose bibs on any onsite irrigation system presently operating or designated to operate with recycled water, regardless of the hose bib construction or identification, is strictly prohibited.

(f) Unprotected Public Facilities - Facilities that may be used by the General Public including, but not limited to, eating surfaces and playground equipment, and located within the approved use area designated by the user permit, shall be protected by an appropriate separation from contact with recycled water, whether by windblown spray or by direct application through irrigation or other approved use. Lack of such protection, whether by design, construction practice, or system operation, is strictly prohibited.

(g) Unprotected Drinking Fountains - Any and all drinking water facilities located onsite shall be protected from direct or windblown recycled water spray.

(h) Fire Hydrants - Use or installation of fire hydrants on any onsite system that is in current use or is designed to operate with recycled water, regardless of the fire hydrant construction or identification, is strictly prohibited.

(i) Ponding - Irrigation with recycled water should be controlled to prevent ponding and runoff unless approved by the City, otherwise it is strictly prohibited.

(j) Periods of Operation - The operation of the irrigation system shall be during periods of minimal use of the approved use area by the general public. Such periods of operation shall remain within any general period of recycled water irrigation operation specified by the City. Irrigation should be restricted to times when the area has least human contact.

6.To ensure that the recycled water facilities remain in compliance with these Rules.

7. To comply with any and all applicable Federal, State, and local statutes, ordinances, regulations, contracts, rules and regulations, and all requirements prescribed by the City. In the event of violation, all charges and penalties shall be applied and collected.

4. Meter Testing

If a recycled water meter fails to register during any period, or is known to register inaccurately, the customer shall be charged with an average daily consumption at the same season shown by the reading of the meter when in use and registering accurately. Any customer may demand that the meter through which recycled water is being furnished be examined and tested by the PUD for the purpose of ascertaining whether or not it is correctly registering the amount of recycled water being delivered through it. Such demand shall be in writing and shall be accompanied by a deposit equal to the potable bi-monthly service fee for a same sized meter.

Upon receipt of such demand and deposit, the PUD will have the meter examined and tested and, if upon such test the meter shall be found to register over two percent (2%) more water than actually passes through it, the meter shall be properly adjusted or another meter substituted therefor, the deposit shall be returned, and the recycled water bill for the current month will be adjusted proportionately. If the meter should be found to register not more than two percent (2%) more water than actually passes through it, the deposit shall be retained by the PUD to offset the expense of making the test.

5. Records

The user shall maintain as-built drawings of the use area showing all buildings, domestic and recycled water facilities, the sewage collection system, etc. Drawings shall be updated as modifications are made. The user shall keep a copy of the drawings on site and present them to the City as needed.

H. PROTECTIVE MEASURES

1. General

Recycled water may be used for any purpose permitted by Federal, State and local regulations provided that all such use is in accordance with these Rules and the City's NPDES Permit (Regional Board Order No. 95-18-NPDES-CA-0105350) and provided further that:

- a. The design and construction of the recycled water system shall be approved by the PUD.
- b. The applicant shall execute a service agreement to receive such water and use it only for approved purposes.

c. Violation of permit conditions will result in a notice of violation, fines and/or termination of service, depending on the severity of violation.

2. System Design Requirements

a. Recycled water distribution and transmission system piping shall comply with the design requirements contained in the California-Nevada Section AWWA publication "Guidelines for Distribution of Recycled Water" and AWWA publication "Dual Water Systems (M-24)."

1. All piping, valve boxes, valves and outlets shall be marked to differentiate recycled water from domestic or other water using purple piping, Pantone #512, or purple labeling.

2. All recycled water controllers and valves shall be appropriately tagged to warn the public and employees that the water is not safe for drinking.

b. All recycled water valves, outlets, quick couplers, and sprinkler heads shall be of a type or secured in a manner that only permits operation by personnel authorized by the user.

c. Notification shall be provided to inform the public that recycled water is being used. The notification shall include the posting of conspicuous warning signs with proper wording of sufficient size to be clearly read.

d. An air-gap separation or reduced pressure principle device as determined by the Program Specialist shall be provided at all domestic water service connections to properties having a recycled water service connection.

e. There shall be no connection between the potable water supply and piping containing recycled water.

f. Adequate measures shall be taken to prevent the breeding of insects and other vectors of health significance, and the creation of odors, slimes or unsightly deposits.

g. There shall be at least a 10-foot horizontal and 1-foot vertical separation (with the domestic water above the recycled water pipeline) between all pipelines transporting recycled water and those transporting water supplied from the domestic system.

h. In special cases where a 10-foot horizontal separation is not practical, the domestic water piping shall be encased with concrete using a 2-sack sand-cement slurry. Concrete dimension shall be a minimum of 12" above and on each side of the pipeline. Approved 3" width marking tape, labeled "DOMESTIC WATER" shall be placed the entire length of the piping on top of the concrete encasement and at a depth of 6" below the finished grade centered on the pipeline.

3. System Layout

The irrigation system shall be designed to prevent discharge onto certain areas that are not approved for use. Part-circle sprinklers shall be used adjacent to roadways and boundary lines to confine the discharge from the irrigation system to the approved use area.

The system design shall avoid spray patterns that include obstructions that tend to concentrate recycled water to produce ponding and/or runoff, such as spraying against bridge abutments and outlet structures.

4. System Control Devices

The system shall include automatic system control devices that can be programmed to prevent the ponding and/or runoff of recycled water. These devices shall include automatic controllers, valves and associated equipment. The devices shall be designed so that, if the current application program is producing any runoff, they can be readily programmed on site to prevent such occurrences.

5. System Operation

a. The Owner shall notify the Utility in writing if the Supervisor named on the permit for recycled water service is changed.

1. The Supervisor shall be aware of the entire system within his or her responsibility and of all applicable conditions of recycled water use. The Supervisor shall be responsible for installation, operation and maintenance of pipelines and backflow prevention connection equipment.

2. The Owner/Supervisor shall be responsible for the operation and surveillance of onsite recycled water distribution facilities to avoid cross-connections. Cross-connection between the potable water system and the recycled water system shall not take place under any circumstances.

b. The Owner/Supervisor shall maintain the irrigation system properly so as to minimize failures and to repair broken valves, pipes and sprinklers in a timely fashion.

c. The Owner/Supervisor shall educate occupants, residents and maintenance personnel on a continuing basis to be sure they understand the proper use of recycled water.

d. The Owner/Supervisor shall prevent people from drinking and minimize the contacting of recycled water.

6. System Identification

a. Each location of a recycled water outlet must be identified and marked with a conspicuous warning label. The label or sign shall be a size no less than 4 inches by 8 inches and shall include the following wording: "RECYCLED WATER – DO NOT DRINK." Signage shall be in Spanish, as well as in English, and shall include the universal symbol for "DO NOT DRINK."

b. All pipes, valves, and other appurtenances installed above the ground, that are designed to carry recycled water, shall be painted and maintained a purple color, Pantone color #512.

c. All pipes, valves, and other appurtenances installed below the ground, that are designed to carry recycled water, shall be colored purple. PVC pipe manufactured with an integral purple color shall be marked on opposite sides to read "CAUTION: RECYCLED WATER - DO NOT DRINK" in intervals not to exceed three feet.

7. Inspection Procedures

Coverage Inspection. An inspection is made annually to determine the adequacy of the recycled system in meeting the health and safety concerns. The coverage inspection reviews concerns of over spray, misting, ponding, runoff, color coding and signage. The Department of Environmental Health or the Program Specialist should be involved in the coverage test and inspection since it directly relates to the protection of public health and safety.

Cross-connection Inspection. For sites having both a potable and recycled distribution system, the method of testing is to follow a procedure, approved by the State Health Department and conducted by the Program Specialist with oversight by the local and state health department.

a. A site walk-through and record check will be performed annually to verify the lack of discoverable cross-connections.

b. An initial and subsequent cross-connection verification inspection and test shall be performed at least every four years on both the potable and recycled water systems using one of the procedures as follows:

1. Methods for conducting the cross-connection verification test:

(i) Shut down test with pressure recorders on both the potable and recycled service connections.

(ii) Shut down test by observing each outlet on both the potable and recycled service connections.

(iii) Shut down test using a TDS concentration testing of each outlet on both the potable and recycled service connections.

(iv) Shut down test using a TDS concentration testing of each hose bibs connection for sites with occupied residences.

(v) Exposing and visual inspection of all potable water lines on new construction sites.

(vi) Dye testing for sites where it is inconvenient to conduct a shut down test.

(vii) Uniform Plumbing Code test for dual plumbing inside building structures.

2. In the event that a cross-connection is discovered, the following procedure, in the presence of the Program Specialist, shall be activated immediately:

(i) Recycled water piping to the premises shall be shut down at the meter, and the recycled water piping shall be drained.

(ii) Potable water piping to the property shall be shut down at the meter.

(iii) All cross-connections shall be uncovered and disconnected.

(iv) The systems shall be retested following procedures listed in subsection (b)(2) above.

(v) The potable water system shall be chlorinated with fifty (50) ppm chlorine for twenty-four (24) hours.

(vi) The potable water system shall be flushed and after twenty-four (24) hours, a standard bacteriological test shall be performed by a certified water testing lab. If test results are acceptable, the potable water system may be reactivated.

The Department of Environmental Health Officer or their designated appointee may substitute for the Program Specialist in the inspections and tests.

I. ENFORCEMENT

1. Notice of Violation

Any person, firm, corporation, association, or agency found to be violating any provision of these Rules, or the terms and conditions of the user's service agreement, permit, or any applicable Federal, State, City or local statutes, regulations, guidelines, ordinances, or other requirements will be served by the PUD with written notice of non-compliance stating the nature of the violation and providing a reasonable time limit, as determined by the City, for the satisfactory correction thereof. This provision is in addition to, and not

by way of derogation of, any other remedies or procedures available to the City by law, regulation, or pursuant to any of the provisions of these Rules.

Notice of violation procedure shall be in addition to any other remedies available to the City, including the provisions set forth in the Water Recycling Law (California Water Code Section 13500 et seq.).

2. Non-compliance Following Notice of Violation

Failure to cease all violations within the stated time limit shall result in revocation of the permit by the Board and termination of recycled water service. At the discretion of the Board, violations regarding any one service may result in termination of recycled water service in the following manner:

- a. **Interim Revocation:** In cases where the serious nature of the violations require immediate action, the Board may, at its discretion, immediately revoke the permit on an interim basis and thereupon cease recycled water service, subject to a timely decision on a permanent revocation of the permit, pursuant to a public hearing as provided herein.
- b. **Permanent Revocation:** Permanent revocation of a permit shall occur only subsequent to a public hearing held in the manner hereinafter provided. The user shall be given written notice of violation ten (10) consecutive calendar days prior to a hearing on the possible permanent revocation of a permit by the Board. The notice shall specify the grounds of the proposed permanent revocation of such permit in reasonable detail and it may elect to suggest corrective actions acceptable to the Board. Notice may be delivered personally to the user or it may be given by deposit in the United States mail with postage prepaid, return receipt requested, addressed to the user as reflected in the records of the City, or addressed to the owner as shown on the last equalized assessment roll of the County, as defined in the Revenue and Taxation Code of the State of California. Any such action to permanently revoke the permit shall be effective immediately after notice of the Board's decision and shall be either personally delivered to the user or placed in the United States mail, postage prepaid, return receipt requested, addressed to the user in the manner hereinabove specified.
- c. **Re-establishment of Service:** Any request to re-establish service subsequent to the permanent revocation of a permit and the termination of recycled water service, shall be in the manner prescribed for initially obtaining recycled water service from the PUD, which may include the collection of a security deposit. However, in addition, the PUD may, at its discretion, require that a service agreement, approval of a new Project Report and financial security conditioned upon compliance with the Rules be provided in an amount, manner and for a period of time as determined by the PUD.

The PUD shall have the right to refuse to re-establish service following permanent revocation of a permit for violations of these provisions.

Re-establishment of service shall only be made during regular working hours established by the PUD.

- d. Delinquency: Disconnection of service by reason of a delinquent bill shall not automatically constitute revocation of a permit. However, such delinquency may be considered as sufficient reason for a revocation of permit, in accordance with the provisions of these Rules.
- e. Provisions: The continuing satisfaction of the requirements of these Rules is an on-going condition of service.
- f. Objections: The user may file a notice of objection with the PUD within sixteen (16) days after notice of violation is given or mailed to the owner. The objection must be in writing and specify the reasons for the objection. The preliminary determination shall be made, with the user able to appeal this determination in a process established by the Board. The decision resulting from the appeal process shall be final.
- g. Appeals: Appeals on any ruling of the Board concerning violations of the provisions or penalties provided for in these Rules shall be in writing requesting for reconsideration within sixteen (16) days of receiving the result of the preliminary determination. The Board may grant the user an opportunity to present additional oral or documentary information, or it may decide on the basis of information filed in connection with the objection/appeal. The Board shall respond within sixteen (16) days of receipt of the appeal, with a decision whose findings shall be final.
- h. Conflicts: If there is any conflict between the provisions of these Rules and the provisions of any other applicable laws or regulations, the most restrictive requirement shall control and prevail, as determined by the city.

CITY OF RIVERSIDE
RECYCLED WATER SERVICE

GENERAL NOTES

System Operation

1. Irrigated areas of human contact - parks, playgrounds, school yard and golf courses during the late night/early morning hours.

2. Prevent washing of food or eating utensils in recycled water.

System Installation

1. Hose bibs are not permitted on the recycled water irrigation system.

2. Provide a physical separation barrier between areas irrigated with recycled water and areas irrigated with potable water.

3. Each of the recycled water system, the potable water system and any other separate water system, shall be provided with appropriate drain valving and air vacuum valves to allow the deactivation and draining of each water system.

System Identification

1. All on-site potable water lines and recycled water lines must have distinguishing identification.

- a. The warning tape for the newly installed potable water piping must be approved 3" width marking tape, labeled "DOMESTIC WATER" centered 12 inches above the entire length of the piping. The warning tape for the recycled water piping must also be centered 12 inches above the entire length of the piping. The recycled water warning tape must be purple in color, Pantone color #512, having a minimum of 3" in width with the words "CAUTION: RECYCLED WATER - DO NOT DRINK" printed in ½ " high, black, uppercase letters.

2. All new buried recycled water distribution piping, including service lines, valves and other appurtenances shall be either embossed or integrally stamped/marked colored purple, Pantone color #512, "CAUTION: RECYCLED WATER - DO NOT DRINK."

3. Outlets for the recycled water must be identified and marked with a conspicuous warning label. The label or sign shall be a size no less than 4 inches by 8 inches, that include the following wording: "RECYCLED WATER - DO NOT DRINK." Signage shall be in Spanish, as well as in English, and shall include the universal symbol for "DO NOT DRINK."

SERVICE INTERACTIONS

The following interaction with the City can occur during the obtaining and ongoing administration of recycled water service. Interactions for irrigation and construction use may differ. Interactions are listed in the order of normal occurrence.

1. Preliminary Investigation

Applicant meets with the PUD to establish potential service locations and service pressures for proposed site. Areas that may receive recycled water and areas that must receive potable water are established. See Subsection D.2.

2. Application Submittal

Applicant completes and submits to the PUD the application form and onsite usage plan showing proposed areas to receive recycled water, proposed service locations, meter size, size and location of offsite facilities that would provide service, and any other specific call-outs regarding recycled water use. See Subsection D.3.

3. Recycled Water User Permit Issuance

The City reviews the application form and Project Report and if acceptable, submits copies to the RWQCB for their review and approval. The PUD concurrently submits copies to state and county health departments for their review and approval. If regulatory review of application is successful, the PUD issues a Recycled Water User Permit with assigned accounting number. See Subsection D.4.

4. Plan Submittal

Irrigation designer prepares plans and specifications and submits three copies to the City for review. Designer concurrently submits additional required information along with construction cost estimate to establish plan review and inspection fee. Plan review and inspection fee is paid to the PUD. Plans must be approved prior to facilities installation. Construction water user prepares and submits location drawing to the PUD for review. Operator concurrently submits materials list to the PUD for approval prior to construction of water facility installation. See Subsection D.5.

5. Construction Schedule

The contractor submits facilities installation schedule to the PUD in order to initiate the inspection process. A minimum of 70 hours notice must be given before starting work and before all inspection requirements. See Subsection D.5, G.3 and H.1.

6. Record Document Submittal

Irrigation designer prepares as-built drawings and control charts and submits to the City for review and approval prior to regular service start-up. See Subsections G.3 and G.5.

7. Service Connection

The user makes a request to the PUD to have meter(s) installed. The request for meter(s) must be accompanied by all preliminary and connection fees. See Subsection F.2.

8. Final Inspection

The contractor or user requests the PUD to perform a final inspection after completion of facilities installation and approval of any required record documents. Operational testing is included as part of final inspection after the completion of the shut-down verification using potable water. See Subsection H.7.

9. Service Start-up

User makes a request to the PUD for service start up after final inspection. The City notifies RWQCB of intent to begin service and, upon authorization of RWQCB, the PUD begins regular service after a successful "cross-connection shutdown test" as described in the Project Report. Start-up requests must be accompanied by cash deposit. After start-up, the City confirms service to RWQCB and state and county health departments. See Subsection F.2.

10. System Surveillance

The PUD Program Specialist regularly inspects, at least annually, the offsite and onsite facilities to make sure the system and operation is in conformance with the permit. A written report documenting the results of the inspection shall be submitted to the State Health Department. See Subsection H.7.

11. Reporting

The PUD reports the volume of recycled water consumed by user as part of billing. The City reports the quality of recycled water only upon a specific request by the user. See also Subsection F.3.

12. Violations

The PUD's Program Specialist determines violations of the permit and immediately notifies the onsite Supervisor. Violation constituting immediate public health danger and minor violations not corrected in reasonable time result in service termination by shutting

off meter and locking it. Service resumption must be accompanied by start-up fee. User may appeal determination to the City. See Subsection H.1 and Section I.

Adopted by Board of Public Utilities: June 20, 1997

Approved by City Council: July 8, 1997

Effective Date: August 8, 1997

Appendix J

State Water Resources Control Boards Order Approving RPU's Change Petition



State Water Resources Control Board



Division of Water Rights

1001 I Street, 14th Floor ♦ Sacramento, California 95814 ♦ 916.341.5300
P.O. Box 2000 ♦ Sacramento, California 95812-2000
Fax: 916.341.5400 ♦ www.waterrights.ca.gov

RECEIVED

Linda S. Adams
*Secretary for
Environmental Protection*

Arnold Schwarzenegger
Governor

MAY 30 2008

JUN 04 2008

Public Utilities
Administration

To: Enclosed Interested Parties List

ORDER WR 2008-0024 – Approving the City of Riverside's Wastewater Change 0045

Enclosed is a copy of the final, certified order WR 2008-0024 regarding the City of Riverside's Wastewater Change - 0045. The petition will allow the City of Riverside to decrease the amount of effluent it discharges to the Santa Ana River. Order WR 2008-0024 was adopted by the State Water Resources Control Board (State Water Board) on May 20, 2008. A copy of the order can also be reviewed at: <http://www.waterrights.ca.gov/hearings/wro2008.html>. Interested parties who have agreed to accept electronic service will receive this letter by electronic mail; otherwise, parties will receive this letter by First Class mail.

Any person wishing to submit a petition for reconsideration of the final order may do so within 30 days of the adoption of the order. As described in California Code of Regulations, title 23, section 768, any interested person may file a petition for reconsideration upon any of the following causes:

- (a) Irregularity in the proceedings, or any ruling, or abuse of discretion, by which the person was prevented from having a fair hearing;
- (b) The decision or order is not supported by substantial evidence;
- (c) There is relevant evidence which, in the exercise of reasonable diligence, could not have been produced; or
- (d) Error in law.

Petitions should be addressed to:

**Charles Lindsay, Chief
Hearings Unit
Division of Water Rights
State Water Resources Control Board
P.O. Box 2000
Sacramento, CA 95812-2000**

Petitions for reconsideration may also be delivered by hand to the following address:

**Division of Waters
State Water Resources Control Board
Cal/EPA Headquarters
1001 "I" Street, 14th Floor
Sacramento, CA 95814**

Enclosed Interested Parties List
City of Riverside

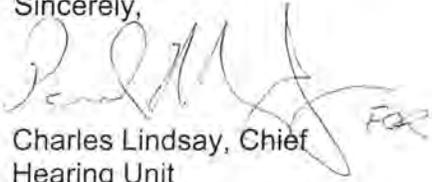
- 2 -

MAY 30 2008

Couriers delivering petitions for reconsideration must check in with lobby security and have them contact Division of Water Rights mailroom, second floor. The mailroom will receive and date stamp petitions.

If you have any questions regarding this letter, please contact Jane Farwell at (916) 341-5349 or jfarwell@waterboards.ca.gov or Matthew Bullock at (916) 341-5164 or mbullock@waterboards.ca.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "Charles Lindsay". The signature is stylized and includes a large flourish at the end. To the right of the signature, the initials "CLR" are written in a smaller, simpler font.

Charles Lindsay, Chief
Hearing Unit

Enclosures: Order WR 2008-0024 and Interested Parties List

**City of Riverside
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(Parties who have agreed to electronic service)**

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**City of Riverside
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(continued)**

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Curt Taucher
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California Department of Fish and Game
Eastern Sierra-Inland Deserts
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Ontario, CA 91764

STATE OF CALIFORNIA
STATE WATER RESOURCES CONTROL BOARD

ORDER WR 2008 – 0024

In the Matter of Wastewater Change Petition WW-0045

City of Riverside

SOURCE: Effluent from the City of Riverside's Regional Water Quality Control Plant,
Santa Ana River

COUNTY: Riverside

ORDER CONDITIONALLY APPROVING WASTEWATER CHANGE PETITION WW-0045

BY THE BOARD:

1.0 INTRODUCTION

Pursuant to Water Code section 1211, the City of Riverside (City) filed Wastewater Change Petition WW-0045 with the State Water Resources Control Board (State Water Board or Board) on December 1, 2006. In its petition, the City seeks to change the place of use and purpose of use of a portion of the treated wastewater discharged from the City of Riverside Regional Water Quality Control Plant (RWQCP).¹ The amount of treated wastewater currently discharged to the Santa Ana River (River) ultimately will be reduced by approximately 11,000 acre-feet per annum (afa). The State Water Board has considered all of the evidence in the hearing record and conditionally approves the City's Petition WW-0045.

2.0 APPLICABLE LAW

Water Code section 1211 requires the owner of a wastewater treatment plant to obtain the State Water Board's approval of any change in the point of discharge, place of use, or purpose of use of treated wastewater that will result in the decreased flow in any portion of a watercourse. The State Water Board must review the proposed change pursuant to the provisions of chapter 10 (commencing with section 1700) of part 2 of division 2 of the Water Code, which govern changes to appropriative water rights. Before the State Water Board can approve a proposed

¹ The City also petitions for a change in the amount of discharge. When considering a petition for change in the point of discharge, place of use, or purpose of use under Water Code section 1211, the State Water Board will consider the impacts of a reduction in discharge under the California Environmental Quality Act and the Board's public interest and public trust authorities.

change, it must find that the change will not operate to the injury of any legal user of water. (Wat. Code, § 1702; see also *id.*, § 1210 [while owner of a wastewater treatment plant has the exclusive right to treated wastewater as against anyone who has supplied the water discharged, the owner's obligations to any legal user of the discharged treated wastewater are not affected].)

In addition, the State Water Board has an obligation to consider the effect of the proposed project on public trust resources and to protect those resources where feasible. (*National Audubon Society v. Superior Ct.* (1983) 33 Cal.3d 419 [189 Cal.Rptr. 346]; see also State Water Board Orders WR 95-9, p. 29, fn. 10 and WR 98-01, p. 5, fn 2 [suggesting that fish, wildlife and other instream beneficial uses may constitute legal users of water within the meaning of Water Code section 1702, consistent with the public trust doctrine].) Thus, the State Water Board must consider the impacts to public trust uses of the River in considering whether to approve the City's petition.

3.0 PROJECT DESCRIPTION

The City owns and operates the RWQCP, which is permitted by the California Regional Water Quality Control Board, Santa Ana Region, to treat 40 million gallons per day, approximately 44,800 afa of wastewater. (Riverside 2-0, ¶ 9.)² The RWQCP currently produces about 36,000 afa of treated effluent and discharges almost the entire amount into the River via a constructed channel that intersects the flow of the Santa Ana River. A portion of the effluent is directed through constructed wetlands (known as the Hidden Valley Wetlands Enhancement Project) before reentering a constructed channel. (Riverside 1-0, ¶ 13.) The City is required to discharge 15,250 afa to the River under a 1968 settlement agreement incorporated into the judgment in *Orange County Water District v. City of Chino, et al.* (Orange County Super. Ct. No. 117628 (Apr. 17, 1969).) (*Id.*, ¶ 22.) Accordingly, approximately 20,750 afa is presently available for recycled water uses. (Riverside 2-0, ¶ 9.)

² The City's exhibits are designated with the prefix "Riverside" and the State Water Board's exhibits are designated with the prefix "SWRCB." The prefix "App. Joint" refers to the exhibits jointly submitted by all the applicants in the hearing. "Muni/Western" refers to exhibits submitted by the San Bernardino Valley Municipal Water District and Western Municipal Water District of Riverside County (Muni/Western).

The City plans to increase the permitted capacity of the RWQCP to approximately 67,400 afa by the year 2030. (Riverside 1-0, ¶ 14.) It also plans a phased expansion of its existing recycled water distribution system from the current 290 afa to 41,400 afa by 2025. (*Id.*, ¶ 15.) The City will effectively reduce its discharge of treated effluent to the River to approximately 26,000 afa by the year 2030, with a minimum discharge of about 25,000 afa in the year 2025. Thus, the City will discharge approximately 11,000 afa less than it currently discharges to the River. (Riverside 2-0, ¶ 5.)

A portion of the treated effluent is currently used for the irrigation of approximately 41 acres at the Van Buren Golf Center and of about 10 acres at the Van Buren median and frontage, and for industrial use at the Toro Manufacturing Company. (Riverside 2-3.) Under Petition WW-0045, the City requests the place of use be changed to include areas within the City's Limits, the City's Water Service Area Boundary, and within the boundary of the Jurupa Area Plan. The purpose of use will include municipal, industrial and agricultural purposes.

According to the City's Petition WW-0045, the point of discharge to the River will remain the same. (SWRCB-1, Water Right Files for Petition WW-0045 [Attachment to Petition for Change].) The proposed project, however, involves a change in the discharge of treated wastewater from the River to an expanded place of use on land. Accordingly, the State Water Board will construe the petition as requesting a change in the point of discharge to an area coincident with the proposed place of use.³

4.0 PROCEDURAL BACKGROUND

In 2002 the City filed water right Application 031372. The City, however, did not propose to divert water from the Santa Ana River under the application; instead, the City proposed to increase the use of recycled water taken directly from the RWQCP. Because the City's project involved changes in the purpose of use and place of use, and a reduction in the discharge of treated wastewater from the RWQCP into the Santa Ana River, it subsequently filed Petition WW-0045 on December 1, 2006. Petition WW-0045 describes the same activities previously described in Application 031372.

³ The hearing notice dated February 16, 2007, which also provided an opportunity for parties to protest Petition WW-0045, characterized the petition as including a change in point of discharge; thus, the public has had notice of such a proposed change.

On February 16, 2007, the State Water Board provided notice of Petition WW-0045 concurrently with a Notice of Public Hearing to receive evidence relevant to multiple water right applications⁴ in the Santa Ana River watershed, including Application 031372 and Petition WW-0045. The State Water Board issued a revised notice on March 1, 2007. The State Water Board conducted pre-hearing conferences on April 5 and 20, 2007 and a hearing on May 2, 3, 4, and 8, 2007. The hearing was an adjudicative proceeding governed by certain provisions regarding administrative adjudication in the Administrative Procedure Act (commencing with Gov. Code, §§ 11400-11470.50 & 11513) and other statutory provisions, as specified in the State Water Board's regulations at California Code of Regulations, title 23, section 648.

5.0 CANCELLATION OF APPLICATION 031372

The City does not propose to divert water from the Santa Ana River under Application 031372. In the City's closing brief, the City's attorney requested that the State Water Board dismiss Application 031372. State Water Board hereby cancels Application 031372.

6.0 PROTESTS

Four entities protested Application 031372: the California Sportfishing Protection Alliance (CSPA), California Department of Fish and Game (DFG), East Valley Water District (EVWD) and the United States Forest Service (USFS). In their protest dismissal agreements with the City, the USFS, DFG, and EVWD agreed not to protest Petition WW-0045. The Center for Biological Diversity (Center) filed the only protest against Petition WW-0045. Before the hearing, the City resolved all of the protests against the application and petition, except for CSPA's protest.⁵

In the City's agreement with DFG, dated March 29, 2007, and its agreement with the Center, dated May 1, 2007, the City agreed to request the State Water Board to include certain

⁴ The State Water Board also held the hearing to receive evidence relevant to determining whether the State Water Board should approve, subject to terms and conditions, water right Application Nos. 31165 and 31370 of Muni/Western; No. 31174 of the Orange County Water District; No. 31369 of the Chino Basin Watermaster; and No. 31371 of the San Bernardino Valley Water Conservation District. These applications will not be considered in this order.

⁵ CSPA did not appear at the pre-hearing conference or at the hearing. The State Water Board subsequently dismissed CSPA's protest for failure to respond.

conditions in any approval of either Application 031372 or Petition WW-0045.⁶ The State Water Board will include the monitoring and reporting terms in those agreements as a condition of the Board's approval. The State Water Board will not impose terms contained in the agreements that require the parties to meet and work together in the future. The State Water Board's decision not to include such terms, however, does not constitute a decision on the merits, validity, or enforceability of such terms as between the parties to the agreements.

7.0 DISCUSSION

The State Water Board approves the City's Petition WW-0045 to change the point of discharge, place of use and purposes of use of treated wastewater discharged from the RWQCP. As discussed below, approval of the proposed changes will neither injure any legal user of water nor adversely affect public trust resources. Moreover, approval of the petition is in the public interest.

7.1 Impact on Legal Users of Discharged Water

Before granting permission to make a change under Water Code section 1211, the State Water Board must find that the change will not injure any legal user of treated wastewater discharged into the River. (Wat. Code, § 1702.) The statutory "no injury" rule set forth in Water Code section 1702 codifies the common law no injury rule and therefore should be interpreted consistent with case law that interprets and applies the common law rule. (Order WR 98-01, p. 5; Order WR 99-012, p. 12.) In general, the common law no injury rule precludes a change in the exercise of a water right if, among other things, the change would alter the pattern or rate of return flow to the detriment of downstream water right holders.⁷ (*Scott v. Fruit Growers' Supply Co.* (1927) 202 Cal. 47, 52-53, 55 [258 P. 1095].)

Consequently, the State Water Board's assessment of injury under section 1702 requires an evaluation of the source of the treated wastewater to be reclaimed. Downstream water right holders are protected from injury only to the extent that the source of the return flow to a stream

⁶ The stipulations state that the conditions should be included in "any permit issued pursuant to Application No. 31372 or WW-0045." Because the State Water Board does not issue permits on wastewater change petitions, it will construe the stipulation as applying to the changes approved in this order.

⁷ Return flow is water that flows back into a stream, lake, or other body of water after it has been appropriated and used.

is native water.⁸ When the source of return flow is native water, the return flow is considered part of the natural flow of the stream to which riparian and appropriative water rights may attach.

The no injury rule does not protect downstream water right holders when the source of the return flow is "foreign water." Foreign water is water that would not be present in a given water body under natural conditions. For example, the no injury rule does not protect downstream users if the water has been imported from outside the watershed or it is foreign in time (e.g., stored water).⁹ Foreign water also includes groundwater that does not naturally flow in the stream (e.g., it is not tributary to the stream and is present only because it was extracted from the ground).

Consistent with Water Code sections 1211 and 1702 and the no injury rule, treated wastewater discharged from the RWQCP into the River should be treated as return flow from native water if the source of the treated wastewater is surface water or groundwater that would reach the River under natural conditions. While the hearing record does not specifically identify the source of the City's treated wastewater, the evidence supports a conclusion that the source is either imported water or groundwater. In the Santa Ana watershed, groundwater supplies provide approximately 68 percent of consumptive water needs, with imported water as the second largest water supply source, providing approximately 23 percent of the total water demands. (App. Joint 2-18, pp. 41-42.) Other sources of supply include surface water (5 percent) and recycled water (4 percent). (*Id.*) The City's existing water rights include approximately 77,000 afa of groundwater from wells in the Bunker Hill, Colton, Riverside North, Riverside South, and Arlington groundwater basins; approximately 365 afa of imported water under contracts with the Western Municipal Water District; and approximately 20,000 afa of imported water from Gage Canal Company. (Riverside 1-3, p. 2-11.) The RWQCP treats wastewater from the following agencies: Jurupa Community Services District, Rubidoux Community Services District, Western Municipal Water District, and Edgemont Community Services District. (Riverside 1-1, p. 3-1.)

⁸ Native water is water that under natural conditions would contribute to a given stream or other body of water. (1 Slater, California Water Law and Policy (2002), p. 7-3.)

⁹ While an appropriative right to use return flow from foreign water may be perfected, such a right is contingent on the continued importation of the foreign water and abandonment of the return flow. An appropriative water right holder cannot compel the continued importation of foreign water or claim injury if the importer opts to reclaim or recapture the return flow.

The groundwater will be treated as foreign water if the groundwater is not in hydrologic continuity with the River and would not reach the River under natural conditions. It is reasonable to assume that the RWQCP treats wastewater at least partially supplied from the City's groundwater wells located in the Bunker Hill, Colton, Riverside North, Riverside South, and Arlington groundwater basins. Pumping from the groundwater wells would have an influence on the River only along reaches where the River is gaining (i.e., where groundwater is contributing to the flow of the River). There are several areas where the groundwater contributes to the flow of the River, including the Bunker Hill groundwater basin. (Muni/Western 6-124 and 6-156.) It also appears, however, that much of the River is not hydraulically connected to other groundwater basins from which the City pumps groundwater.¹⁰ (*Id.*) Thus, only a very small percentage of the groundwater extracted by the City may reach the River under natural conditions.

Accordingly, a substantial portion of the City's treated wastewater is derived from foreign surface and groundwater supplies to which downstream water users do not have a right to use. To the extent any portion of the treated wastewater is native water, the amount is insubstantial relative to the proposed change in the amount of discharge. The City is legally required to discharge 15,250 afa under judgment in *Orange County Water District v. City of Chino*. (Riverside 1-0, ¶ 22.) The City has stated that it will not discharge less than 25,000 afa of treated wastewater to the River. (*Id.*) Consequently, the State Water Board conditions its approval by requiring the City to discharge this minimum amount. Approval of the City's proposed changes under Petition WW-0045 will not injure any legal user of water.

Moreover, although not dispositive of the injury question, no legal user has claimed injury as a result of the change. The State Water Board takes official notice pursuant to California Code of Regulations, title 23, section 648.2 of the information in the Division of Water Rights' (Division) records, as of December 10, 2007, showing that there are three appropriative water rights and two pending water right applications located downstream of the City's discharge point to the

¹⁰ This conclusion is based on the information in the hearing record and is made solely for the purposes of the legal injury discussion in this order. It should not be construed as a finding regarding groundwater hydrology that can be used in other proceedings.

Santa Ana River.¹¹ The three appropriative water rights are held by the Orange County Water District (water right Applications A008899 and A008900) and the Chino Basin Watermaster (water right Application A028473), and the pending water right applications are held by the City (water right Application A031372, which is cancelled in this order) and Orange County Water District (water right Application A031174). The Orange County Water District and the Chino Basin Watermaster were also parties to the May 2007 hearing and did not contest the City's wastewater change petition.

7.2 Impacts on Public Trust Resources

The City also presented evidence that the 11,000 cfs reduction in flow will not adversely affect biological resources and habitat in the project area, including habitat for the Santa Ana sucker (*Catostomus santaanae*) (sucker), which is listed as a federally threatened species, and the least Bell's vireo (*Vireo bellii pusillus*) (LBV), which is a state and federally listed species.

In examining the project's impacts on the sucker, the City's witnesses focused in part on the reduction of flow in the area below Van Buren Bridge to the Prado Dam (Reach 3), which includes the RWQCP's current discharge point. On average, the proposed reduction would cause a 3.3 percent flow reduction in that area. (Riverside 5-0, ¶ 11.) The witnesses opined that Reach 3 is low quality habitat for the sucker as a result of the lack of preferred substrate for the sucker, and not as a result of low overall flow. (Riverside 4-0, ¶ 9; 5-0, ¶ 11.)

Mr. Jeff Beehler testified that the City's recycled water project will not have any significant impacts on the sucker. (Riverside 4-0, ¶ 9.) He concluded that the reduction in flow will not decrease the availability of limited habitat in Reach 3, nor will it affect scour required to improve habitat in that area. (Riverside 4-0, ¶ 12.) Mr. Jonathan Baskin testified that although the proposed change in flow could potentially negatively affect a small patch of good substrate forming habitat in the vicinity of the confluence of the City's discharge channel and the Santa Ana River, the impact is not significant overall and is offset by potential Project-related

¹¹ There are also two inactive groundwater recordations located below the City's discharge point. With certain exceptions, Water Code section 4999 et seq. requires persons who extract more than 25 acre-feet of groundwater in four Southern California counties to file a notice of groundwater extraction with the Division. If a person is required to file the notice and fails to do so within six months of the close of a calendar year, the failure to file is deemed equivalent to the nonuse of groundwater for the particular year. (Wat. Code, § 5004.) The Division designates groundwater recordation as "inactive" if the Division has received a notice in previous years, but subsequently does not receive a recordation for a particular year.

improvements to sucker habitat in other places in the project area. (Riverside 5-0, ¶¶ 4, 12.) The project's overall impacts on sucker habitat are either neutral or are improvements. (Riverside 5-0, ¶ 13.)

Mr. Tony Bomkamp testified that the Project's effects on the LBV would also affect other special status species that are likely common to the Prado Basin, such as yellow warblers and yellow-breasted chats. To the extent the LBV is unaffected by the Project, these species with similar habitat requirements also would be unaffected. (Riverside 3-0, ¶ 8.)

Mr. Bomkamp evaluated potential impacts to the LBV by examining whether the willow-dominated riparian habitat used by LBV would be affected by the net loss of up to 11,000 afa of treated wastewater. (Riverside 3-0, ¶ 11.) Using a water budget-based approach, Mr. Bomkamp considered whether LBV habitat potentially would be dewatered by the reduction in flows. (Riverside 3-0, ¶¶ 11-14.) He determined that there would be more than an order of magnitude of surplus water in the system that exceeds existing riparian habitat requirements after implementation of the proposed Project. (Riverside 3-0, ¶¶ 24-28.) Consequently, there are no potential impacts on LBV habitat associated with the project. (Riverside 3-0, ¶ 28)

Accordingly, we conclude that approval of the change petition will not adversely affect public trust resources. In addition to the protest resolution terms, however, the State Water Board will impose a standard term regarding endangered species as a condition of its approval.

7.3 Public Interest

The State Water Board approves the City's Petition WW-0045 to change the point of discharge, place of use and purposes of use of treated wastewater discharged from the RWQCP. Approval of the petition is in the public interest because it maximizes the reuse of reclaimed water. (See, e.g., Wat. Code, §§ 461, 13550 [establishing Legislative policy of maximizing water reuse].)

As explained above, this order imposes monitoring and reporting requirements to which the City agreed as part of its protest resolution agreements. The City agreed to provide annual and quarterly monitoring reports to DFG and the Center, respectively. It is in the public interest to have these monitoring reports available to the public as well; accordingly, the State Water Board will require the City to post and maintain its monitoring reports on the City's website.

8.0 CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

The City is the lead agency under CEQA (Pub. Resources Code, § 21000 et seq.) for the proposed project. In October 2006 the City circulated for public review a draft Program Environmental Impact Report (PEIR) for its Recycled Water Program. On June 26, 2007 the City Council adopted Resolution No. 21432 certifying the final PEIR.¹² (Riverside 1-3(a).) In the PEIR, the City evaluated the environmental impacts associated with the City's adoption of a recycled water feasibility study and Master Plan, implementation of a program of near-term and long-term projects to provide recycled water from the RWQCP, and the State Water Board's approval of the City's water right application and wastewater change petition for reducing discharge to the Santa Ana River by 11,000 afa in connection with the City-wide recycled water program.¹³

The State Water Board is a responsible agency under CEQA for purposes of considering whether to approve the City's petition.¹⁴ As a responsible agency, the State Water Board has a more limited role than the City. The State Water Board must review and consider the environmental effects of the project identified in the PEIR that are within its purview, and any other relevant evidence in the hearing record, and reach its own conclusions on whether and how to approve the project involved. (Cal. Code Regs., tit. 14, § 15096, subd. (a).) For each significant environmental effect within its responsibility identified in the PEIR for this project, the State Water Board must make one or more of the following findings: (1) changes have been required in the project that mitigate or avoid the significant effect; (2) such changes are within the responsibility and jurisdiction of another public agency and have been, or can and should be, adopted by that agency; or (3) specific economic, legal, social, technological, or other considerations make the mitigation measures identified in the PEIR infeasible.

¹² On or about April 25, 2007, the City entered into a stipulation with the Center, City of Chino, Chino Basin Watermaster, EVWD, Orange County Water District, Muni/Western, Santa Ana River Local Sponsors, and USFS, agreeing that the hearing record for the City's petition would be held open until August 15, 2007, for the City to substitute a certified final PEIR for the draft PEIR. The parties agreed the hearing would not be reconvened for cross-examination as to the final PEIR. By letter dated August 10, 2007, the State Water Board notified interested persons that it will substitute the final PEIR for the draft PEIR in the hearing record as requested by the City. (See Riverside 1-3).

¹³ The City has determined that environmental impacts associated with Petition WW-0045 are identical to the impacts relating to Application 031372, and has used the same environmental document to analyze those impacts.

¹⁴ Regardless of any obligation the City or the State Water Board may have under CEQA, the Board has an independent obligation to consider the effect of the proposed project on public trust resources and to protect those resources where feasible. (*National Audubon Society v. Superior Court* (1983) 33 Cal.3d 419 [189 Cal.Rptr. 346].)

(Pub. Resources Code, §§ 21002.1, 21081; Cal. Code Regs., tit. 14, §§ 15091.) The State Water Board is responsible for mitigating or avoiding only the significant environmental effects of those parts of the project that it decides to approve. (Cal. Code Regs., tit. 14, § 15096, subd. (g).) This includes the responsibility to address any significant adverse direct or indirect effects on water resources or public trust resources.

In this order, the State Water Board has considered the environmental impacts identified in the City's PEIR that are associated with approving the wastewater change petition, including the construction and operational impacts on water quality and biological resources that will result from the requested changes. The City determined the project would have potentially significant construction-related impacts on biological, cultural, and water resources. It found that all of the project's impacts on the environment can be mitigated to a less-than-significant level except for impacts to cultural resources. The City also determined that the project's flow-related impacts (i.e., impacts associated with the reduction in discharge of treated water to the River) are not significant and do not require mitigation.

The City identifies mitigation measures to reduce the water quality impacts associated with project construction to less than significant. (Riverside 1-3, table ES-1.) To avoid adverse environmental impacts on water quality, this order will require the City to implement the water quality mitigation measures identified in the Mitigation Monitoring Plan adopted by Resolution No. 21432 on June 26, 2007. (Riverside 1-3(a).)

The City also identified potentially significant impacts on various biological resources associated with the construction or expansion of its facilities. (Riverside 1-3, Table ES-1.) Mitigation for these impacts will occur through implementation of the Western Riverside County Multi-Species Habitat Conservation Plan, the Habitat Conservation Plan for the Stephens' Kangaroo Rat in Western Riverside County, or project-specific requirements. (*Id.*) To the extent these potentially significant impacts are within the State Water Board's purview, such as impacts to aquatic and riparian species, the Board has responsibility for requiring changes that avoid or mitigate those impacts. Accordingly, this order will require the City to implement the relevant mitigation measures identified in the City's Mitigation Monitoring Plan (Riverside 1-3(a), Ex. B.)

Finally, the City determined that the project may have significant impacts on cultural resources, and identifies mitigation measures for certain impacts. It also found, however, that certain impacts on cultural resources are significant and unavoidable. (Riverside 1-3, table 3C-1, p. 3C-18.) To the extent these potentially significant effects are arguably within the State Water Board's purview as a responsible agency, the State Water Board finds that the proposed mitigation measures are within the responsibility and jurisdiction of the City, and they have been, or can and should be, adopted by the City. (Cal. Code Regs., tit. 14, § 15091, subd. (a).)

9.0 CONCLUSION

The State Water Board finds that approval of Petition WW-0045 will neither injure any legal user of water nor adversely affect public trust resources. Petition WW-0045 is conditionally approved.

ORDER

IT IS HEREBY ORDERED THAT Wastewater Change Petition WW-0045 is approved subject to the following terms and conditions:

1. The source of the treated effluent shall be the City's RWQCP. The City is required to discharge a minimum of 25,000 afa of treated effluent from the RWQCP to the Santa Ana River. The City shall continue such discharges as long as the California Water Quality Control Board, Santa Ana Region, permits the discharges to the river.
2. The purposes of use shall be municipal, industrial, and irrigation uses.
3. The place of use shall be within the City's limits, the City's Water Service Area Boundary, and the boundary of the Jurupa Area Plan, as shown on the Map to Accompany Petition for Change in Amount of Discharge, Place of Use and Purpose of Use by City of Riverside, dated December 11, 2006, filed with the State Water Board.

4. The point of discharge shall be the existing point at (1) N. 656,200 and E. 1,633,300 California Coordinate System Zone 6, within SW ¼ of SE ¼ Sec. 25, T2S, R6W, SBB&M, and (2) within the City's limits, the City's Water Service Area Boundary, and the boundary of the Jurupa Area Plan, as shown on the Map to Accompany Petition for Change in Amount of Discharge, Place of Use and Purpose of Use by City of Riverside, dated December 11, 2006, filed with the State Water Board.
5. The City shall conduct its existing monthly monitoring and report the results of the monitoring annually to the DFG and the State Water Board in a form approved by DFG and the State Water Board. At a minimum, reporting shall include average monthly flow data that indicates any changes in the amount of flow in the Santa Ana River caused by changes in the City's discharge of effluent from its wastewater treatment facility. This provision shall bind any transferees and assignees of the approval granted under this order.
6. The City shall conduct its required monthly monitoring and report the results of the monitoring quarterly to the State Water Board and Center for Biological Diversity in a mutually approved form. At a minimum, reporting shall include average monthly flow data as recorded by the City at the RWQCP outfall structure meter, which reflects any changes in the amount of effluent flow discharged to the Santa Ana River by the City from the RWQCP, and water quality data gathered by the City and submitted to the California Regional Water Quality Control Board, Santa Ana Region, in accordance with the City's National Pollutant Elimination Discharge System permit.

The City shall notify the Center 60 days in advance of any plans to decrease its effluent discharge to the Santa Ana River, as measured at the outfall structure meter.

This provision shall bind any transferees and assignees of the approval granted under this order.

7. The City shall post and maintain the annual and quarterly monitoring reports required by paragraphs 5 and 6, above, on its website. The reports shall remain posted for at least five years.

8. The State Water Board adopts and incorporates by reference into this order the water quality mitigation, monitoring, and reporting requirements identified in the Mitigation Monitoring Plan adopted by the City by Resolution No. 21432, dated June 26, 2007, specifically WR-MM-1A-1, WR-MM-1A-2, WR-MM-1A-3, and WR-MM-1B-1. The City must implement the measures to mitigate significant impacts to water quality resources and conduct the required reporting and monitoring of those measures. The State Water Board reserves jurisdiction to require any reasonable amendments to these measures and requirements necessary to ensure that they will accomplish the stated goal.
9. The State Water Board adopts and incorporates by reference into this order the mitigation, monitoring, and reporting requirements applicable to biological resources identified in the Mitigation Monitoring Plan adopted by the City by Resolution No. 21432, dated June 26, 2007, specifically BIO-MM-1 and BIO-MM-2. The City must implement the measures to mitigate significant impacts to biological resources and conduct the required reporting and monitoring of those measures. The State Water Board reserves jurisdiction to require any reasonable amendments to these measures and requirements to ensure that they will accomplish the stated goal.
10. The changes approved herein shall not be implemented until the City obtains all necessary local, state, and federal approvals, including any necessary approvals from the California Regional Water Quality Control Board, Santa Ana Region, to implement the changes approved in this order. The City shall abide by any such approvals.
11. The State Water Board reserves jurisdiction in the public interest and public trust to modify the terms and conditions of this order, including imposition of requirements to alter project facilities or operations and to modify instream flow releases. The Board will take action only after notice to interested persons and an opportunity for hearing.
12. This change does not authorize any act which results in the taking of a threatened, endangered or candidate species or any act which is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish & G. Code, §§ 2050 to 2097) or the federal Endangered Species Act (16 U.S.C.A. §§ 1531 to 1544). If a "take" will result from any act authorized under this order, the petitioner shall

obtain authorization for an incidental take prior to construction or operation of the project. Petitioner shall be responsible for meeting all requirements of the applicable Endangered Species Act for the project authorized under this order. (0000014)

13. Pursuant to California Water Code sections 100 and 275, and the common law public trust doctrine, all rights and privileges under this order are subject to the continuing authority of the State Water Resources Control Board in accordance with law and in the interest of the public welfare to protect public trust uses and to prevent waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of water.

The continuing authority of the Board may be exercised by imposing specific requirements over and above those contained in this order with a view to eliminating waste of water and to meeting the reasonable water requirements of permittee without unreasonable effects on other users of water or instream beneficial uses. The City may be required to implement a water conservation plan, features of which may include but not necessarily be limited to: (1) measures to increase use of reclaimed water; (2) restricting use so as to eliminate irrigation tailwater or return flow; (3) suppressing evaporation losses from water surfaces; (4) controlling phreatophytic growth; and (5) installing, maintaining, and operating efficient water measuring devices to assure compliance with the quantity limitations of this permit and to accurately determine water use as against reasonable water requirements for the authorized project. No action will be taken pursuant to this paragraph unless the Board determines, after notice to affected parties and opportunity for hearing, that such specific requirements are physically and financially feasible and are appropriate to the particular situation.

The continuing authority of the Board also may be exercised by imposing further limitations on the use of water by the permittee in order to protect public trust uses. No action will be taken pursuant to this paragraph unless the Board determines, after notice to affected parties and opportunity for hearing that such action is consistent with California Constitution article X, section 2; is consistent with the public interest; and is necessary to preserve or restore the uses protected by the public trust.

(0000012)

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 May 20, 2008.

AYE: Chair Tam M. Doduc
Vice Chair Gary Wolff, P.E., Ph.D
Arthur G. Baggett, Jr.
Charles R. Hoppin
Frances Spivy-Weber

NAY: None

ABSENT: None

ABSTAIN: None



Jeanine Townsend
Clerk to the Board

Appendix K

City of Riverside's Shortage of Water Supply Rule

**City of Riverside Public Utilities Department
Water Rule #9**

Shortage of Water Supply and Interruption of Delivery

A. Interruption of Delivery A. Interruption of Delivery

The Water Utility shall exercise reasonable diligence and care to furnish and deliver a continuous and sufficient supply of water to all Customers and to avoid any shortage or interruption of service. The Water Utility shall not be liable for interruptions, shortage or insufficiency of supply, or any loss or damage occasioned thereby.

B. Temporary Suspension of Water Service

The Water Utility reserves the right to temporarily suspend the delivery of water whenever it may be necessary for the purpose of making repairs or improvements to its system. The making of such repairs or improvements will be constructed as rapidly as is feasible and, whenever possible, at such times as shall cause the least inconvenience to the Customers. In all cases of such interruptions of water service, the Water Utility shall make a reasonable attempt to give advance notice to the Customers who may be affected.

C. Shortage of Water Supply

In the event of any actual or threatened shortage of water supply, and during the period of such shortage, the Water Utility shall apportion the available supply of water among its Customers in the most equitable manner possible to continue service fairly and without discrimination, except that preference shall be given to such service as is essential to the public interest and to the preservation of life and health.

Adopted by Board of Public Utilities: December 16, 1994

Approved by City Council: April 18, 1995

Effective Date: May 18, 1995

Appendix L

City of Riverside's Draft Water Conservation Ordinance

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ORDINANCE NO.

AN ORDINANCE OF THE CITY OF RIVERSIDE, CALIFORNIA,
AMENDING TITLE 14 OF THE RIVERSIDE MUNICIPAL CODE BY
ADDING A NEW CHAPTER ENTITLED “WATER CONSERVATION”

WHEREAS, on June 4, 2008, the Governor proclaimed a condition of statewide drought, and on February 27, 2009, the Governor proclaimed a state of emergency to exist resulting from below average snow pack, precipitation, dwindling reservoir storage and new biological opinions that have reduced the flexibility of state-wide water operations; and

WHEREAS, although the Governor has recently lifted the state of emergency proclamation regarding the drought, California Constitution, Article X and Water Code section 100 provide that it is the declared policy of the State that the general welfare requires that the water resources of the State shall be put to beneficial use to the fullest extent of which they are capable, the waste or unreasonable use of water shall be prevented, and the conservation of such waters is to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and the public welfare; and

WHEREAS, pursuant to Water Code section 106, it is the declared policy of the State that the use of water for domestic use is the highest use of water and that the next highest use is for irrigation; and

WHEREAS, pursuant to Water Code section 350, the City may declare a water shortage emergency to prevail within its jurisdiction when it finds and determines that the ordinary demands and requirements of water consumers cannot be satisfied without depleting the City’s water supply to the extent that there would be insufficient water for human consumption, sanitation, and fire protection; and

WHEREAS, pursuant to Water Code section 375, the City may by public hearing adopt and enforce a water conservation program to reduce the quantity of water used by persons within its jurisdiction for the purpose of conserving the water supplies of the City; and

WHEREAS, pursuant to Water Code section 375, the City may specifically require the installation of water-saving devices which are designed to reduce water consumption for other than agricultural uses.

1 The City Council of the City of Riverside does ordain as follows:

2 Section 1: Upon finding that the ordinary demands and requirements of water consumers
3 cannot be satisfied without depleting the City’s water supply to the extent that there would be
4 insufficient water for human consumption, sanitation, and fire protection, the City Council may
5 declare by resolution a water shortage emergency to prevail within its jurisdiction.

6 Section 2: The City Council, by public hearing, hereby adopts a water conservation
7 program to reduce the quantity of water used by persons within its jurisdiction for the purpose of
8 conserving the water supplies of the City.

9 Section 3: The title section of Title 14, “Public Utilities” shall read as follows:

10 **Title 14**

11 **PUBLIC UTILITIES**

12 **Chapters:**

- 13 **14.04 Sewer Service Charges**
- 14 **14.08 Sewer Connections And Permits**
- 15 **14.12 Discharge Of Wastes Into The Public Sewer And Storm Drain**
- 16 **Systems**
- 17 **14.16 Private Dumping And Disposal Of Sewage**
- 18 **14.20 Water Connections**
- 19 **14.22 Water Conservation**
- 20 **14.24 Underground Utility Installation**
- 21 **14.28 Mandatory Use Of Recycled Water**
- 22 **14.36 Special Tax Financing Law for Sustainable Energy Districts**

23 Section 4: The Riverside Municipal Code Title 14 is hereby amended by adding the
24 following new Chapter 14.22.

25 **Chapter 14.22**

26 **WATER CONSERVATION**

27 **Sections:**

- 28 **14.22.010 Unreasonable Uses of Water.**
- 14.22.020 Water Conservation Program.**
- 14.22.030 Stage One - Normal Water Supply.**
- 14.22.040 Stage Two - Minimum Water Shortage.**
- 14.22.050 Stage Three - Moderate Water Shortage.**
- 14.22.060 Stage Four - Severe Water Shortage.**
- 14.22.070 Water Shortage Emergency.**
- 14.22.080 Enforcement and Severability.**

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Section 14.20.010 Unreasonable Uses of Water.

(A) No person shall use or permit the use of water for residential, commercial, industrial, agricultural, or any other purpose, contrary to any provision of this ordinance.

(B) No person shall waste water or use it unreasonably. Unreasonable use of water includes, but is not limited to, the following:

(1) Allowing water to leave the Person’s property by drainage onto adjacent properties or public or private roadways or streets due to excessive irrigation and/or uncorrected leaks

(2) Failing to timely repair a water leak;

(3) Using water to wash down sidewalks, driveways, parking areas, tennis courts, patios or other paved areas, except to alleviate immediate safety or sanitation hazards;

(4) Watering outdoor landscaped areas on rainy days and two days thereafter;

(5) Failing to adjust sprinklers and irrigation systems to eliminate overspray and avoid run-off into streets, sidewalks, parking lots, alleys or other paved surfaces;

(6) Operating a water fountain or other decorative water feature that does not use re-circulated water;

(7) Installing single pass cooling systems in buildings requesting new water service;

(8) Installing non-re-circulating water systems in new commercial conveyor car wash and new commercial laundry systems; and

(9) Failing to install operational re-circulating water systems for commercial conveyor car wash systems and commercial laundry systems.

Section 14.22.020 Water Conservation Program.

(A) This Chapter establishes a Water Conservation Program which uses four stages to address conditions and needs. The Water Conservation Stage shall be set by City Council action. All normal water efficiency programs and water conservation regulations shall remain in force during any stage, unless the City Council directs otherwise.

(B) Stage One represents normal conditions; Stages Two, Three and Four represent potential and actual shortages. Stages Two, Three and Four may be triggered by a local or regional water supply shortage; production, treatment, transmission, or delivery infrastructure problems; limited or unavailable alternative water supplies are; or other circumstances.

(C) Stages One and Two conservation measures are voluntary, and will be enforced through public outreach, education, and awareness measures by the City.

1 (D) Stages Three and Four conservation measures are mandatory, and violations are
2 subject to criminal, civil, and administrative.

3 **Section 14.22.030 Stage One - Normal Water Supply.**

4 (A) Stage One applies when the City can meet all of its water demands, but declares, by
5 resolution, that it has determined that certain conservation methods are warranted to preserve
6 existing water supply in the event that the City will be unable to meet future water demands.

7 (B) Upon declaration of Stage One by the City Council, the following water conservation
8 measures shall apply:

9 (1) Watering lawns and/or ground cover and irrigating landscaping is prohibited
10 from 8:00 a.m. to 8:00 p.m. Pop-up spray-type sprinklers are limited to 15 minute total run-
11 time. Impact and rotor sprinklers are limited to 30 minutes total run-time. Irrigation water
12 cannot leave the landscaped area.

13 (2) All open hoses shall be equipped with automatic, positive shut-off nozzles.

14 (3) Washing of automobiles, trucks, trailers, boats, airplanes and other types of
15 mobile equipment, is permitted at any time with a hand-held bucket or a hand-held hose
16 equipped with an automatic, positive shut-off nozzle for quick rinses. Washing may be done
17 at any time at a commercial car wash or commercial service station, or by a mobile car wash
18 or on-site car wash using high pressure washing equipment. Washings necessary for the
19 health, safety, and welfare of the public, such as garbage trucks or vehicles used for food and
20 perishables, are exempt from this section.

21 (4) Construction operations shall not use water unnecessarily. Newly-installed
22 landscaping at construction sites requiring watering are subject to (1) and (2) above.

23 **Section 14.22.040 Stage Two – Minimum Water Shortage.**

24 (A) Stage Two applies when the City Council declares, by resolution that a reasonable
25 probability exists that the City will not be able to meet all of its water demands.

26 (B) Upon declaration of Stage Two by the City Council, the following water conservation
27 measures shall apply:

28 (1) Except as otherwise provided in this Section, all Stage One measures remain
in effect.

(2) Customers will be asked to reduce their monthly water consumption by ten
percent (10%) to fifteen percent (15%).

(3) Non-agricultural irrigation, including construction meter irrigation, is limited
as follows:

(a) Properties with odd number street addresses, parks, and the public
right of ways may be irrigated only on Saturdays, Mondays, and Wednesdays
between the hours of 8:00 p.m. to 8:00 a.m.

1 (b) Properties with even number street addresses may be irrigated only on
2 Sundays, Tuesdays, and Thursdays between the hours of 8:00 p.m. to 8:00 a.m.

3 (c) All automatic irrigation timers shall be adjusted according to changing
4 weather patterns and shall completely eliminate run-off.

5 (d) Irrigation landscaping is prohibited on Fridays and on any day of the
6 week from 8:00 a.m. to 8:00 p.m.

7 (e) All irrigation timers shall be adjusted to comply with the above.

8 (f) Recycled water may be used to irrigate fruit trees, lawns and ground
9 covers, and ornamental trees and shrubs at any time and on any day of the week
10 notwithstanding (a) – (e), above.

11 (4) All plumbing leaks, improperly adjusted sprinklers, or other water
12 appurtenances requiring repair or adjustment shall be corrected to the satisfaction of the City
13 within seventy-two (72) hours of notification by the City. The City will attempt to contact
14 customers by phone, mail or printed “door-hanger” notice. All customers shall ensure that
15 the City has current telephone contact information.

16 (5) Use of water from fire hydrants shall be limited to fire-fighting-related
17 activities, utility operation and repair, or other uses necessary to maintain the health, safety,
18 and welfare of the public.

19 (6) Eating or drinking establishments, or other public place where food or drinks
20 are sold, served, or offered for sale, may only provide drinking water upon specific request.

21 (7) Hotels, motels and other commercial lodging establishments shall provide
22 customers the option of not having towels and linen laundered daily. Commercial lodging
23 establishments shall prominently display notice of this option in each bathroom using clear
24 and easily understood language.

25 (8) Construction operations receiving water from a construction meter or water
26 truck shall not use water unnecessarily for any purpose, other than those required by
27 regulatory agencies. Construction projects requiring watering for new landscaping materials
28 shall adhere to the designated irrigation requirements set forth in (3)(a) – (3)(e), above.

Section 14.22.050 Stage Three - Moderate Water Shortage.

(A) Stage Three applies when the City Council declares, by resolution, that the City will
not be able to meet all of the water demands of its Customers.

(B) Upon declaration of Stage Three by the City Council, the following water
conservation measures shall apply:

(1) Except as otherwise provided in this Section, all Stage One and Two measures
remain in effect.

1 (2) Water customers will reduce their monthly water consumption by fifteen to
2 twenty percent (15 – 20%) for the duration of Stage Three.

3 (3) Non-agricultural irrigation is limited to the following designated hours and
4 designated days:

5 (a) Properties with odd number street addresses, parks, and the public
6 right of ways may be irrigated only on Saturdays and Wednesdays between the hours
7 of 8:00 p.m. to 8:00 a.m.

8 (b) Properties with even number street addresses may be irrigated only on
9 Sundays and Thursdays between the hours of 8:00 p.m. to 8:00 a.m.

10 (c) Pop-up spray-type sprinklers shall be limited to a maximum of fifteen
11 (15) minute total run-time on the allowed days of irrigation. Impact and rotor
12 sprinklers shall be limited to a maximum thirty (300 minute total run-time on the
13 allowed days of irrigation. All automatic irrigation timers shall be adjusted according
14 to changing weather patterns and to completely eliminate run-off.

15 (d) Irrigation is prohibited on Mondays and Fridays and on any day of the
16 week from 8:00 a.m. to 8:00 p.m.

17 (4) Use of recycled water for irrigation is permitted on any day and at any time
18 notwithstanding (3)(a) – (2)(e) above.

19 (5) Washing of automobiles, trucks, trailers, boats, airplanes and other types of
20 mobile equipment is permitted only during the hours of 6:00 a.m. to 6:00 p.m. on Fridays,
21 Saturdays, Sundays, and Mondays with a hand-held bucket or a hand-held hose equipped
22 with an automatic, positive shut-off nozzle for quick rinses. Washing is permitted at any
23 time on the immediate premises of a commercial car wash. Commercial car washes not
24 using partially reclaimed or recycled water shall reduce their water use as determined by the
25 City Council. Washings necessary for the health, safety, and welfare of the public, such as
26 garbage trucks or vehicles used for food and perishables, are exempt from this section.

27 (6) The overfilling of swimming pools and spas is prohibited.

28 (7) The filling or refilling of ponds, streams, and artificial lakes is prohibited.

(8) The operation of any ornamental fountain or similar structure is prohibited.

(9) Construction projects requiring water from a construction meter or a water
truck shall not use water unnecessarily for any purposes, other than those required by
regulatory agencies. Construction projects requiring water for new landscapes shall adhere
to the designated days and times as set forth in Section 8(c)(2) hereof.

Section 14.22.060 Stage Four – Severe Water Shortage.

(A) Stage Four applies when the City Council declares, by resolution, that the City's
ability to meet its water demands is seriously impaired.

1 (B) Upon declaration of Stage Four by the City Council, the following water conservation
2 measures shall apply:

3 (1) Except as otherwise provided in this Section, all Stage One, Two, and Three
4 conservation measures shall be in full force and effect during Stage Four.

5 (2) Water customers will reduce their monthly water consumption by twenty to
6 fifty percent (20 – 50 %) for the duration of Water Conservation Stage Four.

7 (3) Non-agricultural irrigation shall be limited to supporting minimal survival of
8 trees and shrubs. Trees and shrubs may be irrigated, only during the following designated
9 hours and designated days:

10 (a) Properties with odd number street addresses, parks, and public right of
11 ways may irrigate only on Saturdays between the hours of 8:00 p.m. and 8:00 a.m.

12 (b) Properties with even number street addresses may irrigate only on
13 Sundays between the hours of 8:00 p.m. and 8:00 a.m.

14 (c) Irrigation is prohibited on Mondays, Tuesdays, Wednesdays,
15 Thursdays, and Fridays and on any day of the week from 8:00 a.m. to 8:00 p.m.

16 (4) Use of recycled water for irrigation is permitted on any day and at any time
17 notwithstanding (3)(a) – (2)(e) above.

18 (5) All outdoor watering and irrigation of lawns and similar ground covers is
19 prohibited with the exception of plant materials determined by the General Manager to be
20 rare, exceptionally valuable, or essential to the well being of the public or threatened or
21 endangered animals.

22 (6) Washing of automobiles, trucks, trailers, boats, airplanes and other types of
23 mobile equipment is prohibited except at a commercial car wash. Commercial car washes
24 shall only use wholly- or partially-recycled water for washing automobiles, trucks, trailers,
25 boats, airplanes and other types of mobile equipment. Washings necessary for the health,
26 safety, and welfare of the public, such as garbage trucks or vehicles used for food and
27 perishables, are exempt from this section.

28 (7) Filling, refilling, or replenishing swimming pools, spas, ponds, streams, and
artificial lakes is prohibited.

(8) Operation of any ornamental fountain, pond, or similar structure is prohibited.

(9) Use of water for cooling mists is prohibited.

(10) Water used for commercial, manufacturing, or processing purposes shall be
reduced as determined by the City Council.

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Section 14.22.070 Water Shortage Emergency.

(A) If the City Council has declared either Stage Three or Stage Four conservation, it may also, by resolution, declare a Water Shortage Emergency. A Water Shortage Emergency may be an immediate emergency, or a threatened future water shortage, or both; and

(B) Upon declaration of a Water Shortage Emergency:

- (1) No new construction meters will be issued.
- (2) No construction water may be used for earth work such as road construction purposes, dust control, compaction, or trench jetting.
- (3) No new building permit(s) shall be issued, except:
 - (a) Projects found by the City Council to be necessary for public health, safety.
 - (b) Projects using recycled water for construction.
 - (c) Projects which will not result in a net increase in non-recycled water use.
 - (d) Projects with adequate Conservation Offsets, if available. The City, in its sole discretion, may choose to make Conservation Offsets available. Conservation Offset costs shall be based on the cost of conserving the water elsewhere to provide the water needed for a project, the cost of providing an alternative water supply deemed acceptable by the City, or other measures as may be found in the City’s Water Use Efficiency Master Plan. Conservation Offset fees will be set forth in the Water Rules and Rate Schedules.

Section 14.22.080 Enforcement and Severability.

(A) Any violation of this article shall be subject to enforcement by issuance of an administrative citation pursuant to Chapter 1.17 of this Code. Prior to issuance of an administrative citation, the City shall give one courtesy notice requesting voluntary correction of the violation. The City Manager, or his or her designee, may enter into a written agreement with a customer to resolve any violation provided that such agreement is consistent with the purpose and intent of this Chapter.

(B) If any phrase, section, sentence, or word of this Ordinance is held invalid by a court of competent jurisdiction, such invalidity shall not affect any other phrase, section, sentence, or word of the Ordinance that can be given effect without the invalid phrase, section, sentence, or word, and to this end each phrase, section, sentence, or word of this Ordinance is declared to be severable.

Section 5: The City Council has reviewed the matter and, based upon the facts and information contained in the staff reports, administrative record, and written and oral testimony, hereby finds that this ordinance is not subject to CEQA pursuant to Sections 15060(c)(2),

1 15060(c)(3) and/or 15061(b)(3) of the State CEQA Guidelines, California Code of Regulations, Title
2 14, Chapter 3, in that it will not result in a direct or reasonably foreseeable indirect physical change
3 in the environment nor have a significant impact on the environment.

4 Section 6: The City Clerk shall certify to the adoption of this ordinance and cause
5 publication once in a newspaper of general circulation in accordance with Section 414 of the Charter
6 of the City of Riverside. This ordinance shall become effective on the 30th day after the date of its
7 adoption.

8 ADOPTED by the City Council this _____ day of _____, 2011.

9
10 _____
11 Mayor of the City of Riverside

12 Attest:

13 _____
14 City Clerk of the City of Riverside
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1 I, Colleen J. Nicol, City Clerk of the City of Riverside, California, hereby certify that the
2 foregoing ordinance was duly and regularly introduced at a meeting of the City Council on the
3 _____ day of _____, 2011, and that thereafter the said ordinance was duly and
4 regularly adopted at a meeting of the City Council on the _____ day of _____, 2011,
5 by the following vote, to wit:

6 Ayes:

7 Noes:

8 Absent:

9 Abstain:

10
11 IN WITNESS WHEREOF, I have hereunto set my hand and affixed the official seal of the
12 City of Riverside, California, this _____ day of _____, 2011.

13
14 _____
15 City Clerk of the City of Riverside

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17 O:\Cycom\Wpdocs\D002\P012\00070998.DOC
18 10-1081 SDW 6/15/11

Appendix M

City of Riverside's Water Waste Rule

City of Riverside Public Utilities Department
Water Rule #15
Water Waste

Any Person using, wasting, or permitting water to run from any water main, tap, fire hydrant, or other connection in a manner not authorized shall pay to the City for all such water at the rates fixed in Water Rate Schedule WA-1, notwithstanding the fact that such water is not metered.

Reference is made to Riverside Municipal Code Section 13.04.120 - RUNNING WASTE WATER UPON STREETS: "It is unlawful for any Person using water for irrigation, domestic or other use or purpose, to run any waste water or allow the same to run onto or upon any public street in the City, but each Person must care for and dispose of his own waste water."

Reference is also made to Riverside Municipal Code Section 1.01.110:

1.01.110 PENALTY FOR VIOLATION - CONTINUING VIOLATIONS.

"Whenever in this Code or in any other ordinance of the City, or any rule or regulation promulgated pursuant thereto, any act is prohibited or is made or declared to be unlawful or an offense, or the doing of any act is required or the failure to do any act is declared to be unlawful or a misdemeanor, where no specific penalty is provided for, the violation of any such provision of this Code or any other ordinance of the City shall be punishable by a fine not exceeding one thousand dollars or imprisonment for a term not exceeding six months, or by both such fine and imprisonment; except that notwithstanding any other provisions of this Code, any such violation constituting a misdemeanor may, in the discretion of the City Attorney, be charged and prosecuted as an infraction.

Any person convicted of an infraction under the provisions of this code, unless provision is otherwise herein made, shall be punishable by a fine not exceeding one hundred dollars for a first violation, a fine not exceeding two hundred dollars for a second violation of the same provision within one year, and a fine not exceeding five hundred dollars for each additional violation of the same provision within one year."

"Every day any violation of this Code or any other ordinance of the City shall continue shall constitute a separate offense."

Whenever it appears to the Director that water delivered by the Water Utility is being used in violation of the terms of this Rule, he shall give written notice to the person so wasting water of his intention, after a reasonable time to be therein stated, to shut-off the water supply to the Person's Premises.

In the event that waste of water shall be found to be due to leaking, or defective or wasteful equipment, such water shall remain shut-off until such Person makes necessary corrections in their equipment to prevent further water waste.

Adopted by Board of Public Utilities: December 16, 1994

Approved by City Council: April 18, 1995

Effective Date: May 18, 1995

Appendix N

Typical Concentration of Blended Potable Water



Water Quality Report 2010

An important message about drinking water sources from the USEPA

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of land or through the ground, it dissolves naturally occurring minerals, and in some cases radioactive materials, and can pick up substances resulting from the presence of animals or human activity. Contaminants that may be present in source water include:

Microbial Contaminants, such as viruses and bacteria, that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.

Inorganic Contaminants, such as salts and metals, that can be naturally occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.

Pesticides and Herbicides, which may come from a variety of sources, such as agriculture, urban stormwater runoff, and residential uses.

Organic Chemical Contaminants, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production and can also come from gas stations, urban storm water runoff, agricultural application, and septic systems.

Radioactive Contaminants, which can be naturally occurring or be the result of oil and gas production and mining activities.

Regulations: In order to ensure that tap water is safe to drink, U.S. Environmental Protection Agency and the California Department of Public Health (CDPH) prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. Department regulations also establish limits for contaminants in bottled water that must provide the same protection for public health.

Important Health Information: Some people may be more vulnerable to contaminants in drinking water than the general population. Immunocompromised persons, such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly people, and infants, can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. USEPA/CDC guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hot Line. Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the USEPA's Safe Drinking Water Hotline at 1(800) 426-4791.

Water Sources: Riverside's water is groundwater from wells in the Bunker Hill Basin and Riverside Basin. RPU and other water agencies completed a source-water assessment study for Bunker Hill Basin in San Bernardino in October 2002 and the Riverside Basin in 2000. The source water assessment reports were submitted to the CDPH. Copies are available at Riverside Public Utilities, Water Resources.

This report contains important information about your drinking water. Translate it or speak with someone who understands it.

SPANISH

Este reporte contiene información muy importante sobre su agua potable. Tradúzcalo o hable con alguien que lo entienda bien. Para más información por favor llame (951) 782-0330.

CHINESE

此份有关你的食水报告,内有重要资料和讯息,请找他人为你翻译及解释清楚。

JAPANESE

この情報は重要です。
翻訳を依頼してください。

TAGALOG

Mahalaga ang impormasyong ito.
Mangyaring ipasalin ito.

VIETNAMESE

Chi tiết này thật quan trọng.
Xin nhờ người dịch cho quý vị.

KOREAN

이 인내는 매우 중요합니다.
본인을 위해 번역인을 사용하십시오.

SECONDARY STANDARDS

AESTHETIC STANDARDS

| | STATE MCL | RIVERSIDE PUBLIC UTILITIES AVERAGE | PUBLIC UTILITIES RANGE | SOURCES IN DRINKING WATER |
|---------------------------------|--------------|------------------------------------|------------------------|--|
| Odor Threshold | 3 | <1 | <1 - 1 | Naturally present in environment |
| Chloride | 500 ppm | 29 ppm | 25 - 31 ppm | Naturally present in environment |
| Sulfate | 500 ppm | 67 ppm | 57 - 79 ppm | Naturally present in environment |
| Total Dissolved Solids "TDS" | 1,000 ppm | 363 ppm | 300 - 430 ppm | Naturally present in environment |
| Specific Conductance | 1,600 µmho | 575 | 560 - 590 | Substances form ions in water |
| Corrosivity | Noncorrosive | 0.7 | 0.6 - 0.7 | Natural or industrially influenced balance of hydrogen, carbon, and oxygen in the water; affected by temperature and other factors |
| pH Units | NS | 7.7 units | 7.0 - 8.1 units | Naturally present in environment |
| Hardness (CaCO ₃) | NS | 200 ppm (12 gpg) | 190 - 210 ppm | Naturally present in environment |
| Alkalinity (CaCO ₃) | NS | 160 ppm | 150 - 170 ppm | Naturally present in environment |
| Sodium | NS | 40 ppm | 38 - 42 ppm | Naturally present in environment |
| Calcium | NS | 64 ppm | 61 - 67 ppm | Naturally present in environment |
| Potassium | NS | 3 ppm | 3 ppm | Naturally present in environment |
| Magnesium | NS | 10 ppm | 9 - 11 ppm | Naturally present in environment |

Monitoring Report 2010

Riverside Public Utilities tests for more than 200 possible contaminants in our water system. This report provides data from sampling conducted in calendar year 2010. Only those contaminants detected in our water system are listed here. For a listing of additional chemical tests, please contact Water Quality Manager Adam Ly at (951) 351-6331.

Water Resources

Riverside met all of its water supply needs by utilizing groundwater sources located in the San Bernardino, Bunker Hill, and Riverside Basins.

Water Compliance & Monitoring Program

In 2010, we collected more than 18,600 water samples to test for a variety of potential contaminants. Samples were collected at water sources, along transmission pipelines, throughout the distribution system, including reservoirs and booster stations, and treatment plants to ensure water quality from its source to your meter.

The Utility uses state certified independent laboratories to perform water tests. This ensures that an independent set of experts test your water from the source to your meter. Last year, we spent more than \$700,000 on compliance laboratory costs.

Riverside Public Utilities 2010 Water Sampling Data

- 6,752 - Samples collected to test for bacteria.
- 6,527 - Samples collected for source and system compliance and monitoring.
- 5,376 - Samples collected for treatment plant compliance and monitoring.
- 18,655 - Total samples collected.

We are pleased to report that our water met or surpassed all state and federal drinking water quality standards in 2010. We welcome you to attend our Board of Public Utilities meetings at 3901 Orange Street, in Riverside, held at 8:30 a.m. on the first and third Fridays of each month. You can also visit our website at BlueRiverside.com for more information.

RIVERSIDE PUBLIC UTILITIES 2010 WATER QUALITY REPORT

PRIMARY STANDARDS: MANDATORY HEALTH-RELATED STANDARDS

| CONTAMINANT | STATE MCL | STATE PHG | RIVERSIDE PUBLIC UTILITIES AVERAGE | PUBLIC UTILITIES RANGE | SOURCES IN DRINKING WATER |
|--|---------------------------|--------------------------|------------------------------------|------------------------|---|
| MICROBIOLOGICAL | | | | | |
| Total Coliform (P/A) (a) | 5% | 0% | 0% | 0 - 0.5% | Naturally present in environment |
| CLARITY | | | | | |
| Turbidity | 0.5 NTU | NS | 0.1 NTU | <0.1 - 0.7 NTU | Naturally present in environment |
| REGULATED ORGANIC | | | | | |
| Total Trihalomethanes "TTHMs" | 80 ppb | NS | 10 ppb | ND - 15 ppb | By-product of drinking water disinfection |
| Halocetic Acids "HAA5" | 60 ppb | NS | ND | ND - 2 ppb | By-product of drinking water chlorination |
| Chlorine | 4 ppm | 4 ppm | 0.5 ppm | ND - 1.6 ppm | Drinking water disinfectant added for treatment |
| Control of DBP precursors | Treatment Requirement | NS | 0.4 ppm | ND - 0.8 ppm | Various natural and man-made sources |
| Total Organic Carbon "TOC" | | | | | |
| Dibromochloropropane "DBCP" | 200 ppt | 1.7 ppt | ND | ND - 10 ppt | Banned nematocide still present due to past agricultural activities |
| REGULATED INORGANIC | | | | | |
| Arsenic | 10 ppb | 4 ppt | 2 ppb | ND - 2 ppb | Erosion of natural deposits |
| Fluoride | 2 ppm | 1.0 ppm | 0.6 ppm | 0.5 - 0.6 ppm | Naturally present in environment |
| Nitrate (NO ₃) | 45 ppm | 45 ppm | 22 ppm | 18 - 30 ppm | Naturally present in environment |
| Perchlorate | 6 ppb | 6 ppb | ND | ND - 4 ppb | Inorganic chemical used in variety of industrial operations. |
| RADIOLOGICAL | | | | | |
| Gross Alpha | 15 pCi/L | NS | 7 pCi/L | <3 - 20 pCi/L | Erosion of natural deposits |
| Uranium | 20 pCi/L | 0.5 pCi/L | 9.5 pCi/L | <1 - 18 pCi/L | Erosion of natural deposits |
| LEAD/COPPER (AL) (90% Household Tap) | | | | | |
| Copper (b) | 1,300 ppb | 170 ppb | 470 ppb | <50 - 730 ppb | Internal corrosion of home plumbing |
| REGULATED CONTAMINANTS WITH NO MCLS | NOTIFICATION LEVEL | STATE PHG OR MCLG | AVERAGE | RIVERSIDE RANGE | |
| Chromium VI | NS | NS | 2.2 ppb | 1.6 - 2.7 ppb | |
| Vanadium | NL 50 ppb | NS | 6 ppb | 6 - 7 ppb | |
| Boron | NL 1000 ppb | NS | 125 ppb | 100 - 160 ppb | |

Definitions

Maximum Contaminant Level (MCL) The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.

Maximum Contaminant Level Goal (MCLG) The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the US Environmental Protection Agency (EPA).

Public Health Goal (PHG) The level of a contaminant in drinking water below which there is no known or expected health risk. PHGs are set by the California EPA.

Regulatory Action Level (AL) The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.

Primary Drinking Water Standard (PDWS) MCLs and MRDL's for contaminants that affect health, along with their monitoring and reporting requirements, and water treatment requirements.

Maximum Residual Disinfectant Level (MRDL) The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

Maximum Residual Disinfectant Level Goal (MRDLG) The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

Parts Per Million (ppm) One part per million corresponds to one minute in two years or one penny in \$10,000.

Parts Per Billion (ppb) One part per billion corresponds to one minute in 2,000 years or one penny in \$10,000,000.

Parts Per Trillion (ppt) One part per trillion corresponds to one minute in two million years or one penny in \$10,000,000,000.

Picocuries Per Liter (pCi/L) A measure of the radioactivity in water.

Nephelometric Turbidity Units (NTU) A measure of suspended material in water.

Micromhos (μ MHOS) A measure of conductivity (electric current) in water.

| | |
|-------------|--|
| NL | Notification level. |
| ND | Not detected at the detection limit for reporting. |
| NS | No standard. |
| GPG | Grains per gallon of hardness (1 gpg = 17.1 ppm). |
| < | Less than the detectable levels. |

(a) Results of all samples collected from the distribution system during any month shall be free of total coliforms in 95 percent or more of the monthly samples.

(b) The Lead and Copper Rule requires that 90 percent of samples taken from drinking water taps in the program homes must be below the action levels. Monitoring is required every 3 years. In 2010, 62 homes participated in the monitoring program. No lead was detected in the samples collected. The next monitoring program is scheduled for 2013.

Additional Regulatory Information

Fluoride - The California Department of Public Health (CDPH) has established an "optimal" fluoride level for water at 1 ppm. Riverside has naturally occurring fluoride levels at 0.6 ppm and is not planning to add fluoride to its water by artificial means.

Lead - If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. Riverside Public Utilities is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to two minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to take minimize exposure is available from the Safe Drinking Water Hotline or at www.epa.gov/safewater/lead.

Nitrate - In drinking water at levels above 45 ppm is a health risk for infants of less than six months of age. Such nitrate levels in drinking water can interfere with the capacity of an infant's blood to carry oxygen, resulting in a serious illness; symptoms include shortness of breath and blueness of the skin. Nitrate levels above 45 ppm may also affect the ability of the blood to carry oxygen in other individuals, such as pregnant women and those with certain specific enzyme deficiencies. If you are caring for an infant or you are pregnant, you should ask advice about nitrate levels from your health care provider.

Riverside provides drinking water that on average is at 22 ppm and has a range from 18 ppm to 30 ppm during the year. CDPH has set the MCL for nitrate at 45 ppm. Riverside has 52 wells that are blended to comply with drinking water standards. The city conducts extensive monitoring of the blend operations. Seasonal variation in demand and flow, in addition to system maintenance and repair, impact the nitrate levels during the year.

Perchlorate - Perchlorate is a regulated drinking water contaminant in California. The maximum contaminant level for perchlorate is 6 parts per billion. Perchlorate salts were used in solid rocket propellants and other industrial applications.

Monitoring Unregulated Contaminants

This monitoring helps USEPA to determine where certain contaminants occur and whether the contaminants need to be regulated. Data is available at www.epa.gov/ogwdw.

Appendix O

City of Riverside's Septic Systems Ordinance

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A. No one shall occupy a house or any other structure in the City or camp or live on any premises within the City, unless such house or other structure or such premises be properly connected to a public sewer whenever the property on which such house, other structure or premises is situated abuts upon a public or private street or alley or other right-of-way in which there exists a public sewer to which connection may be made; provided, however, if a house or structure is served by a satisfactorily functioning septic system, such connection to a public sewer system will not be required until the septic system for such house or other structure fails.

B. Anyone desiring to obtain a building permit for an addition to any existing house or structure shall be allowed to use a properly functioning septic system.

C. Anyone desiring to obtain a building permit for a new house or structure shall connect to the public sewer system when the property on which such house or structure is situated is not more than one hundred sixty feet from the public sewer and the right-of-way admits such connection, or if the house or structure is located within an area where the use of a septic tank poses a potential contamination risk to the City's drinking water wells in the area, as specified by resolution of City Council. All new houses or structures located within such area must be properly connected to the public sewer system, even if the property on which such house or structure is situated more than one hundred sixty feet from the public sewer and/or the right-of-way must be altered to admit such connection.

Section 2: The City Clerk shall certify to the adoption of this ordinance and cause publication once in a newspaper of general circulation in accordance with Section 414 of the Charter of the City of Riverside. This ordinance shall become effective on the 30th day after the date of its adoption.

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ADOPTED by the City Council and signed by the Mayor and attested by the City Clerk
this 13th day of August, 2002.

Nancy E. Hart Mayor Pro Tempore
Mayor of the City of Riverside

Attest:

Kelly Palmer, Jr
City Clerk of the City of Riverside

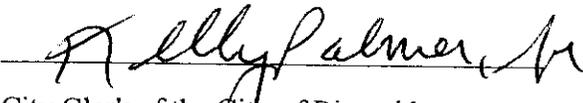
1 I, Colleen J. Nicol, City Clerk of the City of Riverside, California, hereby certify that the
2 foregoing ordinance was duly and regularly introduced at a meeting of the City Council on the
3 23rd day of July, 2002, and that thereafter the said ordinance was duly and regularly
4 adopted at a meeting of the City Council on the 13th day of August, 2002, by the
5 following vote, to wit:

6 Ayes: Councilmembers Beaty, Moore, Defenbaugh, Schiavone, Adkison,
7 Hart, and Pearson.

8 Noes: None.

9 Absent: None.

10 IN WITNESS WHEREOF I have hereunto set my hand and affixed the official seal of the
11 City of Riverside, California, this 13th day of August, 2002.
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14 City Clerk of the City of Riverside
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Appendix P

**2009-2010 Annual Report to the California Urban
Water Conservation Council**



CUWCC BMP RETAIL COVERAGE REPORT 2009-2010
Foundation Best Management Practices for Urban Water Efficiency

Agency: **City of Riverside Public Utilities** District Name: **City of Riverside Public Utilities** CUWCC Unit #: **79**
 Retail

Primary Contact: **Jolene Church** Telephone: **951-826-5745** Email: **jchurch@riversideca.gov**

Compliance Option Chosen By Reporting Agency:
 (Traditional, Flex Track or GPCD)

GPCD if used:

| | |
|----------------------|-----|
| GPCD in 2010 | 207 |
| GPCD Target for 2018 | 222 |

| Year | Report | Target | | Highest Acceptable Bound | |
|------|--------|--------|------|--------------------------|------|
| | | % Base | GPCD | % Base | GPCD |
| 2010 | 1 | 96.4% | 262 | 100% | 271 |
| 2012 | 2 | 92.8% | 252 | 96% | 262 |
| 2014 | 3 | 89.2% | 242 | 93% | 252 |
| 2016 | 4 | 85.6% | 232 | 89% | 242 |
| 2018 | 5 | 82.0% | 222 | 82% | 222 |

Not on Track if 2010 GPCD is \geq than target

GPCD in 2010: **207**
 Highest Acceptable GPCD for 2010: **271**

On Track



CUWCC BMP RETAIL COVERAGE REPORT 2009-2010
Foundation Best Management Practices for Urban Water Efficiency

Foundational BMPs

BMP 1.1 Operational Practices

| | 2009 | | 2010 | | Conservation Coordinator provided with necessary resources to implement BMPs? |
|--|--|--------------------------|---|--------------------------|---|
| | Name | Monroe | Name | Monroe | |
| 1. Conservation Coordinator provided with necessary resources to implement BMPs? | Clay | Monroe | Clay | Monroe | |
| | Title | Conservation Coordinator | Title | Conservation Coordinator | |
| | Email | | Email | cmonroe@riversid | |
| | | On Track | | | On Track |
| 2. Water waste prevention documentation | | | | | |
| Descriptive File | RPU Draft Water Conservation | | RPU Draft Water Conservation Ordinance | | On Track if any one of the 6 ordinance actions done, plus documentation or links provided |
| Descriptive File 2010 | This Ordinance Establishes Water Use Efficiency Best | | | | |
| URL | | | 0 | | |
| URL 2010 | This Ordinance Establishes Water Use Efficiency Best | | | | |
| Describe Ordinance Terms | This Ordinance Establishes Water Use Efficiency Best | | This Ordinance Establishes Water Use Efficiency Best Practices and Staged Water Supply Shortage Measures. | | |
| Describe Ordinance Terms 2010 | | | | | |
| | | On Track | | | On Track |



CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

Foundation Best Management Practices for Urban Water Efficiency

BMP 1.2 Water Loss Control

| | 2009 | |
|--|--------|----------|
| Complete a prescreening Audit | Yes | On Track |
| Metered Sales | 62,015 | |
| Verifiable Other Uses | 1,201 | |
| Total Supply | 70,161 | |
| (Metered Sales + System uses)/ Total Supply >0.89 | 0.90 | On Track |
| If ratio is less than 0.9, complete a full scale Audit in 2009? | Yes | On Track |
| Verify Data with Records on File? | Yes | On Track |
| Operate a system Leak Detection Program? | Yes | On Track |

On Track if Yes

On Track if =>.89, Not on Track if No

On Track if Yes

On Track if Yes

On Track if Yes

| | 2010 | |
|---|----------------------------|-----------------------|
| Compile Standard Water Audit using AWWA Software? | Yes | On Track |
| AWWA file provided to CUWCC? | RPU 09_10 AWWA Water Audit | On Track |
| AWWA Water Audit Validity Score? | 85 | |
| Completed Training in AWWA Audit Method? | no | |
| Completed Training in Component Analysis Process? | No | |
| Complete Component Analysis? | No | |
| Repaired all leaks and breaks to the extent cost effective? | Yes | On Track |
| Locate and repair unreported leaks to the extent cost effective. | Yes | On Track |
| Maintain a record-keeping system for the repair of reported leaks, including time of report, leak location, type of leaking pipe segment or fitting, and leak running time from report to repair. | | |
| Provided 7 types of Water Loss Control Info | | |
| Leaks Repaired | Value Real Losses | Value Apparent Losses |
| | Miles Surveyed | Press Reduction |
| | Cost of Interventions | Water Saved |
| 2006 | \$ - | \$ 128,877 |
| | | 822 |
| | | Off |
| | \$ 753,261 | 152.48 |

On Track if Yes, Not on Track if No

On Track if Yes, Not on Track if No

Info only until 2012

Info only until 2012

Info only until 2012

On Track if Yes, Not on Track if No

On Track if Yes, Not on Track if No

Info only until 2012

Info only until 2012



CUWCC BMP RETAIL COVERAGE REPORT 2009-2010
Foundation Best Management Practices for Urban Water Efficiency

1.3 METERING WITH COMMODITY RATES FOR ALL NEW CONNECTIONS AND RETROFIT OF EXISTING CONNECTIONS

Exemption or 'At least as Effective As' accepted by CUWCC

Numbered Unmetered Accounts

Metered Accounts billed by volume of use

Number of CII accounts with Mixed Use meters

Conducted a feasibility study to assess merits of a program to provide incentives to switch mixed-use accounts to dedicated landscape meters?

Feasibility Study provided to CUWCC?

Completed a written plan, policy or program to test, repair and replace meters

| | 2009 | | 2010 | |
|--|-------|----------|-------|----------|
| | 0 | On Track | 0 | On Track |
| | Yes | On Track | Yes | On Track |
| | 4,943 | | 5,605 | |
| | No | | No | |
| | Yes | On Track | Yes | On Track |
| | Yes | On Track | Yes | On Track |

If signed MOU prior to 31 Dec 1997, On Track if all connections metered; If signed after 31 Dec 1997, complete meter installations by 1 July 2012 or within 6 yrs of signing and 20% biannual reduction of unmetered connections.

On Track if no unmetered accounts

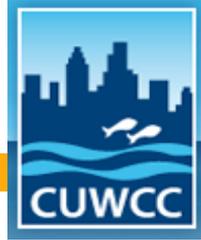
Volumetric billing required for all connections on same schedule as metering

Info only

Info only

On Track if Yes, Not on Track if No

On Track if Yes, Not on Track if No



CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

Foundation Best Management Practices for Urban Water Efficiency

Agency: **City of Riverside Public Utilities**
 Retail
 Primary Contact: **Jolene Church**

District Name: **City of Riverside Public Utilities**
 Email: **jchurch@riversideca.gov**

CUWCC Unit #: **79**
 Coverage Report Date: **June 9, 2011**

1.4 Retail Conservation Pricing Metered Water Rate Structure

Date 2009 data received: **June 24, 2011**
 Date 2010 data received: **June 24, 2011**

On Track if: Increasing Block, Uniform, Allocation, Standby Service; Not on Track if otherwise

| Customer Class | 2009 Rate Type | Conserving Rate? | Customer Class | 2010 Rate Type | Conserving Rate? |
|-----------------|-------------------------|------------------|-----------------|---------------------------|------------------|
| Single-Family | Increasing Block Seas | Yes | Single-Family | Increasing Block Seasonal | Yes |
| Commercial | Increasing Block Seas | Yes | Commercial | Increasing Block Seasonal | Yes |
| Industrial | Increasing Block Seas | Yes | Industrial | Increasing Block Seasonal | Yes |
| Other | Select a Rate Structure | 0 | Other | Select a Rate Structure | 0 |
| Other | Select a Rate Structure | 0 | Other | Select a Rate Structure | 0 |
| On Track | | | On Track | | |

Year Volumetric Rates began for Agencies with some Unmetered Accounts

Info only
 Agencies with Partially Metered Service Areas: If signed MOU prior to 31 Dec. 1997, implementation starts no later than 1 July 2010. If signed MOU after 31 Dec. 1997, implementation starts no later than 1 July 2013, or within seven years of signing the MOU,



CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

Foundation Best Management Practices for Urban Water Efficiency

BMP 2. EDUCATION PROGRAMS

BMP 2.1 Public Outreach Actions Implemented and Reported to CUWCC

Does a wholesale agency implement Public Outreach Programs for this utility's benefit?
Names of Wholesale Agencies

1) Contacts with the public (minimum = 4 times per year)

2) Water supplier contacts with media (minimum = 4 times per year, i.e., at least quarterly).

3) An actively maintained website that is updated regularly (minimum = 4 times per year, i.e., at least quarterly).

4) Description of materials used to meet minimum requirement.

5) Annual budget for public outreach program.

6) Description of all other outreach programs

| | 2009 | 2010 | Yes/No |
|---|---|---|--|
| Does a wholesale agency implement Public Outreach Programs for this utility's benefit? Names of Wholesale Agencies | | | |
| 1) Contacts with the public (minimum = 4 times per year) | 66 | 22 | |
| 2) Water supplier contacts with media (minimum = 4 times per year, i.e., at least quarterly). | 12 | 13 | |
| 3) An actively maintained website that is updated regularly (minimum = 4 times per year, i.e., at least quarterly). | Yes | Yes | |
| 4) Description of materials used to meet minimum requirement. | Newsletter articles on conservation General water conservation information Select a public contact Select a public contact Newspaper contacts Select a type of media contact Select a type of media contact Select a type of media contact | Newsletter articles on conservation General water conservation information Select a public contact Select a public contact Newspaper contacts Select a type of media contact Select a type of media contact Select a type of media contact | All 6 action types implemented and reported to CUWCC to be 'On Track') |
| 5) Annual budget for public outreach program. | \$ 25,000 | \$ 25,000 | |
| 6) Description of all other outreach programs | Description is too large for text area. Data will be stored in the BMP Reporting database when online. | Description is too large for text area. Data will be stored in the BMP Reporting database when online. | |
| | OnTrack for 5 Actions | OnTrack for 5 Actions | |



CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

Foundation Best Management Practices for Urban Water Efficiency

2.2 School Education Programs Implemented and Reported to CUWCC

| | 2009 | 2010 | |
|--|---|---|---|
| Does a wholesale agency implement School Education Programs for this utility's benefit? Name of Wholesale Supplier? | No | No | |
| | NO WHOLESALE PROGRAM... All information below is GSWC funded as Retailer. | NO WHOLESALE PROGRAM... All information below is GSWC funded as Retailer. | |
| 1) Curriculum materials developed and/or provided by agency | See below | See below | Yes/ No |
| 2) Materials meet state education framework requirements and are grade-level appropriate? | No | No | All 5 actions types implemented and reported to CUWCC to be 'On |
| 3) Materials Distributed to K-6? Describe K-6 Materials | Yes | Yes | Describe materials to meet minimum requirements |
| | Each participant receives classroom materials and a WaterWise Activity Kit containing efficiency measures for their homes to perform the hands-on activities. Modifications were made to select materials which incorporated Golden State Water Company's logo and color scheme. Each student/teacher receives: Student Guide, Student Workbook, Parent Introduction Letter*, Home Audit Form, Pre & Post Surveys, Certificate of Achievement WaterWise Activity Kit containing: Oxygenics® High Efficiency Showerhead*, Kitchen Aerator*, • Bathroom Aerator*, Digital Water / Air / Refrigerator / Freezer | Each participant receives classroom materials and a WaterWise Activity Kit containing efficiency measures for their homes to perform the hands-on activities. Modifications were made to select materials which incorporated Golden State Water Company's logo and color scheme. Each student/teacher receives: Student Guide, Student Workbook, Parent Introduction Letter*, Home Audit Form, Pre & Post Surveys, Certificate of Achievement WaterWise Activity Kit containing: Oxygenics® High Efficiency Showerhead*, Kitchen Aerator*, | |
| Materials distributed to 7-12 students? | No | No | Info Only |
| 4) Annual budget for school education program. | \$ 15,000 | \$ 15,000 | |
| 5) Description of all other water supplier education programs | conservation tips, activity sheets | conservation tips, activity sheets | |

| | |
|--------------------------------------|--------------------------------------|
| <p>On Track for 5 Actions</p> | <p>On Track for 5 Actions</p> |
|--------------------------------------|--------------------------------------|