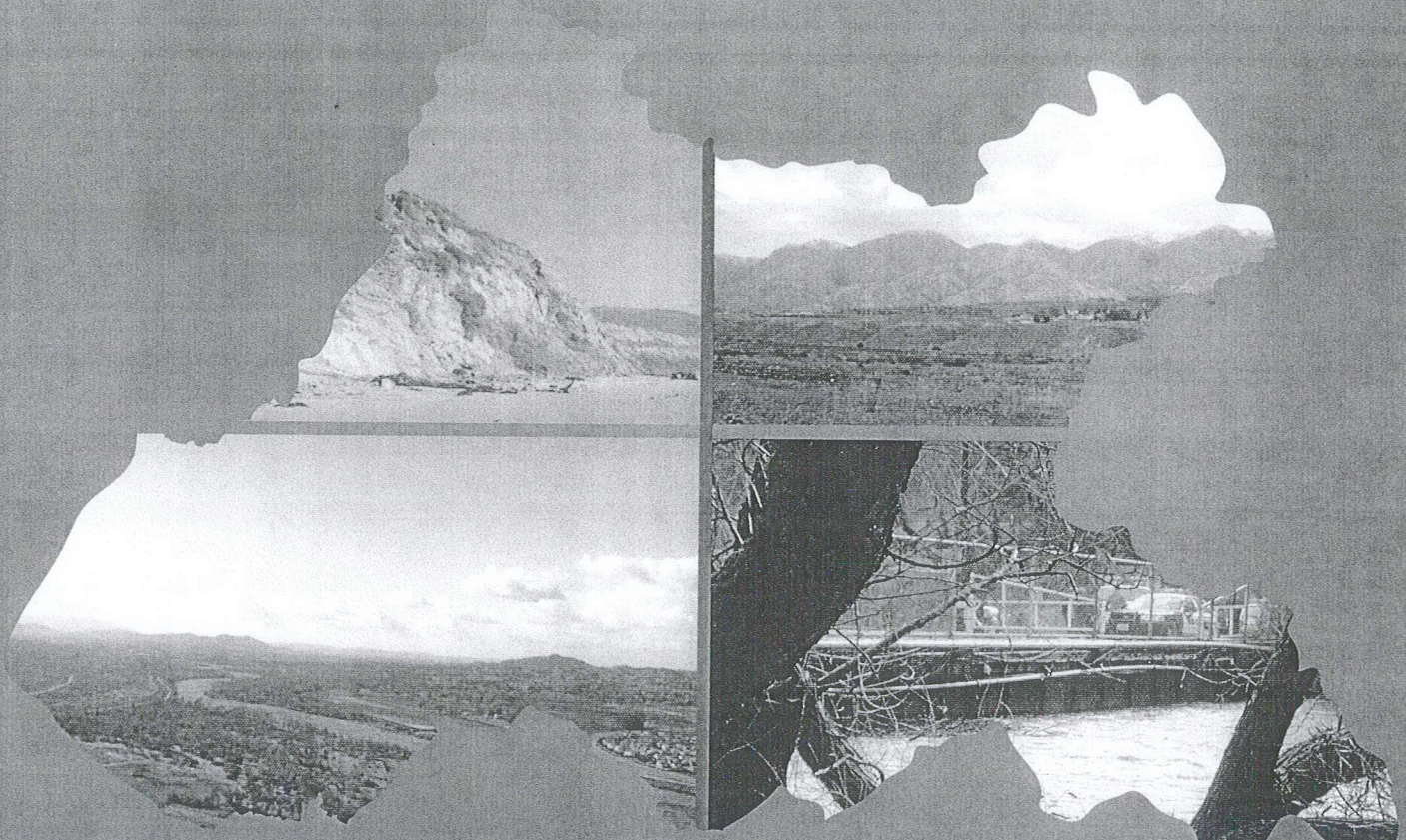
SANTA ANA WATERSHED PROJECT AUTHORITY



Santa Ana Integrated Watershed Plan 2005 Update

An Integrated Regional Water Management Plan

June 2005

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2005 Update

An Integrated Regional Water Management Plan

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List of Acronyms:

Abbreviations and terms used in this report:

AFY	Acre-feet per year
Basin Plan	Water Quality Control Plan, Santa Ana River Basin
BMP	Best Management Practices
CDA	Chino Basin Desalter Authority
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
CFS	Cubic feet per second
CRA	Colorado River Aqueduct
DWR	California Department of Water Resources
EMWD	Eastern Municipal Water District
EPA	California Environmental Protection Agency
ET	Evapotranspiration
EVMWD	Elsinore Valley Municipal Water District
GWR	Groundwater Replenishment
HUD	United States Department of Housing and Urban Development
IEUA	Inland Empire Utilities Agency
IRP	(MWD) Integrated Water Resources Plan
IRWMP	Integrated Regional Water Management Plan
IWP	Integrated Watershed Program
JCSD	Jurupa Community Services District
LEED	Leadership in Energy and Environmental Design
LESJWA	Lake Elsinore & San Jacinto Watersheds Authority
LLNL	Lawrence Livermore National Laboratory
LUFT	Leaking Underground Fuel Tank
mg/L	Milligrams per liter
MGD	Million gallons per day
MTBE	Methyl tertiary butyl ether
MWD	Metropolitan Water District of Southern California
NPS	Non point source
OCWD	Orange County Water District
POTW	Publicly Owned Treatment Works
PPCP	Pharmaceutical and Personal Care Pollutants
RCD	Resource Conservation District
RCSD	Rubidoux Community Services District
RF/CP	Recharge Facilities/Community Park
RCFCWCD	Riverside County Flood Control and Water Conservation District
RWQCB	Regional Water Quality Control Board
SAIWP	Santa Ana Integrated Watershed Plan
SAR	Santa Ana River
SARI	Santa Ana River Interceptor
SARWG	Santa Ana River Watershed Group

(continued)

List of Acronyms (cont.)

SAW	Santa Ana Watershed
SAWA	Santa Ana Watershed Association of Resource Conservation Districts
SAWDMS	Santa Ana Watershed Data Management System
SAWPA	Santa Ana Watershed Project Authority
SBCFCD	San Bernardino County Flood Control District
SBVMWD	San Bernardino Valley Municipal Water District
SCAG	Southern California Association of Governments
SCIWP	Southern California Integrated Watershed Plan
SPW	State Project Water
SWRCB	State Water Resources Control Board
TDS	Total Dissolved Solids
TIN	Total Inorganic Nitrogen
TVRI	Temescal Valley Regional Inceptor
ug/L	Micrograms per liter
USACOE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFS	United States Forest Service
USFS-BAER	United States Forest Service-Burn Area Emergency Response
USFWS	United States Fish and Wildlife Service
USGS	United States Geologic Survey
VOC	Volatile Organic Compound
WMI	Watershed Management Initiative
WMWD	Western Municipal Water District
WRDP	Water Resource Development Plan
WRP	Water Resources Plan
YVWD	Yucaipa Municipal Water District

Preface

The Santa Ana Watershed Project Authority (SAWPA) Integrated Watershed Plan, 2005 Update is the next step in implementing SAWPA's program to create a sustainable Santa Ana River Watershed supporting economic and environmental vitality, and an enhanced quality of life updating SAWPA's three volume 2002 Integrated Watershed Plan (IWP) included as Appendices A thru C. This plan supports the planning goals and objectives of stakeholders within the Santa Ana River Watershed and serves as the watershed's Integrated Regional Water Management Plan (IRWMP).

This plan can be used by anyone interested in improving the sustainability of water resources and ecological health of the watershed. We are all inextricably linked to the projects and opportunities identified in this Plan because they will help to create a more sustainable Santa Ana Watershed. New partnerships have arisen out of scoping meetings and other discussions during the preparation of this document. Many more partnerships are expected to grow. For example, there is a special message to the planning community inviting public and private sector planners alike to increase awareness of the benefits of planning on a watershed scale and to integrate watershed thinking into the everyday planning process. It is with great excitement and anticipation that SAWPA invites you to read the pages that follow. We hope you will be inspired by the projects, opportunities, and messages contained within this Plan.

Part 1: SAWPA's Integrated Watershed Program

A. Background

The Santa Ana River watershed is home to over 5 million people in southern California, and within the next 50 years, the region's population is projected to grow to almost 10 million people. This growth will certainly accelerate the pressures already on the region's limited water resources. The Santa Ana Watershed Project Authority, or SAWPA, has supported its five member water agencies (see Figure 1-1) and various stakeholder groups throughout the watershed including the Santa Ana Regional Water Quality Control Boards (RWQCB) with developing and implementing a plan to ensure that there is sufficient clean water to support all the water needs of the watershed into the future.

Santa Ana Watershed Project Authority (SAWPA)

SAWPA is a Joint Powers Authority, focusing on water supply and water quality. Its stated mission is to develop and maintain regional plans, programs and projects that will protect the Santa Ana River basin water resources to maximize beneficial uses within the watershed in an economically and environmentally responsible manner. First formed in 1968 as a planning agency, SAWPA was reformed in 1972 with a mission to plan and build facilities to protect the water quality of the Santa Ana River Watershed. The agreements formalizing the current agency were signed in 1974 and went into effect in 1975.

SAWPA Member Agencies

SAWPA carries out functions useful to its five member agencies: Eastern Municipal Water District (EMWD), Inland Empire Utilities Agency (IEUA), Orange County Water District (OCWD), San Bernardino Valley Municipal Water District (SBVMWD), and Western Municipal Water District (WMWD). The jurisdiction of SAWPA and its member agencies spans approximately 2,650 square miles of the Santa Ana Watershed encompassing much of Orange County, a sliver of Los Angeles County, and the major population centers of western Riverside and southwestern San Bernardino Counties. Each of these agencies described below plans and executes long-term projects and management programs of their own, but it is primarily agencies working through SAWPA that provide the vehicle for effective and concerted planning efforts on a regional basis.

Eastern Municipal Water District (EMWD)

Eastern Municipal Water District (EMWD) is a retail water agency servicing an area covering approximately 555 square miles in western Riverside County. The District serves a population of approximately 400,000 in six incorporated cities and unincorporated portions of western Riverside County. In addition to its role as a retail agency, the District also provides wholesale water to the following sub-agencies of Lake Hemet Municipal Water District, City of Hemet, City of San Jacinto, City of Perris, Nuevo Water Company, Elsinore Valley Municipal Water District and Rancho California Water District.

As a member agency of the Metropolitan Water District of Southern California (MWD), the District gained a supply of imported water from the Colorado River Aqueduct and, ultimately, water from northern California through the State Water Project, which transports water from Northern California via the California Aqueduct. The District's initial mission was to deliver imported water to supplement local groundwater supplies. Over time the District's role changed as additional agency responsibilities were added, including groundwater production and resource management, wastewater collection and treatment, and finally regional water recycling.

Inland Empire Utilities Agency (IEUA)

Inland Empire Utilities Agency (IEUA) service area covers about 242 square miles in the southwestern corner of San Bernardino County, and serves a population of approximately 700,000. IEUA provides regional wastewater service and imported water deliveries to eight contracting agencies. These include the City of Chino, City of Chino Hills, Cucamonga Valley Water District (CVWD), City of Fontana, City of Montclair, City of Ontario, City of Upland and Monte Vista Water District.

As a member agency of MWD, IEUA provides supplemental water, as well as regional wastewater treatment for both domestic and industrial clients and energy recovery/production facilities. In addition, the Agency has become a recycled water purveyor, biosolids/fertilizer treatment provider and continues to focus on water supply salt management, for the purpose of protecting the regions vital groundwater supplies.

Orange County Water District (OCWD)

Orange County Water District (OCWD) service area covers more than 350 square miles, and the Orange County Groundwater Basin. The basin provides a water supply to more than 20 cities and water agencies, serving over two million people. The District owns 1,600 acres in and near the Santa Ana River in Anaheim and Orange, which it uses to capture flows and recharge the groundwater basin. The District also owns 2,400 acres above Prado Dam, which it uses for water conservation and water quality improvement.

OCWD's mission is to manage and protect the Orange County Groundwater Basin in northern and central Orange County. The groundwater basin supplies approximately two-thirds of the water used by over two million residents in the District's service area. The balance is imported from the Colorado River and from Northern California through the Sacramento/San Joaquin Delta State Water Project by MWD.

San Bernardino Valley Municipal Water District (SBVMWD)

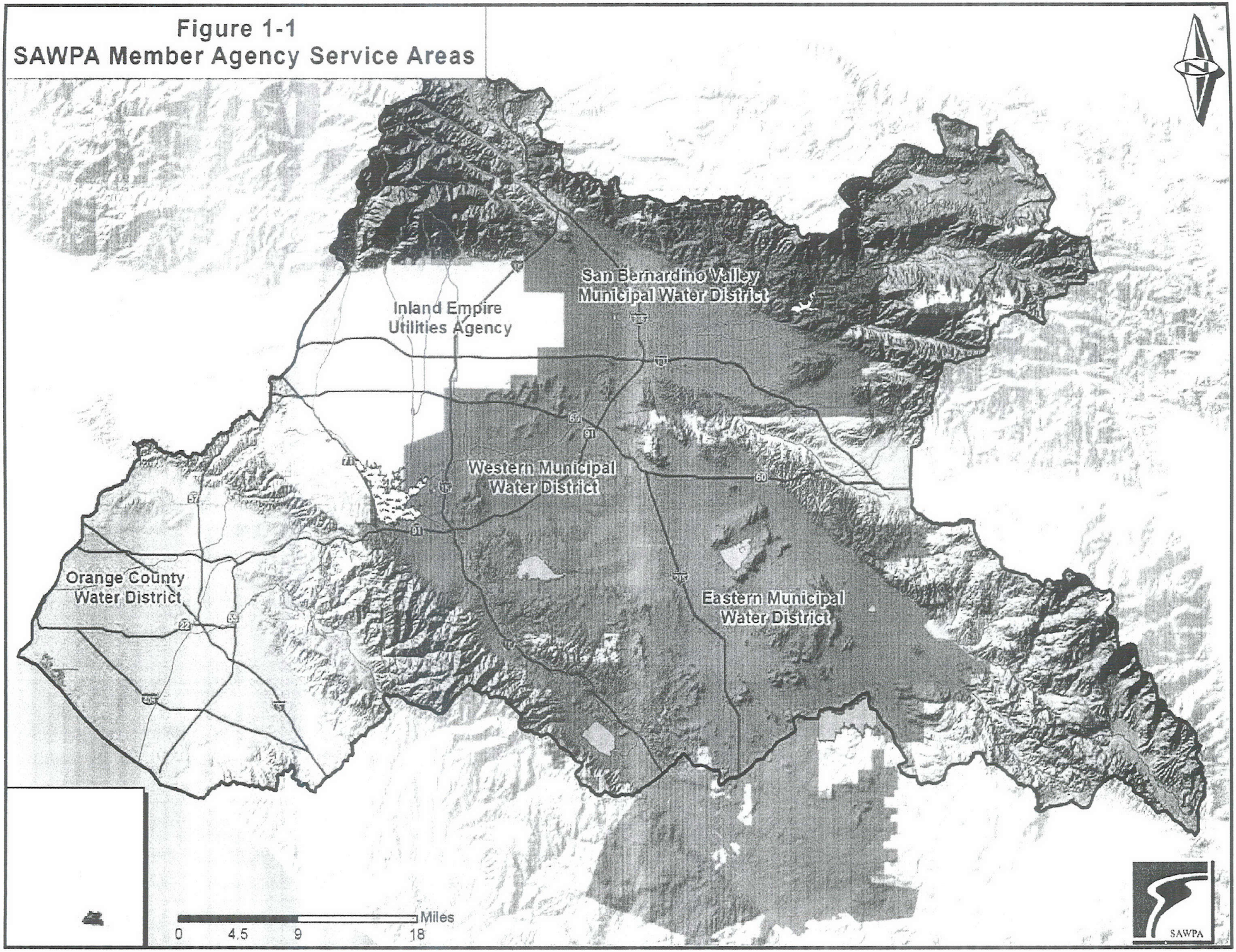
San Bernardino Valley Municipal Water District (SBVMWD) service area covers about 325 square miles primarily in southwestern San Bernardino County with a very small portion of its service area in Riverside County. The area within SBVMWD includes a population of around 600,000. The SBVMWD spans the eastern 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, Bloomington, Highland, Grand Terrace, and Yucaipa. The SBVMWD's mission is to import water into its service area through participation in the California State Water Project. SBVMWD is also charged with managing groundwater and surface water within its boundaries through various court judgments.

Western Municipal Water District (WMWD)

Western Municipal Water District (WMWD) service area covers a 510 square mile area of western Riverside County with a population of about 438,000 people. WMWD serves more than 17,000 retail and nine wholesale customers with water from both the Colorado River and the State Water Project. As a member agency of MWD, WMWD provides supplemental water to the cities of Corona, Norco, and Riverside and the water agencies of Box Springs, Lee Lake, Elsinore Valley, and Rancho California, as well as serving customers in the unincorporated areas of El Sobrante, Eagle Valley, Temescal Creek, Woodcrest, Lake Mathews, and March Air Reserve Base. WMWD also operates and maintains domestic and industrial wastewater collection and conveyance systems for retail and contract services customers in Lake Hills, March Air Reserve Base, Home Gardens, Corona, and Norco.

About one-quarter of the water that WMWD purchases from the MWD comes from the Colorado River Aqueduct and about three-quarters from the State Water Project, which transports water from

Figure 1-1
SAWPA Member Agency Service Areas



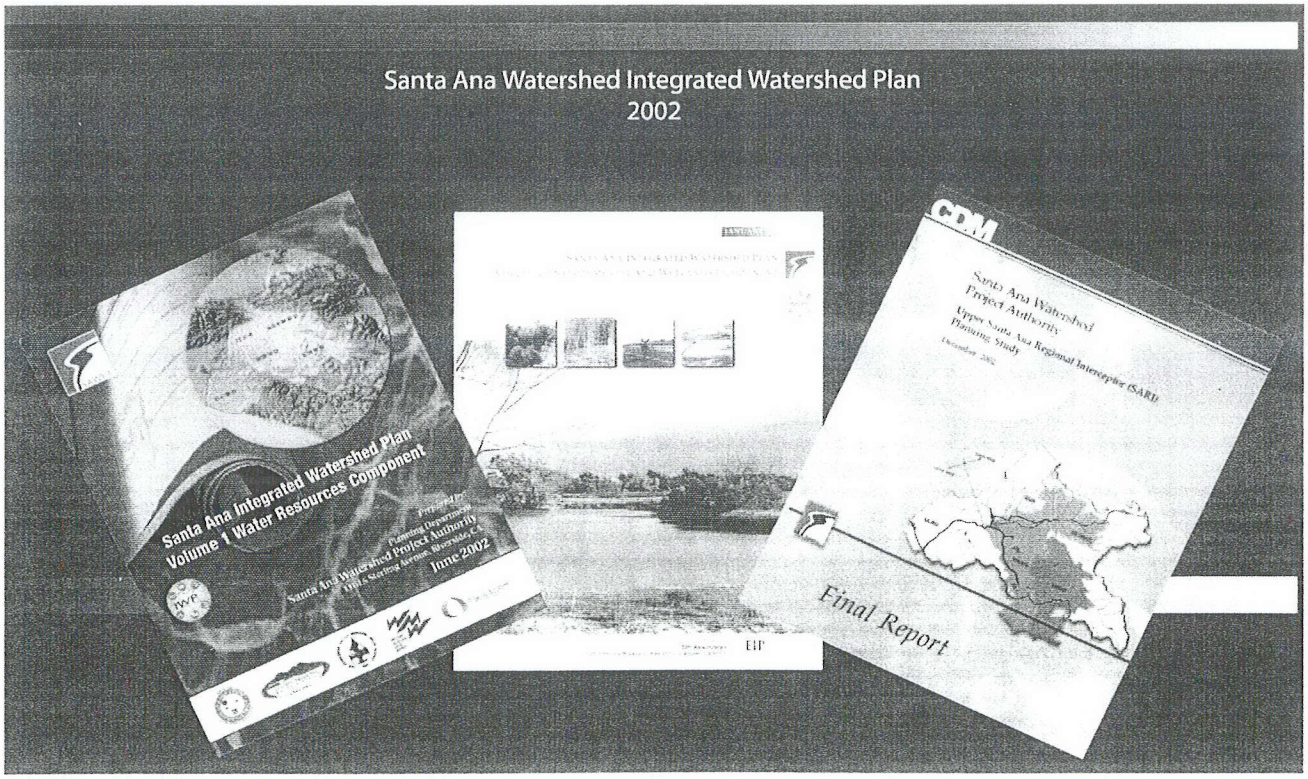
Northern California via the California Aqueduct. Western currently imports a very small quantity of water from the San Bernardino basin and intends to increase these imports with the implementation of the Riverside-Corona Feeder project.

SAWPA's program to address the water resource needs for the region is identified as the Santa Ana Integrated Watershed Program (SAIWP). This program was initiated in 1998 with SAWPA's Water Resources Plan (WRP). The WRP described the measures that must be taken in order to more efficiently utilize both local and imported water resources. This plan was updated and expanded in 2002 as SAWPA's 2002 Santa Ana Integrated Watershed Plan (SAIWP), a three volume planning guide which examined key aspects of watershed growth, health and maintenance in regard to water resources (see Figure 1-2).

The first volume of the SAIWP included as Appendix A is the Water Resources Component, a planning document, which builds upon member agency long-term water resource plans and management programs, thus providing a vehicle to ensure effective and concerted planning efforts on a regional basis. The second volume of the SAIWP included as Appendix B is the Environmental and Wetlands Component. It describes the watershed wide wetlands program and watershed plan that integrates wetlands, trails, habitat, open space, education, and invasive species removal. The third volume of the SAIWP included as Appendix C is the Upper Santa Ana Regional Interceptor (SARI) Planning Component which provides a foundational evaluation of the upper SARI, the watershed brine disposal pipeline, and a future long-term beneficial use of the SARI as the critical facility required to meet the SAWPA goal of transporting highly saline, non-domestic discharges out of the upper watershed to protect its groundwater resources. In addition, to support the IWP process, SAWPA has prepared numerous reports to address regional water resources issues in the Santa Ana River Watershed. These include reports such as:

- The October 2003 Old, Grand Prix and Padua Fires Burn Impacts to Water Systems and Resources Report, which documented the likely impacts to water supply, quality, habitat and flood control throughout the Watershed resulting from the San Bernardino area fires, included as Appendix D;

Figure 1-2

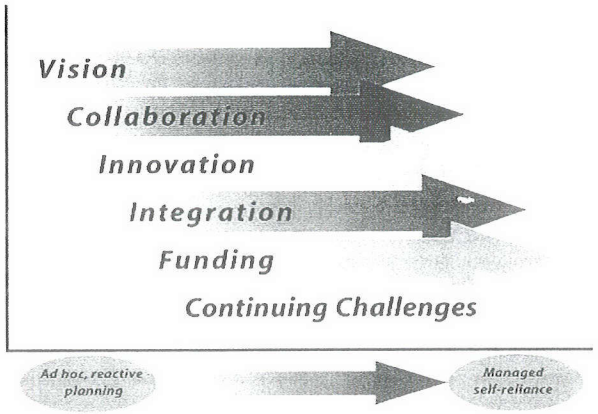


- The March 2004 Santa Ana River Projected Flow Impacts Report, which characterized current flow conditions and projected the impact of municipal wastewater discharges on future flow, included as Appendix E;
- The November 2004 Santa Ana River Watershed Regional Perchlorate Investigative Report, which examined the extent of perchlorate contamination in the watershed and possible actions to address the impacts to water resources, included as Appendix F;
- Water and the Santa Ana Watershed's Economy (Husing, 2005), an analysis of demographic and economic challenges facing the watershed in regard to future water needs, included as Appendix G;
- The 2005 Santa Ana Regional Groundwater Management Plan, which summarizes regional groundwater management plans, included as Appendix H;
- The 2005 SAWPA Urban Water Management Plan, included as Appendix I.

Taken together, the SAIWP and these related planning documents prepared by SAWPA provide an invaluable tool to address the most important long-term regional water resources issues in the Santa Ana watershed.

B. Planning Process

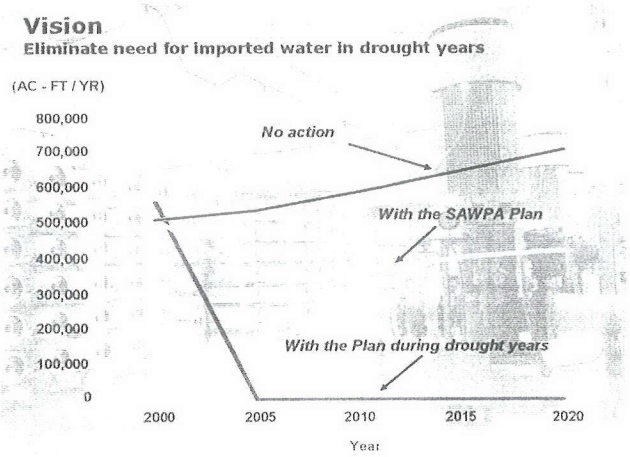
The SAIWP is developed and maintained through an ongoing collaborative stakeholder process, which examines a wide array of watershed issues. This collaborative planning process headed by SAWPA, incorporates input from SAWPA member agencies, as well as, numerous member sub-agencies and other water resource agencies. It considers a broad mix of local, regional, as well as, Statewide plans and priorities and integrates and builds upon regional planning efforts in order to develop and maintain a single comprehensive regional watershed management strategy. The result of this process is an integrated regional plan that provides a detailed mix of projects and programs to address a variety of watershed concerns.



SAWPA believes there are six critical factors that have led to the success of this planning process: vision, collaboration, innovation, integration, funding, and response to continuing challenges.

Vision

It is easy to identify a problem; it much more difficult to start with a vision of how to solve the problem. The problem is to identify how to meet the water needs of a quickly growing population,



in a time when water is becoming scarcer, while also dealing with environmental and other concerns. SAWPA's vision for the watershed is:

A sustainable Santa Ana River Watershed supporting economic and environmental vitality, and an enhanced quality of life.

A key component of SAWPA's long term vision, the SAIWP objective is to lay out an adaptive approach to make the region entirely self sufficient during drought cycles, thereby firming

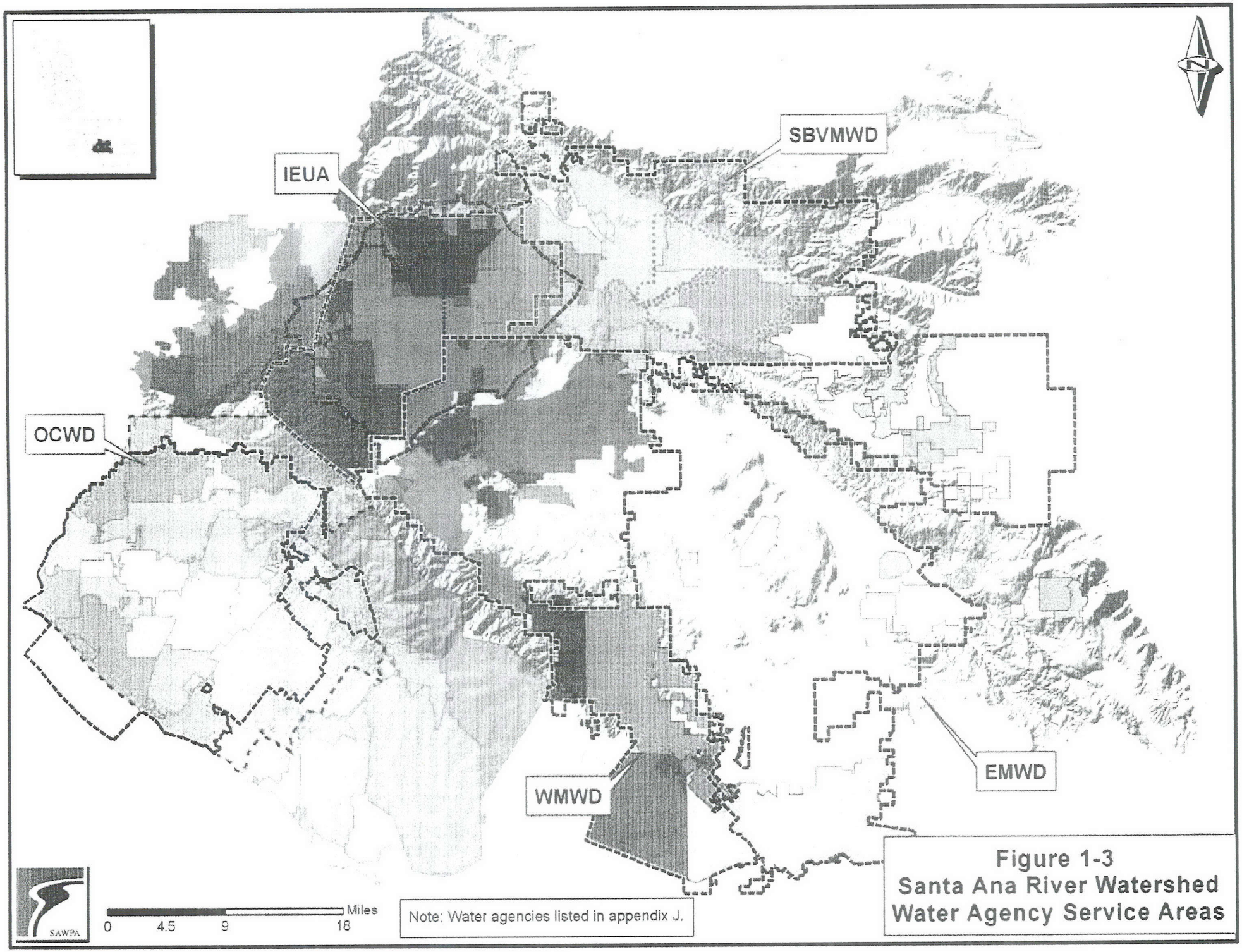


Figure 1-3
Santa Ana River Watershed
Water Agency Service Areas

up the regions ability to assure a stable economy, while improving water quality, and also allowing more of the State's scarce water resources to be allocated to wildlife and agriculture during those times. Through this approach SAWPA is able to develop and maintain regional strategies, programs and projects that protect and preserve the water resources of the Santa Ana River basin. In accordance with this approach, the SAIWP is periodically updated to address the changing goals and needs of the regions water agencies, which are listed as follows:

- Identify and update regional problems, issues, and describe long-term integrated solutions.
- Recognize and adapt to updates and changes in member and member sub-agencies water resource planning.
- Review planning time horizons for 2010, 2025, and 2050 of water demands and supplies.
- Identify and describe a comprehensive mix of water resource projects.
- Balance and integrate available resources, including projects that enhance the environment.
- Assure that three years of groundwater storage is maintained in the Santa Ana River Basin by 2020 so that no imported water would be needed under a drought scenario.
- Assure a salt balance – no net gain in salt volumes – for the Santa Ana River Basin by 2050.

Collaboration

As is likely to occur within any watershed, the sometimes conflicting goals or priorities of various watershed agencies can hinder progress. Within the Santa Ana River Watershed there are over 100 large and small water districts (see Figure 1-3), local, regional, state and federal agencies, and public/private stakeholder groups. SAWPA recognizes that all of these stakeholders have their own valid interests in ensuring there is sufficient clean reliable water in the watershed, and SAWPA takes the initiative to keep all of these groups working together to solve the watershed's issues.

SAWPA strives for a collaborative approach to bring together the planning community, including both public and private sector planners, to advance the benefits of planning on a watershed scale and integrating watershed thinking into the everyday planning process. Working with varied interests and agendas, this watershed planning process has opened the doors to still greater partnerships, funding opportunities, connectivity, and increased awareness of planning projects and opportunities both in the city next door and in the community on the other side of the Watershed.

As many cities and counties are in the process of updating their General Plans, funding opportunities and greater collaboration between water agencies, nongovernmental organizations, and local land use authorities are facilitating beneficial projects such as conservation, open space, restoration, enhancement, connectivity, and multi-benefit approaches. In this way, planners are finding themselves in a new place, one of noting the quality of these projects and how to get them through the regulatory planning process with more agreement and greater speed. State law is helpful in this process for Conservation, Safety, Open Space and Land Use Elements are required elements of every General Plan in the State of California. These Elements provide essential components of good watershed plans. In addition, newly proposed Fire Hazard Planning, as well as the more traditional floodplain management guidelines for preparation of General Plans, include helpful explanations and instructions for planners trying to make sense of how watershed planning can be and should be integrated into General Plan Updates.

In developing regional plans and prioritizing multi-benefit projects, it is important to not only coordinate efforts with other planning agencies within the region, but it is equally important to coordinate across regional boundaries. During the preparation of the IWP, SAWPA staff exchanged information and discussed priorities with planners from regions adjoining the Santa Ana watershed. For example, SAWPA staff coordinated closely with planners and project proponents in south Orange County and in the Los Angeles and San Gabriel River valleys.

State and Federal Involvement

The Resources Agency of the State of California is in the process of developing statewide watershed planning guidelines. This Agency, in conjunction with the SWRCB, issued a draft report for the State Legislature titled "Addressing the Need to Protect California's Watersheds: Working with Local Partnerships". The first recommendation to come out of this report was the development of statewide watershed policy, including the establishment of a single set of overall principles, policies, and flexible guidelines for watershed management. SAWPA has reviewed the draft report and has sought to incorporate the State supported policies, principles, and guidelines in its planning processes to build strong local partnerships.

With authority granted through the California Water Code and the Clean Water Act, the State Water Resources Control Board (SWRCB) and the nine RWQCBs are responsible for the protection and enhancement of California's water quality. The SWRCB sets statewide policy and works with the RWQCBs to implement State and federal laws and regulations. The Water Quality Control Plan for the Santa Ana River Basin (Basin Plan), adopted by the Santa Ana RWQCB, which forms the basis for the region's regulatory program was revised in 1983 and 1995, and 2002. Most policies outlined in the Basin Plan are addressed in the Water Resources Plan Component rather than the Environmental and Wetlands Component of the 2002 SAIWP.

Santa Ana River Watershed Partnerships

Since its formation, SAWPA has taken a lead role in establishing effective regional partnerships with the Santa Ana RWQCB, and other stakeholders in the watershed to address water quality and water resource issues. The following task forces and workgroups are examples of watershed partnerships that SAWPA has administered and formed by working closely with the RWQCB in response to the need for updating various components of the Basin Plan.

San Jacinto TMDL Workgroup

The San Jacinto TMDL Workgroup is a collaborative effort of public and private sector agencies and interests focused on the development of TMDLs within the San Jacinto River watershed and the downstream water bodies of Lake Elsinore and Canyon Lake. Formed in 2000, the workgroup has participated by contributing manpower for a stormwater monitoring program, as well as, local data and input for a watershed modeling study to assess nutrient sources and identify management strategies for the control nutrients in the watershed. Currently, the workgroup is working with the Santa Ana Regional Water Quality Control Board in the formulation of TMDL allocations and implementation strategies.

Santa Ana River Watershed Alliance

In 2004, the Department of Conservation provided a grant to Earth Resource Foundation to help implement water conservation and better water quality management practices (BMPs) within the lower watershed. This grant led to the formation of the Santa Ana River Watershed Alliance (SARWA), composed of over 50 stakeholders from throughout the watershed. The goal of SARWA is to develop in the public an understanding of the issues within the watershed and the tasks being undertaken to address them, and to foster support among public and private organizations and agencies for the advance of watershed management.

Chino Basin TMDL Workgroup

The Chino Basin TMDL Workgroup is a collaborative effort of public and private sector agencies and interests focused on the development of pathogen TMDLs for Santa Ana River Reach 3 and its tributaries and other water bodies in the Chino Basin area. Formed in 2000, the workgroup has been working on several pathogen related activities and studies for the Chino Basin. These include the implementation of a pathogen monitoring program to identify sources and assess contributions of pathogens within the watershed, a beneficial use survey of the Santa Ana

River to examine stream usage and the development of a pathogen modeling framework to evaluate pathogen management scenarios to simulate pathogens. Additionally, the workgroup is working with the Santa Ana Regional Water Quality Control Board in the formulation of pathogen TMDL allocation and implementation strategies.

Santa Ana Watershed TIN/TDS Task Force

The nitrogen management and total dissolved solids (TIN/TDS) Task Force has been recognized in the State of California as a highly effective and successful example of local stakeholders working in conjunction with the RWQCB to maintain high water quality in California. This Task Force formed in 1995 was established to evaluate Basin plan objectives and implement these objectives for nitrate-nitrogen and TDS in the Santa Ana River Watershed. Partners include the Orange County Water District, City of Riverside, City of Colton, City of Rialto, Elsinore Valley Municipal Water District, Riverside-Highland Water Company, Inland Empire Utilities Agency, City of San Bernardino Water Dept., Eastern Municipal Water District, Yucaipa Valley Water District, West San Bernardino County Water District, Chino Basin Watermaster, Chino Basin Water Conservation District, City of Redlands, San Bernardino Valley Water Conservation District, California Institution for Men, San Bernardino Valley Municipal Water District, Jurupa Community Services District, City of Corona, Western Municipal Water District, US Geological Survey, Metropolitan Water District of Southern California, Orange County Sanitation District, San Timoteo Watershed Management Authority and Santa Ana Watershed Project Authority.

Santa Ana Watershed TIN/TDS Meeting

Success of the Maximum Benefit Demonstration

The TIN/TDS Task Force was instrumental in establishing new groundwater objectives for TIN/TDS in the watershed based on established Federal and State law. For the first time in any RWQCB Basin Plan in the State, the study proponents were able to demonstrate that groundwater quality can be protected not solely based on historical quality (the "antidegradation" objectives), but also by meeting demonstration requirements that protect groundwater quality for the "maximum benefit to the people of the State" and be maintained at (the "maximum benefit" objectives). In the Chino Basin, Beaumont and Yucaipa basins, local stakeholders were able to demonstrate to the State that through the implementation of local cooperative projects such as groundwater desalination plants and expanded stormwater capture and recharge basins, groundwater basin quality can be protected and existing and downstream beneficial uses will be met. Through an aggressive series of monitoring requirements, the State will be able to assure that water quality is protected with the antidegradation objectives defined as the default condition. The success of this multi-agency approach in working closely with a local RWQCB to maximize the use of water resources while protecting water quality as been defined by the SWRCB has an extraordinary success and an excellent example for other regions to follow throughout the State.

Santa Ana Watershed Stormwater Quality Task Force

The Santa Ana Watershed Stormwater Quality Task Force is a collaborative effort of public and private sector agencies and interests. The Task Force was formed in 2002 to assist the Santa Ana Regional Water Quality Control Board in providing additional data and science in the evaluation of the REC-1 beneficial use designation and associated water quality objectives for the river. Since beneficial use designations and water quality objectives define the quality of point and nonpoint discharges into receiving waters and these receiving waters are regulated by the Santa Ana RWQCB, municipal stormwater entities as well as other regulated business, industrial and development groups are interested in providing the best available information to update the water quality objectives and designated beneficial uses of receiving waters. Workgroup members will develop a basin-wide assessment of existing conditions of receiving waters and of existing beneficial uses supported by those waters and identify data gaps and other areas where further assessment is needed.

Santa Ana Watershed Basin Monitoring Task Force

The Santa Ana Watershed Basin Monitoring Task Force is a collaborative effort of public and private sector agencies and interests. The Task Force was formed as a spin off of the TIN/TDS Task Force in 2003 with the mission of implementing the monitoring requirements required as part of the original TIN/TDS Task Force effort. These monitoring requirements include a triennial update of the ambient groundwater quality throughout all the groundwater basins in the Santa Ana River Watershed, an annual report on the Nitrogen and TDS in the Santa Ana River for Reaches 2, 4 and 5, and an optional annual monitoring program with report to justify an increased nitrogen loss coefficient of more than 25%. Agencies participating in this Task Force are largely the same as those who participated in the TIN/TDS Task Force and have elected to combine their efforts and provide watershed-wide monitoring reports rather than providing separate reports for each of their separate jurisdictions.

Perchlorate Impacts Workgroup

The Perchlorate Impacts Workgroup, formed in 2004, is a collaborative effort of public and private sector agencies and interests formed to develop and implement regional strategies toward the removal of perchlorate contamination from groundwater resources of the San Ana River. Perchlorate contamination has been detected in groundwater wells throughout the watershed and has been linked directly to past aerospace industry activities, the manufacturing of pyrotechnics and other products, as well as, from past banking of water imported from the Colorado River and chemical fertilizers imported from Chile in the early 1900's.

The Santa Ana Regional Water Quality Control Board has identified perchlorate as a priority for groundwater resource protection. Additionally, within the water industry there is concern regarding the increasing reliance of local agencies on imported water to replace contaminated groundwater to meet potable water demands and the long term impacts to the regional Integrated Watershed Program goal of becoming less dependent on imported water supplies. Workgroup members have been pursuing federal funding to address the perchlorate contamination and SAWPA completed a report describing the extent of perchlorate contamination in the Santa Ana Watershed (SAW).

Regional Watershed Partnerships

In addition to the previously described collaborative partnerships with the RWQCB, over the past decade SAWPA has played a significant role in participating and partnering other regional task force study efforts.

Team Arundo

Team Arundo is recognized throughout the State of California as a leader in the removal of *Arundo donax*, a rapidly growing water thirsty species of giant reed which has infested the Santa Ana River Watershed. Partners include the Santa Ana Watershed Association (SAWA), the Riverside

County Parks and Open Space District, the Riverside County Flood Control District, the Orange County Water District, the Orange County Public Facilities and Resources Department, the Monsanto Company, the Orange County Conservation Corps, California Conservation Corps and SAWPA, which serves as administrator. Historically, the Nature Conservancy has also participated in Team Arundo. Team Arundo members have undertaken a number of ambitious invasive species removal and restoration projects throughout the watershed. The foresight and leadership of these groups have proven instrumental in elevating the need for Arundo removal to an issue of statewide and Federal importance.

Removal of Arundo donax from Santa Ana River

Santa Ana River Trail Partnership

The Santa Ana River Trail Partnership is a multi County effort to develop a continuous multi-use regional trail system and parkway along the Santa Ana River corridor. Partners include San Bernardino, Riverside and Orange Counties, the cities of Anaheim, Colton, Corona, Highland, Huntington Beach, Loma Linda, Norco, Orange, Redlands, Rialto, Riverside, San Bernardino, Santa Ana and Villa Park, as well as, numerous agencies, organizations and consulting groups. While the 110-mile trail is not yet complete, several segments totaling approximately 40 miles have been constructed. Plans are almost complete for the remaining 70 miles (as well as a number of feeder trails and connections), and full funding has been secured for some segments. The trail is viewed as a valuable resource providing multi-benefit opportunities including connectivity, transportation alternatives, scenic relief to urban dwellers, recreational activities, and linear parkways with opportunities for environmental restoration as well as education.

The Santa Ana River Trail Partnerships seeks to develop recreational opportunities

The Friends of Harbors, Beaches, and Parks

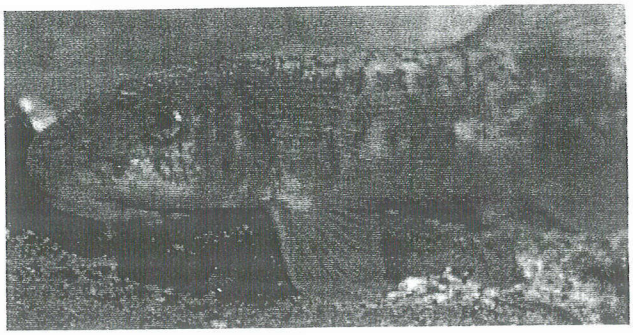
The Friends of Harbors, Beaches, and Parks was established to promote the protection, enhancement, and expansion of Orange County regional parks, open space preserves, recreational trails, and coastal recreational facilities. With a paid membership of over 500 persons and organizations, the Friends of Harbors, Beaches, and Parks works with numerous partners including local cities, Orange County nonprofit organizations, and private entities. This group has proposed to create a 1,400-acre park at the mouth of the Santa Ana River. This park would be assembled from a patchwork quilt of neighboring lands owned and individually managed by three cities; the County of Orange; several regional, State, and federal agencies, and private entities.

Chino Basin Partners

Through the collaboration of community leaders including the Milk Producers Council, Inland Empire Utilities Agency, Chino Basin Watermaster and many others, the Chino Basin has developed an award winning organics management and groundwater protection strategy that offers an integrated (multiple benefit) watershed plan for treating, recycling and reusing organic materials. This partnership is working to deliver significant water and air quality improvements for the region, enhance the reliability of local water supplies, generate clean renewable energy and recycled organic materials, provide significant local economic benefits and contribute to enhanced wildlife habitats within the Chino Basin. Innovative projects include state-of-the-art anaerobic digesters and composting facilities, as well as the construction of California's first platinum Leadership in Energy and Environmental Design (LEED) rated water and energy efficient office building that serves as the headquarters for the Inland Empire Utilities Agency.

Santa Ana Sucker Conservation Team

The Santa Ana Sucker Conservation Team is a multi-agency group effort formed by SAWPA, established to coordinate applied research and direct efforts toward the recovery and delisting of the Santa Ana sucker fish species. Work under this activity allows program participants to continue routine maintenance activities with a regional programmatic section 7 consultation. Partners providing financial support include the City of Riverside, City of San Bernardino, County of Orange PFRD, Orange County Sanitation District, Orange County Water District, Riverside County Flood Control and Water Conservation District, San Bernardino County Flood Control District and SAWPA. Other participants include U.S. Fish and Wildlife Service, California Department of Fish and Game, Santa Ana Regional Water Quality Control Board, Riverside-Corona RCD and the City of Corona. The group has completed a draft Conservation Program for the federally threatened fish, which has been submitted to the U.S. Fish and Wildlife Service. This program enumerates activities that may be undertaken by organizations within the Watershed to minimize effects on the sucker.



The Santa Ana Sucker Conservation Team seeks to restore natural habitat for the threatened Santa Ana Sucker

Lake Elsinore & San Jacinto Watersheds Authority

City of Lake Elsinore • City of Canyon Lake • County of Riverside
Elsinore Valley Municipal Water District • Santa Ana Watershed Project Authority

Lake Elsinore and San Jacinto Watersheds Authority (LESJWA)

LESJWA is a joint powers authority entrusted with $15 million from Proposition 13 Water bond to improve water quality and wildlife habitats, primarily in Lake Elsinore, as well as in Canyon Lake and the surrounding San Jacinto River Watershed. LESJWA members include Riverside County, City of Lake Elsinore, City of Canyon Lake, Elsinore Valley Municipal Water District and the Santa Ana Watershed Project Authority, which serves as LESJWA administrator. LESJWA's mission is to work cooperatively with all stakeholders to rehabilitate, improve and maintain the beneficial uses of the waters within Lake Elsinore and the San Jacinto River Watershed; obtain a sustainable water supply that will provide a stabilized lake level for Lake Elsinore; and protect and enhance the recreational and natural resources within Lake Elsinore and the San Jacinto River Watershed. In the watershed, LESJWA provides a framework to strengthen working relationships between member agencies and stakeholders in an effort to better identify solutions to water and habitat problems that no single agency could effectively address before.

Rainwater Recovery Initiative

In recognition of the opportunities to integrate flood protection and enhancing the groundwater

resources in the region through increased percolation and provide habitat and open space, SAWPA proposed a rainwater recovery initiative in April 2005. This initiative would assist flood control agencies and water agencies to work cooperatively in efforts to enhance the water recovered in the flood control facilities. Unlike many other urbanized systems in California, the Santa Ana Watershed has only about 20% of the flood control infrastructure is concrete lines, with the rest consisting of soft-bottomed channel. The watershed's numerous soft-bottomed channels and associated flood control structures provide outstanding opportunities for increasing groundwater recharge in our region which is so dependent on groundwater to provide water for its economic and environmental future.

The rainwater recovery initiative would assist cooperating agencies in meeting their mandated goals while developing a means to provide additional resources and other important benefits to the region. Cooperative ventures such as these allow individual agencies to leverage scarce resources and develop integrated projects that are more comprehensive than what they could develop individually. The initiative efforts will work to coordinate meetings to cooperatively discuss mission and goals of the agencies, resources available among agencies, understand limitations, and discuss opportunities for cooperative efforts. The initiative will also support projects and efforts to recharge stormwater, provide groundwater clean-up by infiltrating high quality water into the groundwater basins, support non-point pollution control goals, attenuate peak storm flows resulting from urbanization, and improve habitat and facility maintainability through restoration of ecological function in areas where it is possible. Several examples of these types of projects are included in the list of priority projects recommended for funding by SAWPA from the Proposition 50 Chapter 8 Integrated Regional Water Management Grant Program and described under Part 4 of this plan.

San Jacinto River Watershed Council

The San Jacinto River Watershed Council is a multi-agency non-profit group of watershed stakeholders within the San Jacinto River Watershed, a subwatershed of the Santa Ana Watershed. Among the members are local government, water agencies, agriculture, dairy owners and environmental representatives spanning the San Jacinto watershed. Their purpose is to coordinate with stakeholders to ensure that the current and potential uses of the San Jacinto River Watershed's resources are sustained, restored, and where possible, enhanced, while promoting the long-term social and economic vitality of the region. SAWPA is a member of the Council's governing board.

Southern California Wetlands Recovery Program

The Southern California Wetlands Recovery Program is a multi-agency group working cooperatively to acquire, restore, and enhance coastal wetlands and watersheds between Point Conception and the international border with Mexico. Using a non-regulatory approach and an ecosystem perspective, the Wetlands Program will work together to identify wetland acquisition and restoration priorities, prepare plans for these priority sites, pool funds to undertake these projects, implement priority plans, and oversee post-project maintenance and monitoring. The goal of the Southern California Wetlands Recovery Program is to accelerate the pace, the extent, and the effectiveness of coastal wetland restoration in Southern California through developing and implementing a regional prioritization plan for the acquisition, restoration, and enhancement of Southern California's coastal wetlands and watersheds. Ultimately, the Wetlands Program's efforts will result in a long-term increase in the quantity and quality of the region's wetlands.

The Southern California Wetlands Recovery Program seeks to restore natural wetland habitat

Burn Area Working Group

The Burn Area Working Group is a collaborative effort of public and private sector agencies and interest groups focused on evaluating the impacts, as well as, implementing mitigation efforts directly related to impacts of forest fires. The working group was formed in response to the 2003 San Bernardino wildfires which destroyed over 120,000 acres of wildland habitat. Local participants included the cities of San Bernardino, Big Bear, Upland, Redlands, Highland, Claremont, Corona, Rancho Cucamonga and Ontario, as well as, the Chino Basin Watermaster, City of San Bernardino Water Department, San Bernardino Valley Municipal Water District, Western Municipal Water District, Metropolitan Water District of Southern California, West Valley Water District, East Valley Water District, Yucaipa Valley Water District, Cucamonga Valley Water District, Rubidoux County Sanitation District, Fontana Union Water Company, Big Bear Department of Water & Power, Running Springs Water Department, Three Valleys Municipal Water District, San Bernardino Valley Water Conservation District, and the Natural Resources Conservation District. These local stakeholders coordinated efforts and information with federal and State agencies including the United States Forest Service Burn Area Emergency Response (BAER) team, United States Forest Service (USFS), United States Fish & Wildlife Service (USFWS), California Department of Fish & Game (CDFG), United States Army Corps of Engineers (USACOE), and the Santa Ana RWQCB to help the impacted communities identify and mitigate damage from the fires. To support this effort, SAWPA assimilated regional data to produce the "Burn Impacts to Water Systems and Resources Old, Grand Prix, and Padua Fires, October 2003", an important document that described the impacts of the burn areas on the watershed and its resources.

The Burn Area Working Group was key in evaluating the damages from the 2003 San Bernardino wildfires

Local and Regional Plans and Policies

The SAIWP addresses water quality and water supply issues, as well as, environmental issues relating to water within the Santa Ana Watershed and has been developed in accordance with other applicable local, State, and national plans and policies. General Plans for each of the Watershed's three major counties and 59 cities form the cornerstones of policy development within the Watershed. The Orange County General Plan, San Bernardino County General Plan Update and Riverside County General Plan Update have each been reviewed during preparation for this document. One ultimate goal of the SAIWP is to allow watershed planning policies and goals a place in the general plans of local governments.

Coordinating Regional Plans and Programs

Riverside County Integrated Project

Western Riverside County Multispecies Habitat Conservation Plan

San Bernardino County General Plan Update

San Bernardino Valleywide Multispecies Habitat Conservation Plan (MSHCP)

OCWD Long Term Facilities Plan

Orange County Central—Coastal NCCP Subregional Plan

Orange County Southern Subregion Program

Irvine Ranch Land Reserve Program

Endangered Species Recovery Plans

Santa Ana River Canyon Habitat Management Plan

Environmental Assessment for the Santa Ana Watershed Program

Waterfowl-Raptor Conservation Area Program

Lake Elsinore & San Jacinto Watersheds Authority (LESJWA) Nutrient Removal Plan

Stormwater Quality Standards Study

RWQCB TMDL Development and Monitoring

San Jacinto Watershed Management Plan

San Bernardino National Forest Burn Report

Santa Ana River Recycled Water Impacts Report

Santa Ana Watershed Perchlorate Impacts Report

Nitrogen TDS Study

Southern California Comprehensive Water Reclamation and Reuse Study

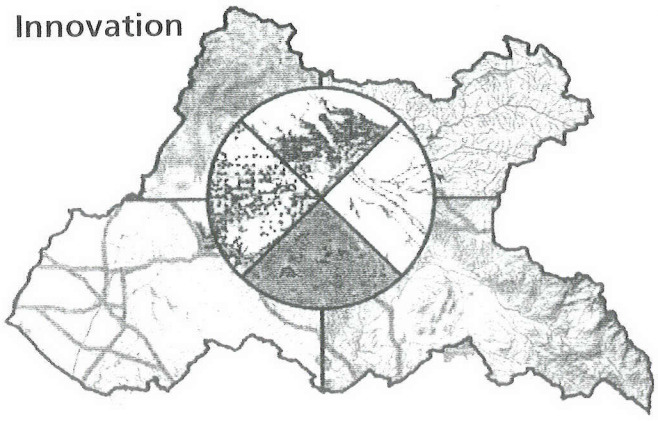
SAWPA strives for a collaborative approach to bring together the planning community, however, it cannot address all watershed planning issues and concerns, nor will it fit together all existing plans and policies of every agency within the watershed. In these cases, SAWPA coordinates with the sponsors of these activities and provides resources when possible. Other planning efforts within the watershed that SAWPA is aware of include:

Metropolitan Water District, 2003 Update Integrated Water Resources Plan

The framework for Metropolitan Water District's (MWD) regional Integrated Water Resources Plan was initiated by their board of directors in 1996. This plan was envisioned to consider current water resource information, factors that may influence water resources in the future, and plans for uncertainties. The 1996 IRP provided a 20-year resource plan that brought a balance between locally developed resources and imported supplies. It called for investments in water conservation, recycling, groundwater treatment storage and water transfers, and in return brought diversity and stability. The 2003 IRP Update builds upon the success of the 1996 IRP.

Three of SAWPA member districts, EMWD, IEUA and WMWD, are members of the Metropolitan Water District of Southern California (MWD) and have been involved in the development of the MWD Integrated Water Resource plans and updates. OCWD has also been indirectly involved through various conjunctive use projects and through their affiliation with Municipal Water District of Orange County, an MWD member agency.

Innovation



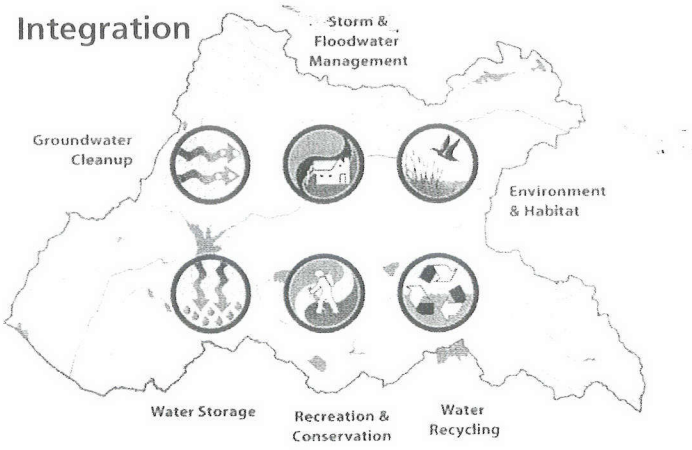
Innovation Concepts
- No watershed is an island
- No "one-size-fits-all" solutions
- Integrated set of differing solutions
- Store/clean/save/reduce
- Solutions with multiple benefits
- More concerns than just water

Water crosses many boundaries: social, political, logistical, environment, regulatory, to name a few. The innovation of the SAIWP is not necessarily in the use of revolutionary new technologies, or in the development of new concepts in water management to help resolve all of the known issues, but in the collaborative approach used by SAWPA to bring together the available information and facilitate communication. The innovation is in getting all the stakeholders to work together towards the common goal; the innovation is in providing a forum where the regulators and environmental groups and the water suppliers can talk, can identify common problems and concerns, and can work together to find solutions to these concerns.

Communication and teamwork are essential elements within any watershed, especially among groups with the authority to manage natural resources. As watershed planning has catapulted to an issue of international significance throughout the past few decades, awareness of watershed ecology and hydrology has illuminated the need for managers within each watershed to work together to manage resources. Watersheds are made up of multiple interests; no one group or individual can manage all the watersheds resources by themselves. Watershed partnering means bringing together different combinations of citizen groups at difference scales and helping them to work together to value and enhance the resources within the watersheds.

The Santa Ana Watershed provides the opportunity to coordinate, as one ecological unit, the management of 1.7 million acres of extremely diverse ecosystems. This opportunity has brought forth both significant challenges and opportunity. There are many groups to bring together, but when brought to work together, there is a much greater ability to achieve landscape-level resource management goals. Through its efforts in the watershed, SAWPA's has been very successful in assembling seemingly conflicting interests at the same table to resolve issues of concern, which has resulted in some unique and effective partnerships. Whereas watershed planning may be easier within smaller watersheds, the difficulty of planning within larger watersheds is balanced by the ability to affect large-scale regional resource management and the opportunity to pool resources on a regional scale.

Integration

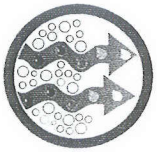


SAWPA is a hub for Santa Ana Watershed planning. Within the watershed SAWPA has sponsored numerous studies to address various watershed issues including groundwater contaminants, lake management and regional water reuse. Its understanding of the watershed overall and ability to collaborate with regional players as a joint powers authority have been used to construct a host of successful projects. The Santa Ana Regional Interceptor, or SARI line, transports salty

water more than 100 miles from the Inland regions to proper disposal in the ocean. Additionally, SAWPA has built two operating desalters, numerous pipelines and water and wastewater treatment facilities to improve the watershed.

The approach to the SAIWP is to understand all of the related factors to supplying and maintaining sufficient, good quality water. This is not just an engineering exercise, but an integrated approach that considers numerous separate but inter-related elements. For the sake of reducing redundancy, SAWPA's IWP approach in considering each of these elements has reduced them into the following six categories.

The **Water Storage** element of the program is developed to ensure a sufficient supply of water will be available in drought years. In the Santa Ana River Watershed groundwater makes up approximately 2/3 of the available local water supply. Through the SAIWP, SAWPA is working with local water agencies to develop a list of projects to maximize the benefit of this capability. This considers elements of water supply reliability, conjunctive use, water banking, water transfers, groundwater recharge, storm water capture, surface storage, as well as, related elements of land use planning, watershed management planning and implementation.



The **Water Quality Protection and Improvement** element of the program addresses a broad spectrum of water quality issues in the watershed. The groundwater basins in the watershed require extensive management to mitigate nearly a century of agricultural and industrial land uses; the SAIWP attempts to address this issue through the construction of projects to treat the groundwater prior to making it available for water supply systems. These include contaminant and salt removal through groundwater desalination, water and wastewater treatment; NPS pollution reduction; demonstration projects to develop new drinking water treatment and distribution methods, as well as, related elements of water quality monitoring, watershed management planning and implementation.

The **Water Recycling** element of the program is the product of a major attitude shift in water use, and the SAIWP encourages recycling and reuse of wastewater as a means to reduce the area's overall imported water consumption.

The **Storm & Flood Water Management** element of the program integrates the concern for protection of life and property in storm and flood events with the potential to use these facilities to support groundwater storage, improve water quality, storm water capture and percolation; and protect or improve wildlife habitat.

The **Environment and Habitat** element of the program can both directly and indirectly contribute to the quantity and quality of water that is available in the watershed. This program element includes the acquisition, protection, and restoration of open space and watershed lands; the construction and enhancement of wetlands; ecosystem restoration; environmental and habitat protection and improvement; the removal of invasive non-native plants, as well as, related elements of land use planning, watershed management planning and implementation. These actions will improve water quality and will help restore the West's Pacific Flyway for native migratory birds.

Not only are there a number of environmental regulations and requirements that must be met in the process of developing the SAIWP, but the protection of threatened, endangered, and sensitive species is essential. The Santa Ana River watershed is heavily developed throughout much of its area; but the development of the SAIWP projects in a way that supports environmental and habitat factors at the same time is of benefit to the native flora and fauna, and also to the quality of life of the residents of the watershed.

The **Recreation, and Conservation** element may also not immediately seem to be a factor that directly contributes to water supply; but its indirect relationships are as strong as those for Environment and Habitat factors. Elements of this category not only include Recreation and Conservation projects, but also aspects of infrastructure security, public access, water use efficiency and land use planning. Many water projects, particularly along the Santa Ana River or its tributaries, have quality of life and water quality elements that make them important considerations in the development of an integrated watershed program. For example, the Santa Ana River Trail is a multi-agency program that, when completed, would provide walking/biking/recreational facilities along the Santa Ana River from the ocean to the Crest of the San Bernardino Mountains. Because this trail would cross many different land owners and water management facilities, it is critical that this program be integrated with how the water supply, water quality, storm and flood water elements of the SAIWP are implemented. Existing water pipeline easements may provide important regional trail linkages of benefit to those in the watershed.

Plan Performance and Management

SAWPA's SAIWP process considers a number of measures to evaluate project/plan performance. These measures, referred to as outcome indicators can be generally categorized as either quantitative outcome indicators or benchmarks indicators. Quantitative outcome indicators include mechanisms, such as monitoring systems used to gather performance data, whereas benchmarks are used to measure the quantity of work completed.

Quantitative goals should accompany outcome indicators; however, some goals for improvement will take many years to reach, or may never be reached due to unforeseen impediments. Therefore, it is important to include mechanisms to adapt project operation and plan implementation based on performance data collected. Benchmarks provide intermediate goals to measure and celebrate successes, such as the completion of 50 percent of the project task by a specific date or by invoking a contingency plan if specific project goals are not reached by the specified date.

Examples of Measurable Goals and Indicators

1. Improve Water Quality

Improve Water Quality

- Number of impaired water bodies within watershed (water bodies removed from the State Water Resources Control Board's 303 (d) List of Impaired Water bodies)
- Use of water quality indicators such as dissolved oxygen, salinity, turbidity, and temperature to determine compliance.
- Percentage of groundwater basins that meet drinking water standards

Increase water conservation/Decrease imported water use/Reduce salinity

- Watershed wide use of recycled water (measured by millions of gallons per day)
- Per capita daily water use (measured by gallons per day)
- Amount of water imported to the Watershed (measured by acre-feet per year)
- Use of local water sources and storage of local water (measured by acre-feet per year)
- Water "banked" in groundwater basins (measured by acre-feet per year)
- Control, reduction and elimination of sources of salt in the Watershed

2. Engage the Community through Education and Recreational Opportunities

Improve Outdoor Recreational Opportunities

- Miles of biking and hiking trails within the watershed
- Number of mega-connected trails (e.g. over 5 miles long)
- Number of publicly provided camping sites
- Number of equestrian staging areas

Increase Open Space

- Acres of land under protection on various levels within the watershed (e.g., private, city, county, state, and conservation easements)
- Acres of land covered in permeable vs. nonpermeable surfaces
- Public space acreage per 1,000 people (from SCAG data)
- Acreage of open space that provide multi-purpose benefits

Promote Watershed Education / Community Outreach

- Percentage of Watershed residents that can accurately answer the questions, "What is a watershed?" and "What watershed do you live in?"
- Incorporation of locally tailored water conservation curriculum into Orange, Riverside, and San Bernardino County Schools
- Participation of Watershed residents in annual Coastal Clean-up (sponsored by the Center for Marine Conservation) or other clean-up activities

3. Plan for the Future

Identify Future Sources of Funding

- Number of grant applications made for watershed projects from
  - a) Local funding sources
  - b) State funding sources
  - c) Federal funding sources
- Number of grants won for watershed projects from
  - a) Local funding sources
  - b) State funding sources
  - c) Federal funding sources
- Operational and maintenance funding budgeted (measured per millions of dollars invested)
- Number of broad programmatic funding sources identified

Regional Plan Performance and Management Measures

Santa Ana Watershed Data Management System (SAWDMS)

The Santa Ana Watershed Data Management System (SAWDMS) is under development and will be available for stakeholders to use for a variety of purposes by late 2005. This watershed-wide database management system would include standardization of data from numerous stakeholders in the watershed, would enable Internet access to the data by appropriate entities, and will be used as a tool to improve water quality in the watershed. The data collected will integrate surface and groundwater data to assist numerous water quality and water management programs.

Santa Ana River Watershed Citizens Monitoring Project

The Santa Ana River Watershed Citizens Monitoring Program is funded through the U.S. EPA and the SWRCB, and administered through the Santa Ana RWQCB. The program is run by the Orange County Coastkeeper, with assistance from the Riverside Corona RCD and the East Valley

RCD. Citizens engage in monitoring activities to identify sources of non-point source contaminants. Public outreach and education is an integral part of the project, which trains volunteers to collect water quality data that is later reported to the RWQCB.

Santa Ana Watershed Basin Monitoring Program

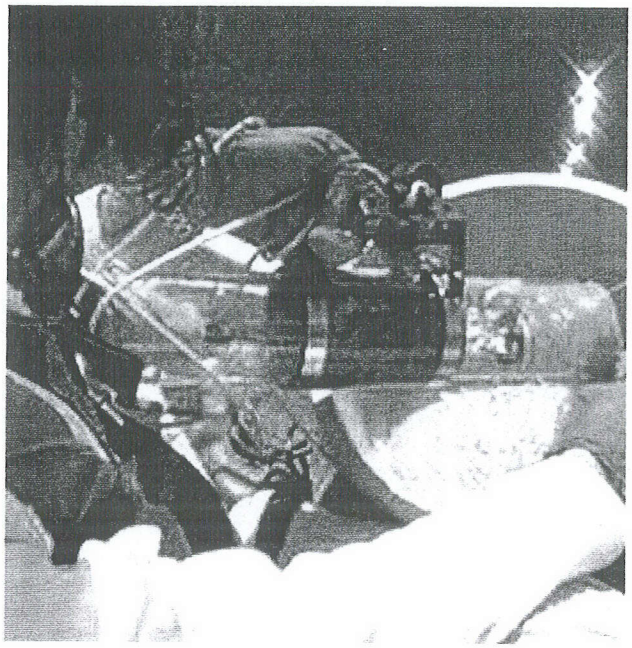
In accordance with the RWQCB regulatory efforts to address salt and nitrate levels in the watershed, many of the Nitrogen/Total Dissolved Solids (N/TDS) Task Force agencies and other parties have joined forces to implement a comprehensive monitoring program as part of their "maximum benefit" water quality objectives on water levels and water quality. The monitoring program consists of both surface water and groundwater components. The program includes the evaluation of compliance with the total dissolved solids and nitrogen objectives for RWQCB designated Reaches 2, 4 and 5 of the Santa Ana River.

San Jacinto Watershed TMDL Monitoring

In coordination with the RWQCB Total Maximum Daily Load (TMDL) efforts to address excess contributions of nutrients and pathogens within the San Jacinto Watershed, local stakeholders and the Lake Elsinore and San Jacinto Watersheds Authority have initiated a comprehensive watershed flow and water quality monitoring program for the San Jacinto watershed. The program consists of monitoring a minimum number of storm events to assess nutrient and pathogen contributions to Lake Elsinore and Canyon Lake.

Chino Basin TMDL Monitoring

In coordination with the RWQCB TMDL efforts to address excess contributions of pathogens within the Chino Basin, local stakeholders have initiated a comprehensive monitoring program. The program consists of both seasonal and storm water monitoring components to assess pathogen contributions to Reach 3 of the Santa Ana River and its Chino Basin tributaries.



Water quality monitoring is a part of the on-going TMDL effort

Lake Elsinore and Canyon Lake Monitoring

In coordination with the RWQCB TMDL efforts to address excess contributions of nutrients and pathogens within the San Jacinto Watershed, local stakeholders and LESJWA are conducting a comprehensive in-lake water quality monitoring program. The program consists of an intensive in-lake monitoring to assess nutrient and pathogen contributions to Lake Elsinore and Canyon Lake.

Santa Ana River Watermaster Monitoring

In accordance with the Prado 1969 Judgment, SBVMWD, IEUA and WMWD are required to maintain a certain average and minimum annual amount of non-storm flow (base flow) at Prado Dam and at the Riverside Narrows. The Santa Ana River Watermaster monitors and records flow and water quality at key locations along the Santa Ana River to maintain a record of the amount and quality of the flow at Prado Dam. Much of the monitoring data used is obtained from the USGS as part of their annual SAR water quality and flow monitoring programs.

Chino Basin Hydraulic Control Monitoring

In accordance with the RWQCB regulatory efforts to address the build-up of salt in the groundwater of the Region, various agencies in the Chino Basin are working together to meet the requirements to implement a comprehensive water quality monitoring program as part of their "maximum benefit" water quality objectives on water levels and water quality. The monitoring program includes both surface water and groundwater components. Some of the monitoring requirements to assure downstream protection are already being implemented, including the annual sampling of the Santa Ana River, Reach 3 at Prado Dam by RWQCB staff.

San Timoteo Water Quality Monitoring

In accordance with the RWQCB regulatory efforts to address the build-up of salt in the groundwater of the Region, N/TDS Task Force members and other parties as appropriate, are required to implement a comprehensive monitoring program as part of their "maximum benefit" water quality objectives on water levels and water quality. The monitoring program must consist of both surface water and groundwater components. This includes the collection of monthly measurements of TDS and nitrogen components in San Timoteo Creek and Santa Ana River, Reaches 4 and 5.

Funding

One of the greatest obstacles to implementing good projects in the region is the lack of funding. While significant seed money and partnerships are currently in place for a number of watershed projects, there are many more projects, both large and small, which require funding. The year 2000 estimate for the complete 10-year SAIWP program is $3 billion dollars.

Through the efforts and planning foundation of the SAIWP, SAWPA has been remarkably successful in moving rapidly into project implementation since the passage of the Proposition 13 Water Bond by the State in March 2000. This includes contracting with the State Water Resources Control Board to use $235 million in Proposition 13 Water Bond funds, matched with over $565 million local agency funds, to construct over $800 million in projects that directly support the SAIWP.

Under an agreement with the SWRCB, SAWPA manages the implementation of 23 projects in the Southern California Integrated Watershed Program (SCIWP) shown in Figure 1-4. These projects include activities as diverse as the development/improvement of desalters, the creation of groundwater recharge spreading basins, and the removal of *Arundo donax*, a very thirsty invasive species that is found all along the course of the Santa Ana River and its tributaries. Together these projects have generated approximately 300,000 acre-feet of new water supply for the region at a cost to the State of less than $100 per acre-foot. Long term, the IWP proposes to store upwards of 1,000,000 acre-feet of new water supplies sufficient to withstand a three-year drought without having to import water.

SAWPA's role in the management of this effort is defined by 10 tasks: Stakeholder Activities, CEQA and SCIWP Review, Project Development, Contract Development and Approval, Program Management, Budget and Schedule Aggregation, Financial Management, Project Closeout, Environmental Program, and Project Management and Administration. A summary of the SCIWP grant funds, anticipated benefits and schedules for each approved project is shown in Table 1-1. In addition, Table 1-1 presents a summary of the allocation of Proposition 13 funding, new water supply projection, and cost to the State to produce an acre-foot of new water.

A number of SCIWP projects have received achievement awards from several professional organizations. The following is a list of awards received:

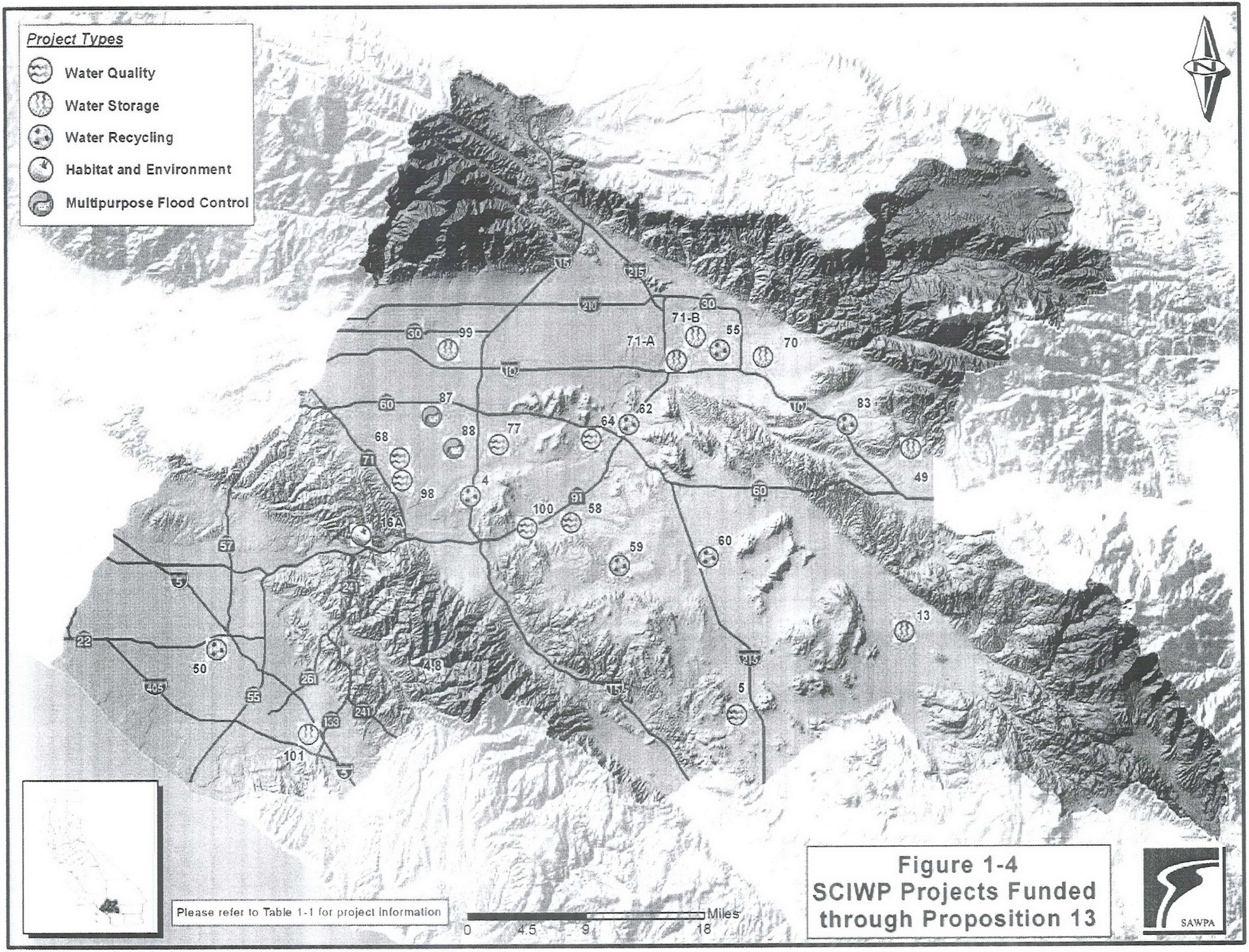

Project Types
Water Quality
Water Storage
Water Recycling
Habitat and Environment
Multipurpose Flood Control
71-B
71-A
16A
Please refer to Table 1-1 for project information
Miles
0
4.5
9
18
Figure 1-4
SCIWP Projects Funded
through Proposition 13
SAWPA

Table 1-1: SCIWP Projects: SOUTHERN CALIFORNIA INTEGRATED WATERSHED PROGRAM

No.	Agency	Project	Prop 13 Funds	Local Funds	New Water (Ac-Ft)	SCIWP $ per Ac-Ft
4	City of Norco	Recycled Water Piping	$ 450,000	$ 282,000	900	$ 25
5	Eastern Municipal Water District	4.5 MGD Perris Desalter	$ 15,150,000	$ 5,100,000	4,000	$ 189
13	Eastern Municipal Water District	San Jacinto Water Harvest Project	$ 525,000	$ 225,000	320	$ 82
16-A	SAWPA Environmental/Habitat Program	Arundo Removal Program	$ 17,745,000	$ 80,000,000	10,000	$ 89
49	San Gorgonio Pass Agency	Recharge Basins	$ 850,000	$ 280,000	3,000	$ 14
50	Orange County Water District	GWRS	$ 37,000,000	$ 319,000,000	78,400	$ 24
55	City of Redlands	Recycled Water and Desalting	$ 5,000,000	$ 10,500,000	9,500	$ 26
58	Western Municipal Water District	Agricultural Water Conveyance	$ 7,425,000	$ 2,451,000	6,000	$ 106
59	Western Municipal Water District	MARB Wastewater Reclamation	$ 2,925,000	$ 966,250	1,000	$ 146
60	Western Municipal Water District	MARB Groundwater Recovery	$ 765,000	$ 257,000	300	$ 128
62	City of Riverside	Canal Reconstruction	$ 5,250,000	$ 1,750,000		
64	Rubidoux Community Services District	La Verne WTF Expansion	$ 450,000	$ 150,000	3,600	$ 6
68	Chino Basin Desalter Authority	Chino I Expansion, Chino II Desalters	$ 48,000,000	$ 14,338,000	15,400	$ 159
70	San Bernardino Valley MWD	Central Feeder	$ 14,000,000	$ 9,200,000	30,000	$ 23
71-A	San Bernardino Valley MWD	High Groundwater Pumpout (Phase I)	$ 4,465,000	$ 2,066,421		
71-B	San Bernardino Valley MWD	High Groundwater Pumpout (Phase II)	$ 6,535,000	$ 5,233,579	20,000	$ 16
77	Jurupa Community Services District	Chino I-II Desalter Inter-tie	$ 1,000,000	$ 200,000		
83	Yucaipa Valley Water District	Non-Potable Water Distribution System	$ 6,000,000	$ 9,748,000	2,800	$ 107
87	San Bernardino County Flood Control	Riverside Dr Storm Drain Segment 2	$ 4,700,000	$ 5,600,000		
88	Riverside County Flood Control	County Line Channel	$ 6,300,000	$ 7,830,000		
98	OCWD	Dairy Wash Water Treatment Project	$ 60,000	$ 290,000		
99	Inland Empire Utilities Agency	Chino Basin Recharge Fac Improvements	$ 19,000,000	$ 28,000,000	100,000	$ 10
100	PA 9 SAWPA	Arlington Desalter	$ 8,000,000	$ 2,667,000	6,400	$ 63
	PA 9 SAWPA	Arlington Bridge - Pending $2M Modification	-na-	-na-		
101	SAWPA Environmental/Habitat Program	Irvine Ranch Water District Natural Treatment System	$ 4,605,000	$ 2,395,000		
	SAWPA	Program Management, 2%	$ 4,700,000	-na-		
	SWRCB	Administration, 3% per Water Code	$ 7,050,000	-na-		
	SWRCB	Proposed Additional SWRCB Administration Fee	$ 7,050,000	-na-		
		Total:	$ 235,000,000	$ 508,529,250	291,620	

- Association of Environmental Professionals, 2003 Award for Outstanding Environmental Resource Document. This prestigious award was presented to SAWPA for Volume 2 of the 2002 Santa Ana Integrated Watershed Program, the Environmental and Wetlands Component.
- Association of California Water Agencies, 2003 Clair A. Hill Award for Water Agency Excellence. This prestigious award was presented to SAWPA for the 2002 Santa Ana Integrated Watershed Program.
- American Society of Civil Engineers, Los Angeles Section award for "2004 Outstanding Government Civil Engineering Project of the Year": Presented for the Chino Basin Groundwater Recharge Project. This prestigious award is shared by the Inland Empire Utilities Agency, Chino Basin Watermaster, San Bernardino Flood Control District, and the Chino Basin Water Conservation District.
- 2004 Santa Ana Watershed Drought Proofing Awards: City of Redlands for the City of Redlands Recycled Water Project and Inland Empire Utilities Agency, Chino Basin Watermaster for the Chino Basin Recharge Basin Project.
- 2004 Santa Ana Watershed Integrated Project Award: Presented to City of Norco, Orange County Water District, Western Municipal Water District, and SAWPA for Completion of the Arlington Desalter Enhancement Project.
- 2005 Santa Ana Watershed Drought Proofing Awards: Western Municipal Water District for Completion of the Agricultural Water Conveyance Project and San Bernardino Valley Municipal Water District for the High Groundwater Pump-Out Project.

Continuing Challenges

The challenges of developing and maintaining a watershed process to lead the watershed to a sustainable water supply is a large and difficult task. This watershed includes over 2,650 square-miles of complex sage scrub, mountain and coastline ecosystems, and is one of the fastest growing regions in the nation. Adding to this are over one-hundred water resource agencies vying for limited resources.

Through its collaborative IWP process SAWPA strives to bring together the planning community, including both public and private sector planners, to advance the benefits of planning on a watershed scale. However, this process can not

address all watershed planning issues and concerns, nor will it fit together all existing plans and policies of every agency within the watershed.

There are numerous challenges in bringing stakeholders together to develop and maintain a collaborative integrated planning approach. These challenges range from spatial and economic issues of need, to ideological and political issues of who should benefit. Some of the challenges faced by SAWPA include:

Climate – The extreme climate of the Santa Ana River Watershed produces an environment of ever changing needs. The Santa Ana River Watershed is susceptible to extended periods of drought, as well as, periods of excessive rains.

Growth – The Inland Empire area of the Santa Ana River Watershed is the fastest growing region of the State. Rapid growth has intensified the need for planners to more frequently update regional plans and has expanded the realm under which the IWP operates.

Project Prioritization – SAWPA's IWP process attracts a great deal of interest within the Watershed and therefore is highly competitive. SAWPA received over 180 project proposals for this IWP update.

Institutional Challenges – Turnover of board members and agency staff often disrupts the paths of communication, creating difficulty in maintaining the transfer of information.

Some agencies, due to the need to address these issues, especially in light of the competitive nature of the SAWPA planning process are attempting to create their own specialized plans. In these cases, SAWPA coordinates with the sponsors of these activities, supporting their efforts and providing resources when possible. Rather than to coerce agencies into the SAWPA planning process, the intent of SAWPA's planning process is to be aware of and integrate as many of these existing plans and policies as possible. Most importantly, the goal is to bring important messages from these documents home to the Santa Ana Watershed in terms of relevant needs within the planning community.

SAWPA's IWP planning process is based on a number of assumptions and time-dependent factors. As part of SAWPA's ongoing process to manage watershed issues, it is understood that over the course of this program, circumstances and situations will change. These can be changes in population, water demand, economy, project effectiveness, environment, regulations, emerging contaminants and a whole host of other factors. Therefore, the program cannot be left to run its course without continuous review and modification to meet these new challenges. Projections and assumptions are just that. As the real-world conditions unfold, SAWPA will work with all the stakeholders to identify and implement the best possible responses within the framework of the SAIWP.

Working with varied interests and agendas, this watershed planning process has opened the doors to still greater partnerships, funding opportunities, connectivity, and increased awareness of planning projects and opportunities both in the city next door and in the community on the other side of the Watershed.

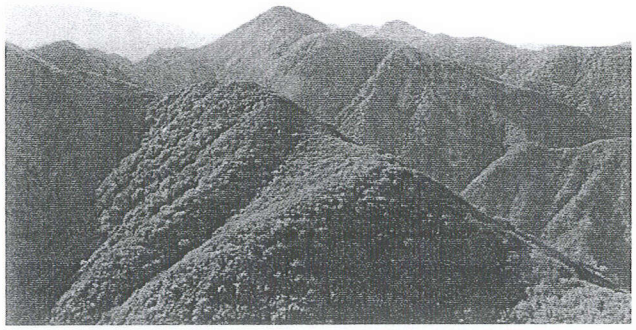
To respond to the changing environment, in July 2004 SAWPA initiated an update to the SAIWP represented by this document. The update seeks to ensure that the very latest water resource projects, programs and study efforts have been included in the integrated planning process. Additional public outreach forums have been held to coincide with the integrated planning process. New State funding opportunities to assist implementation of the SAIWP projects have been shared with stakeholders throughout the watershed.

This document highlights many of the projects that would result in improvements within the Watershed. It also identifies funding needs for these projects.

Part 2: Resources of the Santa Ana Watershed

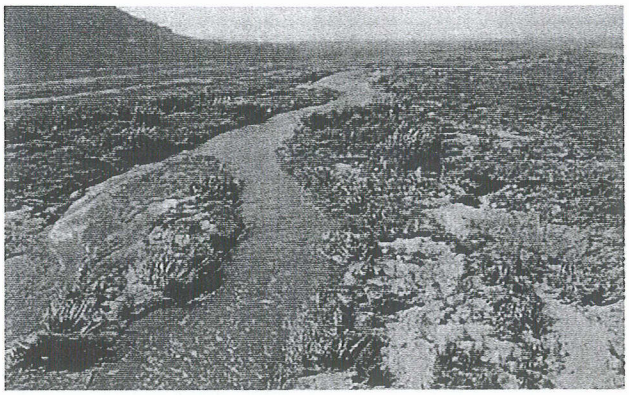
A. Physical Setting, Hydrology, and Geomorphology

Dunne and Leopold (1978) define a watershed as an area of land that drains water, sediment, and dissolved materials to a common outlet at some point along a stream channel. The Santa Ana River watershed, depicted in Figure 2-1, catches stormwater draining a 2,650 square-mile area and channels it into the Pacific Ocean at the City of Huntington Beach. The Santa Ana River, flowing over 100 miles, drains the largest coastal stream system in Southern California including parts of Orange, Riverside, and San Bernardino Counties, as well as a sliver of Los Angeles County. The total length of the River and its major tributaries are about 700 miles.



The Santa Ana River headwaters begin in the San Bernardino Mountains

Much of the movement of materials, energy, and organisms associated with the channel environment and adjoining upland environment depend on the movement of water within the Santa Ana Watershed. To the extent that this movement is altered, so does the potential exist for the system to become "dysfunctional" for species that depend on it for life support. That is, alteration of water movement via damming or channelization can reduce ecosystem functionality. Refer to Figure 2-2, for an illustration of water and sediment transport throughout a watershed.



Today much of the lower Santa Ana River has lost its historical character

Today, only 20 percent of the Santa Ana River is a concrete channel, the majority near the mouth of the River. Discharge from publicly owned treatment works (POTWs) have changed natural surface flows and provides base flow in many parts of the River's drainage network. This treated wastewater has altered the natural system by providing year-round river flow. As populations have increased, urban runoff and wastewater flows have increased. Between 1970 and 2000, the total average volume rose from less than 50,000 to over 146,000 acre-feet per year, as measured at Prado Dam. Base flow is expected to rise to 370,000 acre-feet per year by 2025, a projected increase of 153 percent since 1990.

Prado Wetlands Area

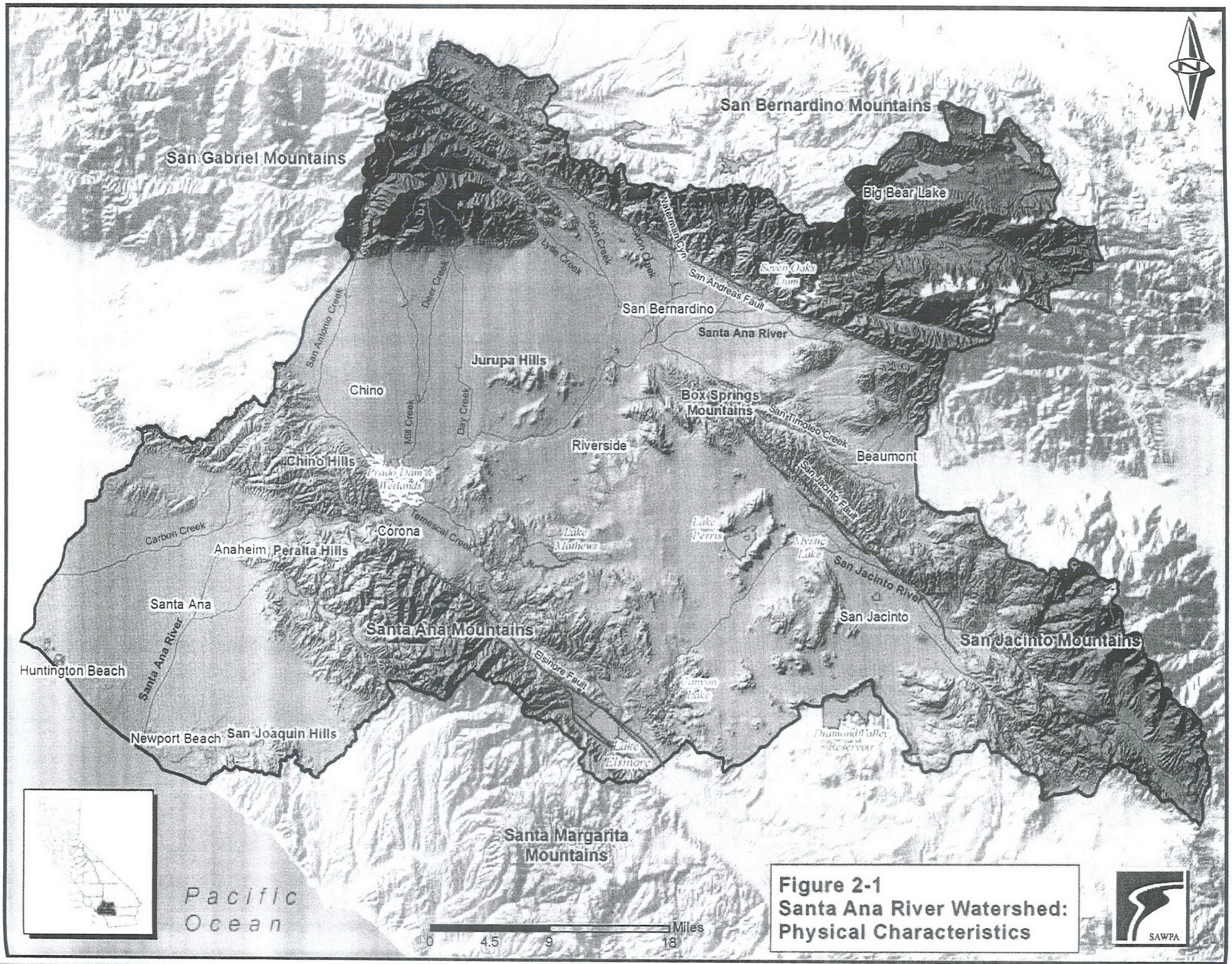


Figure 2-1
Santa Ana River Watershed: Physical Characteristics

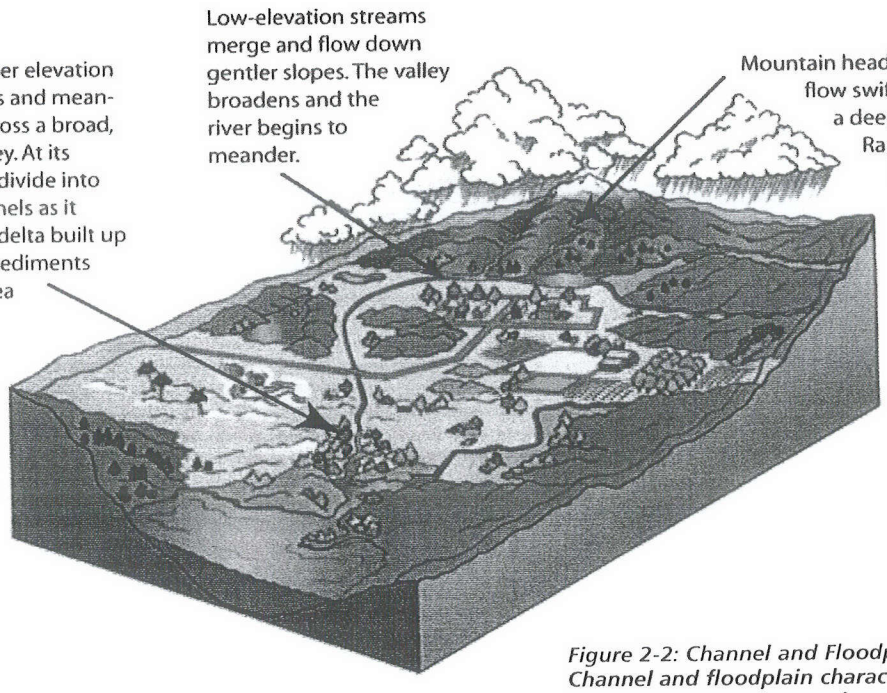


Figure 2-2: Channel and Floodplain Features
Channel and floodplain characteristics change from headwaters to mouth

Geologic and Hydrologic Features of the Watershed

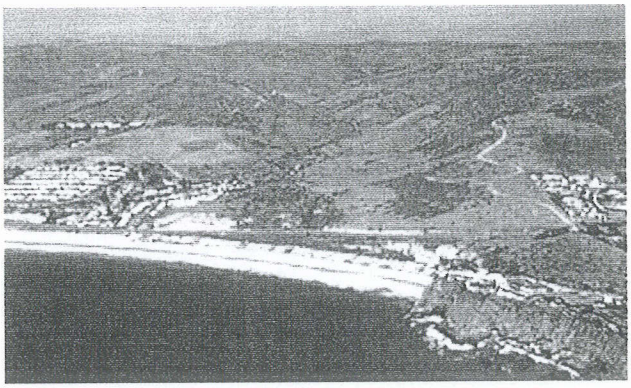
The geologic and hydrologic features of the Santa Ana River Watershed or geomorphology, the study of the classification, description, nature, origin, and development of present landforms and their relationships to underlying structures, and of the history of geologic changes as recorded by these surface features includes the following features. The upper watershed or headwaters, including the highest point in the drainage system, is delineated by the east-west ridgeline of the San Gabriel and San Bernardino Mountains. Over this ridgeline lies the Mojave Desert, which is part of the Lahontan Basin. This upper "erosion" zone of the watershed has the highest gradient, highest erosion level of new sediment to the system, and fastest stormwater runoff. As flows consist mainly of snowmelt and storm runoff from the undeveloped land in the San Bernardino National Forest, water quality tends to be high, with low concentrations of total dissolved solids, nitrates, and other pollutants. In this zone, the Santa Ana River channel is confined in its lateral movement, contained by the slope of the high, mountainous terrain. Within the upper watershed, the River and its tributaries travel around large boulders and over sand and gravel bars punctuated by pools and riffles reaching depths of about six feet. Sedimentary and crystalline materials from the upper watershed move down slope through a process fed by storm pulses; therefore, sediment does not move at a continuous speed. River flow from Seven Oaks Dam to the City of San Bernardino consists mainly of stormflows, flows from the Lower San Timoteo Creek, and groundwater that is rising due to local geological features. From the City of San Bernardino to the City of Riverside, the river flows perennially and much of the reach is operated as a flood control facility. The principal tributary streams in the upper Santa Ana Watershed originate in the San Bernardino and San Gabriel Mountains. These tributaries include San Timoteo, Reche, Mill, Plunge, City, East Twin, Waterman Canyon, Devil Canyon, and Cajon Creeks and University Wash from the San Bernardino Mountains and Lone Pine, Lytle, Day, Cucamonga, Chino, and San Antonio Creeks from the San Gabriel Mountains.

From the City of Riverside to the recharge basins below Imperial Highway, in Orange County river flow consists of highly treated POTW effluent, urban runoff, irrigation runoff water, imported water applied for groundwater recharge, and groundwater forced to the surface by underground barriers (SAWPA, March 2004). Near Corona, the River cuts through the Santa Ana Mountains and the Peralta-Chino Hills, which together form the

northern end of the Peninsular Ranges in Southern California. The River then flows down onto the Orange County coastal plain: the channel lessens in gradient, the valley floor is reached, and the soft features of the channel where sediment has deposited are more prevalent. Floodplains are strewn with boulders and characterized by sand and gravel washes. Within this valley floor, the transport and depositional processes are less confined by higher terrain as water, dissolved material and sediment move toward the sea. Over time, aquatic and terrestrial wildlife have adapted to this dynamic process and channel form. However, rapid urbanization has artificially increased the rate of sedimentation and loss of habitat in this part of the watershed, negatively affecting water quality and wildlife habitat.

In the southern portion of the watershed, the regional boundary divides the Santa Margarita River drainage area, which is not part of the Santa Ana Watershed, from that of the San Jacinto River. The San Jacinto River, part of the Santa Ana Watershed, starts in the San Jacinto Mountains, runs westerly through Canyon Lake and normally ends in Lake Elsinore. In wet years, the San Jacinto River will overflow the lake and connect with the Santa Ana River through the Temescal Wash. Flood flows produce a broad, shallow wetlands area called Mystic Lake near the northernmost point of the River.

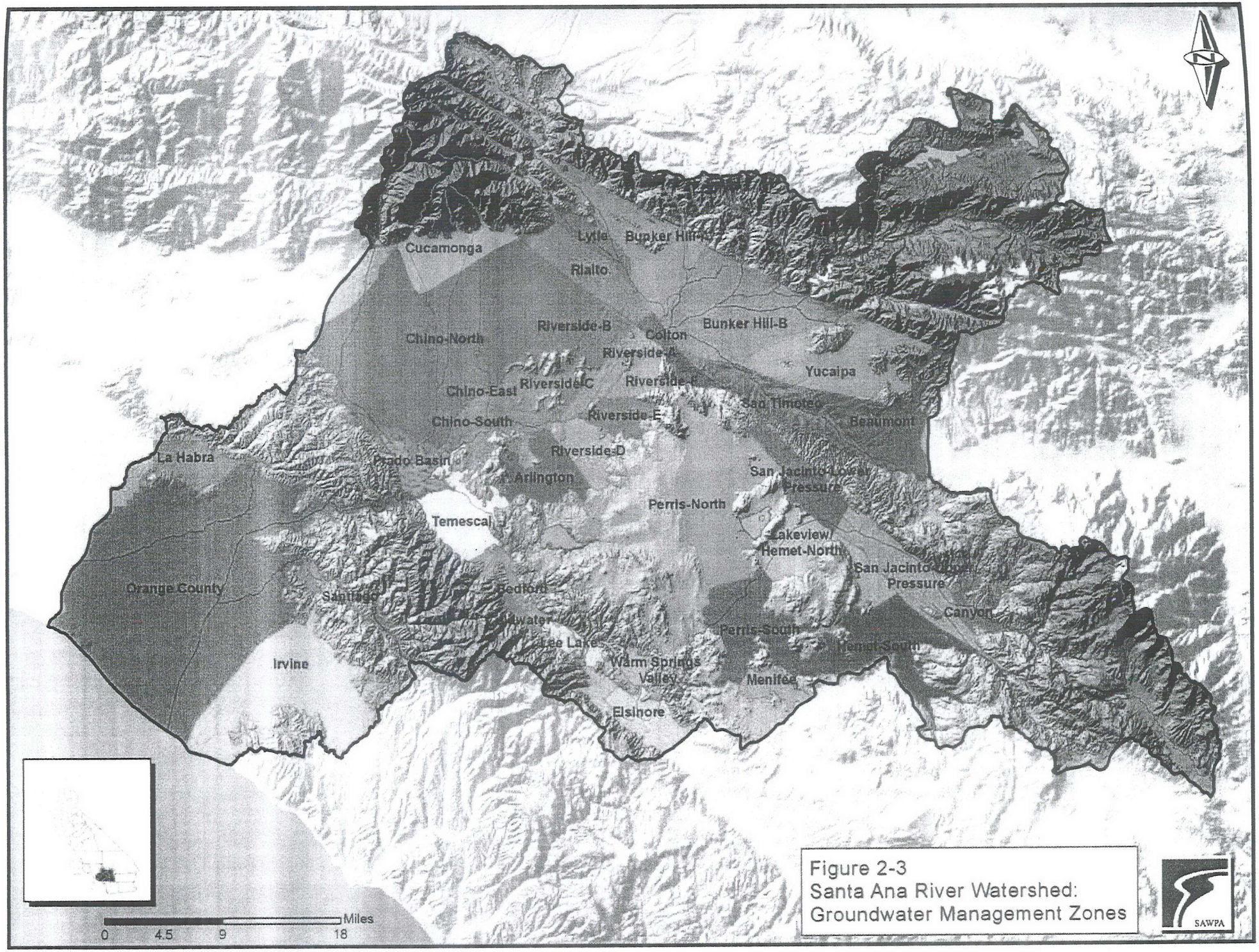
The Orange County coastal plain is composed of alluvium derived from the mountains. Upstream from the Santa Ana Canyon lay Prado Dam and Prado Wetlands; River flows are passed through the Wetlands to improve water quality and remove nitrates before being used for Orange County groundwater basin recharge. Santiago Creek, the only major tributary to the lower Santa Ana River, joins the River in the City of Santa Ana. The lower limit of both the groundwater recharge area and the River's ordinary flows is 17th Street in the City of Santa Ana. Prior to channelization of the lower part of the River, the channel used to meander slowly across broad flood plains. Currently, the River is a concrete channel from 17th Street in the City of Santa Ana to Adams Avenue in Huntington Beach. From 17th Street in Santa Ana to the Victoria Street Bridge, the riverbed is ordinarily dry. The Greenville-Banning Channel, which carries stormwater discharge and urban runoff, is channelized to the Victoria Street Bridge where it joins the Santa Ana River. Discharge from the Greenville-Banning Channel combines with tidal flow from the Pacific Ocean and the River is wet from the Victoria Street Bridge to the mouth of the River.



The Santa Ana River Watershed extends to the Pacific Ocean

Groundwater in the watershed is highly controlled by the geology of the area, both the configuration of bedrock and by the extensive faulting. Most groundwater basins are unconfined, much like a bowl full of sand that has water poured in halfway, see Figure 2-3. However, the variable depth to bedrock, and the presence of faults cause pressure zones where water flows towards (or to) the ground surface. In general, groundwater flows the same directions as surface water from the mountains in the east/north to the Pacific Ocean in the west. There are about 40 groundwater basins in the watershed (depending on how they are defined and boundaries are drawn); many are inter-related. Some of the largest groundwater basins include the Chino Basin (Chino/Ontario/Fontana area), the Orange County basin, the Bunker Hill Basin (San Bernardino) the San Timoteo Basin (Yucaipa/Banning/Beaumont area) and the San Jacinto/Hemet Basins.

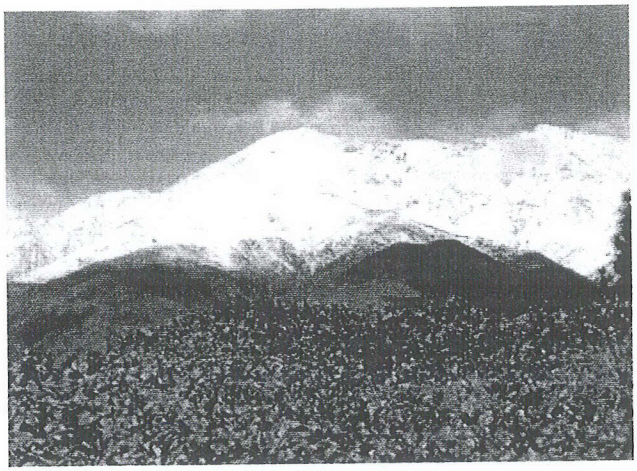
Four primary faults transverse the watershed, with other minor faults either branching off of, or running parallel to, the major faults. Within the upper watershed, the San Andreas Fault divides the San Bernardino Mountains from the San Gabriel Mountains and branches off into the San Jacinto Fault near San Bernardino. Known as Southern California's most active fault, the San Jacinto Fault affects groundwater in the San Jacinto River and the Santa Ana River, forcing groundwater to the surface at the Bunker Hill Dike. Toward the central watershed, the Elsinore-Whittier Fault passes under the Prado Dam from the northwest to the southeast. Toward the coast,


Cucamonga
Lytle
Bunker Hill
Rialto
Riverside-B
Bunker Hill-B
Chino-North
Colton
Riverside-A
Yucaipa
Riverside-C
Riverside-F
Chino-East
San Timoteo
Riverside-E
Chino-South
Beaumont
Riverside-D
La Habra
Prado Basin
San Jacinto-Lower Pressure
Arlington
Perris-North
Temescal
Lakeview/ Hemet-North
San Jacinto-Upper Pressure
Orange County
Santiago
Bedford
Canyon
Perris-South
Hemet-South
Irvine
Warm Springs Valley
Menifee
Elsinore
Miles
0
4.5
9
18
Figure 2-3
Santa Ana River Watershed:
Groundwater Management Zones
SAWPA

the Newport-Inglewood Fault enters the region from the Los Angeles area and passes offshore near Newport Beach.

Climate

The climate of the watershed is considered Mediterranean with hot, dry summers, and cooler, wetter winters.



Snowcapped San Gabriel Mountains

Average annual precipitation ranges from 12 inches per year in the coastal plain, to 18 inches per year in the inland alluvial valleys, reaching 40 inches or more per year in the San Bernardino Mountains, refer to Figure 2-4. Most of the precipitation occurs between November and March in the form of rain with variable amounts of snow in the higher mountains of the watershed. The climatological cycle of the region results in high surface water flows in the spring and early summer period, followed by typically low flows during the dry season. Winter and spring floods generated by precipitation in the high mountains are not uncommon. Similarly, during the dry season, severe thunderstorms in the high mountains have periodically generated torrential floods in local streams.

Much of the Santa Ana River Watershed is a sparsely covered semi-desert

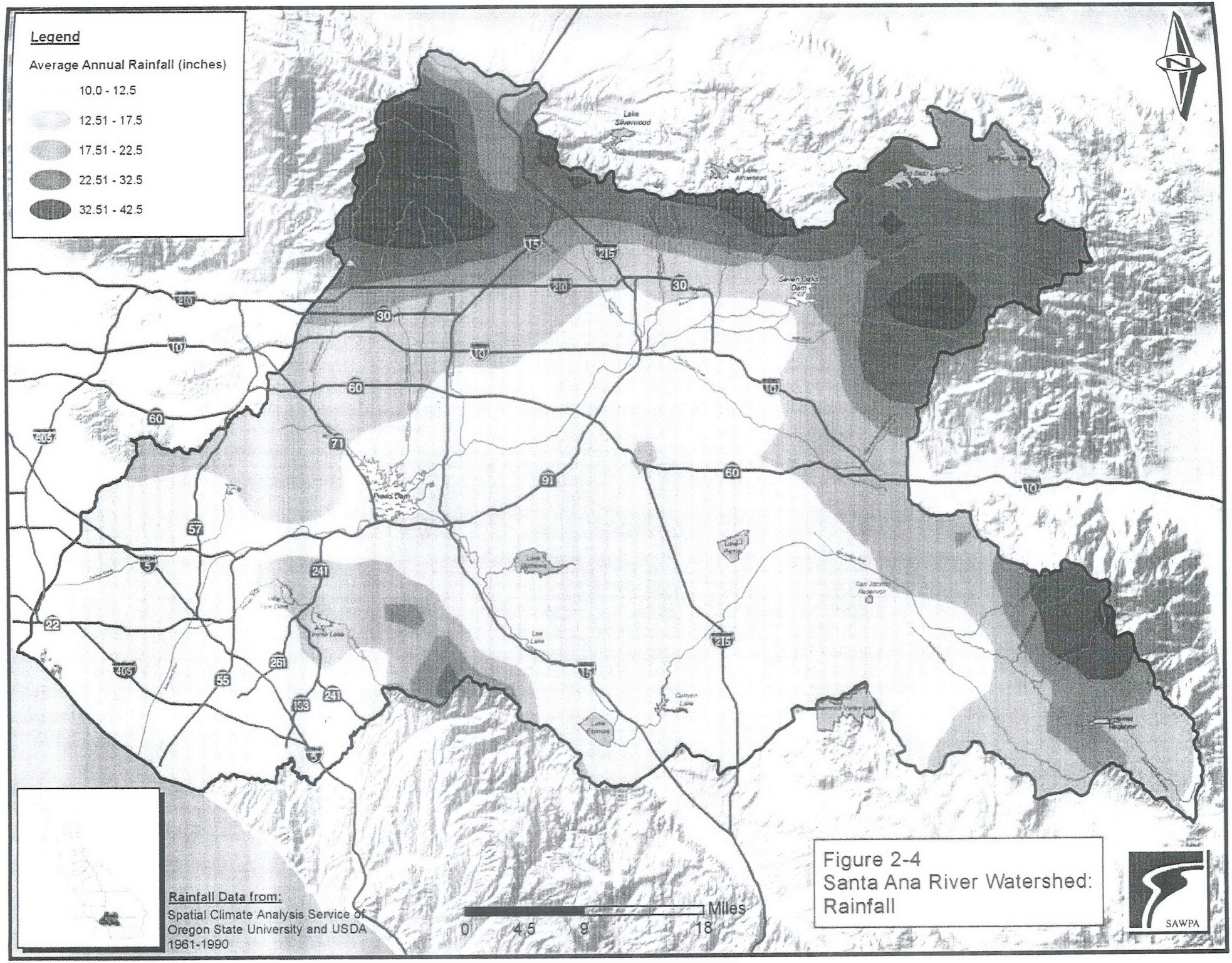
Land Use

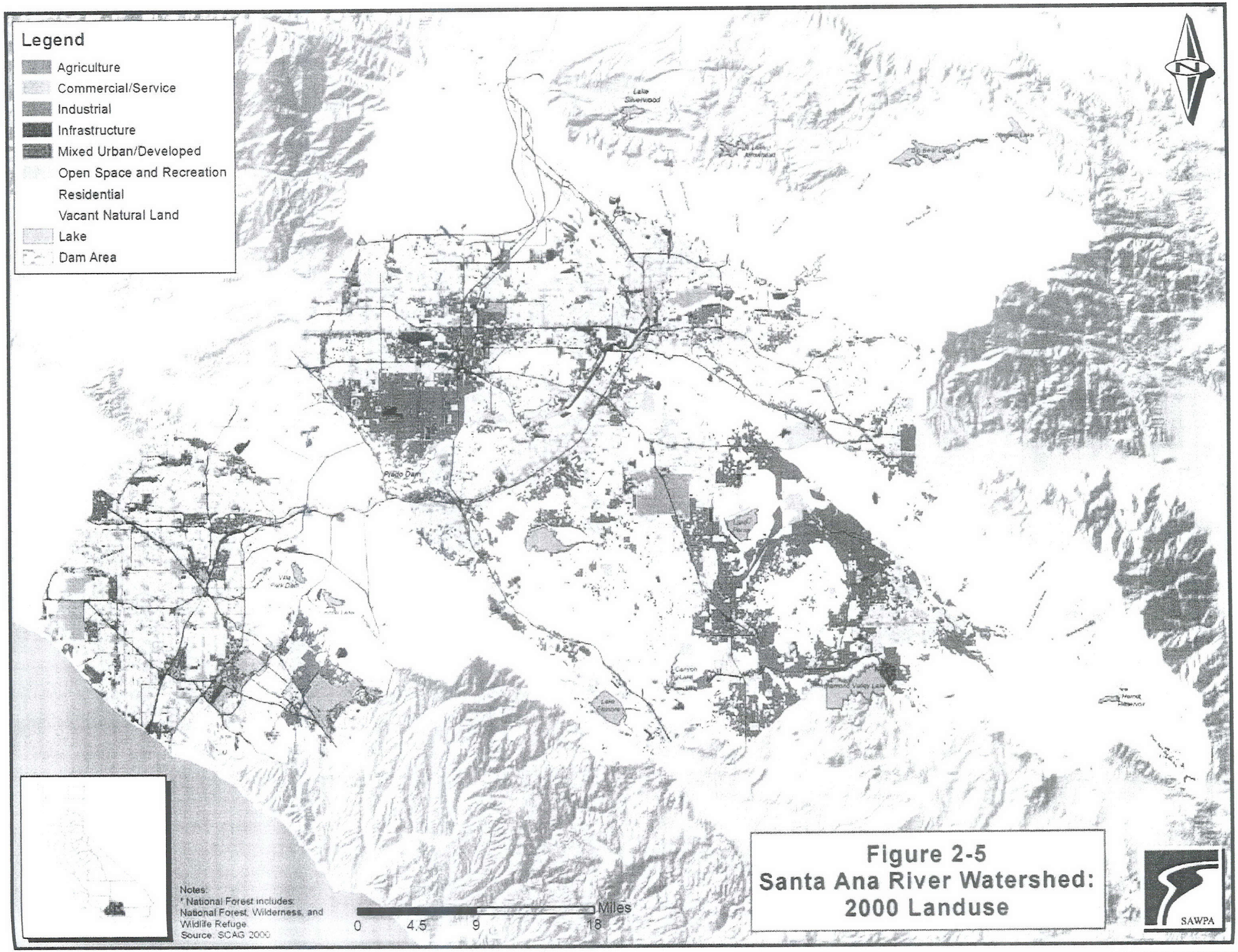
The Santa Ana River watershed is substantially urbanized: about 32 percent of the land use is residential, commercial, or industrial. Agricultural land, once accounting for virtually all of the use of the watershed during the days of the ranchos, now accounts for a mere 10 percent. Instead of a scattered population of indigenous peoples, the watershed now supports over 5 million people. Figure 2-5 presents a breakdown of the major Land Use categories of the Santa Ana Watershed obtained from the Southern California Association of Governments (SCAG) 2000 land use data set published in 2003.

B. Biological Resources

Habitat Modification

As noted by Moyle (2002), most of California's inland waterways today bear little resemblance to the streams and lakes encountered by the first European explorers and settlers. In the Santa Ana River watershed this observation is certainly true, for flood control and channelization activities have left portions of streams channelized and concrete-lined where once riparian forests grew along a meandering stream. Fortunately today only 20% of the Santa Ana River is concrete-lined. Dam construction and flood control activities were not the only factors influencing the Santa Ana River watershed in ways that adversely impact habitat critical for aquatic resources. The following factors have also played a role:

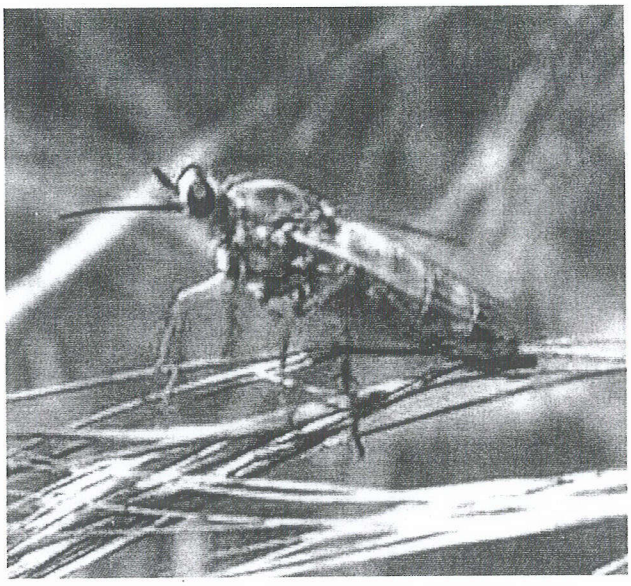

Legend
Average Annual Rainfall (inches)
10.0 - 12.5
12.51 - 17.5
17.51 - 22.5
22.51 - 32.5
32.51 - 42.5
Lake Silverwood
Prado Dam
Seven Oaks Dam
Rainfall Data from:
Spatial Climate Analysis Service of Oregon State University and USDA
1961-1990
0 4.5 9 18
Miles
Figure 2-4
Santa Ana River Watershed:
Rainfall
SAWPA


Legend
Agriculture
Commercial/Service
Industrial
Infrastructure
Mixed Urban/Developed
Open Space and Recreation
Residential
Vacant Natural Land
Lake
Dam Area
Lake Silverwood
Prado Dam
Notes:
* National Forest includes: National Forest, Wilderness, and Wildlife Refuge
Source: SCAG 2000
0
4.5
9
18
Miles
Figure 2-5
Santa Ana River Watershed:
2000 Landuse
SAWPA

- Stream channel alteration
- Draining of streams and lakes, especially adjacent wetlands
- Livestock grazing and the impact on aquatic and riparian vegetation, sedimentation, and water pollution
- Historical logging practices
- Bark Beetle Infestation
- Mining, particularly instream aggregate mining
- Watershed changes resulting in cumulative affects to aquatic resources

Special Status Species

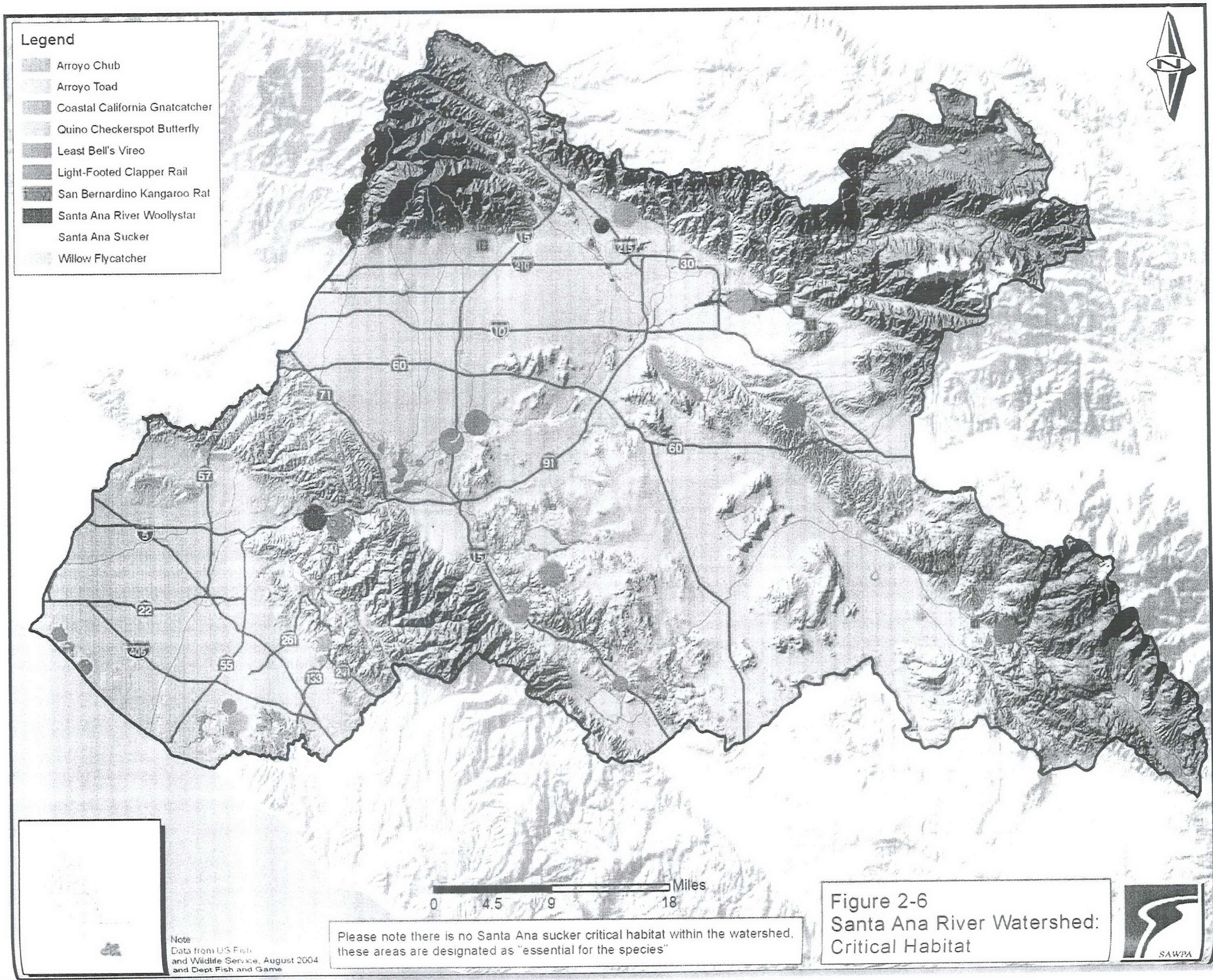
Second only to Hawaii, the State of California is home to the highest number of endangered species in the United States. As defined within the Federal Endangered Species Act of 1973, an endangered species is any animal or plant listed by regulation as being in danger of extinction throughout all or a significant portion of its geographical range. A threatened species is any animal or plant that is likely to become endangered within the foreseeable future throughout all or a significant portion of its geographical range. Federal law prohibits the "take" of any individuals or habitat of federally listed species without a special permit. In addition to federal laws, the State of California has its own California Endangered Species Act, with a separate listing of species and separate laws governing take of listed species. Enforcement of the Federal Endangered Species Act is administered by the U.S. Fish and Wildlife Service and the National Marine Fisheries Service, while the California Department of Fish and Game enforces the California Endangered Species Act. Refer to Figure 2-6 for a map of Critical Habitat within the Watershed.



The Santa Ana Watershed provides habitat for a wide range of biological resources, including the federally endangered Delhi Sands flower-loving fly.

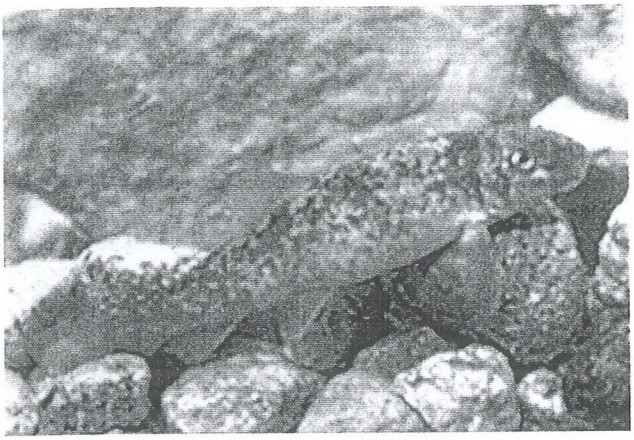
Photo courtesy of the U.S. Fish and Wildlife Service

The varied geography and natural features of the Santa Ana Watershed provide habitat for a number of federally and/or State-listed species. As the Integrated Watershed Plan focuses on the resources in and around the Santa Ana River, listed species of concern herein are those that occupy aquatic, wetland, riparian, or riparian adjacent areas. Of these, two are plants, the Santa Ana River woolly star (*Eriastrum densifolium*) and slender-horned spine flower (*Dodecahema leptoceras*); one fish, the Santa Ana River sucker (*Catostomus santaanae*); one amphibian, the arroyo toad (*Bufo californicus*); three birds, the least Bell's vireo (*Vireo bellii pusillus*), southwestern willow flycatcher (*Empidonax traillii*), and bald eagle (*Haliaeetus leucocephalus*); two mammals, the San Bernardino kangaroo rat (*Dipodomys merriami parvus*) and Stephen's kangaroo rat (*Dipodomys panamintinus*); and one insect, the Delhi Sands flower-loving fly (*Rhaphiomidas terminatus abdominalis*). Any project or policy recommended by the Santa Ana Integrated Watershed Plan will need to assess potential impacts to listed species, and incorporate measures to avoid impacts to these species.


Legend
Arroyo Chub
Arroyo Toad
Coastal California Gnatcatcher
Quino Checkerspot Butterfly
Least Bell's Vireo
Light-Footed Clapper Rail
San Bernardino Kangaroo Rat
Santa Ana River Woollystar
Santa Ana Sucker
Willow Flycatcher
N
Miles
0
4.5
9
18
Note
Data from U.S Fish and Wildlife Service, August 2004 and Dept Fish and Game
Please note there is no Santa Ana sucker critical habitat within the watershed, these areas are designated as "essential for the species"
Figure 2-6
Santa Ana River Watershed:
Critical Habitat
SAWPA

Current Aquatic Resources

Fishes



The Santa Ana sucker is a federally endangered fish native to the Santa Ana River.

The Santa Ana River historically provided habitat for eight species of native fish (species have multiple forms). Only four native nongame freshwater fishes are currently found in nonestuarine waters: arroyo chub, Santa Ana speckled dace, Santa Ana sucker, and threespine stickleback. All of these remaining fishes have limited distributions and face possible extirpation. As previously mentioned, the Santa Ana sucker is listed by the federal government as a "threatened" species pursuant to the Endangered Species Act. Currently, the western brook lamprey, steelhead, and unarmored threespine stickleback are known to be extirpated from the Santa Ana River watershed. The Pacific lamprey has been observed once in the past 47 years and it is likely extirpated as well. Introduced forms of the rainbow trout have been extensively stocked in the watershed for sport fishing for over 100 years, and it is unknown if any genetically pure rainbow trout stocks endemic to the watershed remain. The partially armored threespine stickleback was widely planted in the watershed for mosquito control in the early 1900s and is now found out of its natural historical range, e.g., Big Bear Lake. In contrast, at least 33 fishes have been introduced into the Santa Ana River watershed and are currently present. New species can be expected to be found at any time due to interbasin water transfers, ship ballast water hitchhikers, bait bucket introductions, and hobbyists disposing of unwanted fishes. Many of the introduced fishes are widespread, while a few are restricted to specific locations or habitats. Of the current inventory of introduced fishes, most were introduced by government agencies to serve as a food resource, for insect control, for sport fishing, or to serve as forage for sport fishes. A smaller number of fish have become established after arriving inadvertently via interbasin water transfers or in ships' Ballast water. For a detailed discussion of the introduction of fishes to California, the reader is directed to Dill and Cordone (1997). Additional information about introductions of fishes to Southern California is presented by Swift *et al.* (1993). Supplemental records can be found in Moyle (2002).

Amphibians

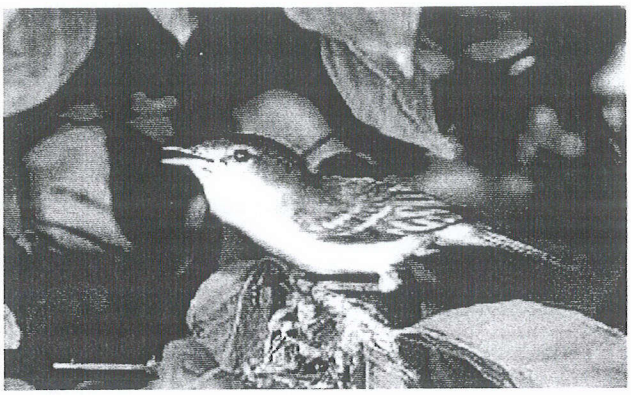
During the last 50 years, population growth and urban development in Southern California has displaced many amphibian species, and encroached upon much of former amphibian habitat. Several species are thought to be extinct, and many others have fragmented populations, which are at risk of extirpation. Amphibians are especially sensitive to environmental changes that alter the hydrology, ecology, and geology of a region, because they have evolved highly specialized adaptations that have allowed them to exist in these relatively arid regions. Introduced species have also been a major contributor to the decline in amphibian populations in Southern California. These nonnative species increase competition for food sources, as well as prey upon many of the native amphibians.

Reptiles

The California Department of Fish and Game considers the Southwestern pond turtle *(Clemmys marmorata)* a species of "special concern." Recent reports on *C. marmorata* in Southern California indicate that a few viable populations remain in the regions (see also Brattstrom 1988). Approximately 6-8 viable populations of the turtle remain south of the Santa Clara River system in California. Droughts have exacerbated the negative effects of habitat alteration accumulated over many years over much of this region from changes in land and water use, and abusive grazing practices. In particular, most western pond turtle populations examined in this region appear to show an age structure increasingly

biased towards adults, indicating little or no recruitment is taking place. Recent surveys indicate that the southwestern pond turtle is also seriously threatened throughout most of its range outside of California.

Birds



Least Bell's vireo, a federally listed bird species

Photo courtesy of the Inland Empire Chapter of AEP

Riparian ecosystems harbor the highest number of bird species in the arid and semi-arid parts of the southwestern United States. Riparian habitat provides productive breeding grounds and offers vital overwintering and migration stopover areas for migrating birds. Loss and degradation of riparian habitat have negatively impacted bird populations throughout the watershed. Other factors affecting bird populations are brood parasitism by the brown-headed cowbird and disruption of natural hydrological regimes from dams and levees.

The federally endangered least Bell's vireo has experienced recent population growth within the watershed due to aggressive management activities within Prado Basin and on adjacent lands. Within the basin, the population rose from 19 pairs in 1986 to 123 pairs in 1993. By the end of 1996, the count stood at 195 nesting pairs. This stunning recovery is due to the provision of high-quality habitat for the bird species in part due to invasive species removal, a project in place to control populations of the predatory cowbird, and efforts on the part of the U.S. Fish and Wildlife Service, Orange County Water District, a number of Resource Conservation Districts (RCDs), and others.

The federally endangered southwestern willow flycatcher is also affected by cowbird brood parasitism. The implementation of cowbird management programs in addition to preservation and restoration of riparian deciduous shrub habitat is needed to reduce current populations. The bald eagle, listed by the USFWS as endangered in 1978 has experienced population growth over the past two decades. The bald eagle could be considered a USFWS success story: reclassified as "threatened" in 1995 and first proposed for delisting in 2000. Delisting of a species is the USFWS's ultimate goal and only happens when specific recovery goals have been met for a species. Unfortunately, delisting is an infrequent occurrence. In the case of the bald eagle, delisting has been delayed while the USFWS determines how the species would be managed once it is no longer classified as threatened.

Factors Affecting Aquatic Resources

Introduced Species

The 33 species of introduced fishes greatly outnumber the four remaining native fish species. The number of species, *per se*, is not the problem but, rather, the impact that introduced fishes and other aquatic organisms, have on the native fishes of the Santa Ana River watershed. Introduced fishes have dramatically changed the composition of the watershed's fish community and now act as a deterrent to the restoration and enhancement of the native fishes that remain. The manner in which introduced fishes can affect the aquatic resources of the Santa Ana River watershed are:

- Competition between native and introduced fishes for food and space
- Predation by introduced species on native fishes
- Habitat interference by introduced fishes that change habitat characteristics
- Introduction of diseases that may infect native fish or other aquatic animals
- Hybridization between closely related species

Water Pollution

Litter is a significant source of water pollution

Fortunately, water quality in the Santa Ana River has improved in recent years due to technological developments and water quality planning. Most of the native fishes of the Santa Ana River watershed are adapted to clear, unpolluted water that can support food resources and provide the various habitat conditions necessary to complete their respective life cycles. While fish kills due to the spill of toxic substances into streams are dramatic examples of the effects of pollution, these instances are acute, or short-term, rather than chronic. More insidious, however, are the chronic effects on aquatic resources of nonlethal forms of pollution that decrease growth, inhibit reproduction, or impair movement. Chronic elevated water temperatures or high sediment loads are an example of this type of pollution, even though toxic chemicals are not involved. Other examples include elevated but nontoxic levels of ammonia, increases in salinity, and low levels of dissolved oxygen. Because most of the remaining native freshwater fishes live, at some time, in treated wastewater, the issue of chronic, low-level pollution is of great concern, although the quality of wastewater has increased markedly in past years.

Exploitation

Overexploitation of rainbow trout/steelhead, primarily by angling, was a major factor in driving the native populations to low levels, and perhaps to extinction. Over-fishing, in turn, led to the stocking of hatchery fish and the introduction of various exotic species as angling alternatives to the native trout. The intensity of overexploitation is illustrated by a report in the July 17, 1892, edition of the Citrograph, a Redlands newspaper, which reported that three boys fishing in Bear Creek, a tributary to the Santa Ana River in San Bernardino County, had caught 592 trout in three hours. Similar reports are common in the historical press.

It was not until 1872 that the California Legislature banned the use of nets, weirs, baskets, traps, explosives, and poisons as acceptable means of harvesting trout. Unfortunately, there was no one to enforce the statute, nor was there any limit on the number of fish that could be harvested by legal means. The overexploitation of trout became such a problem in the watershed that in 1894 San Bernardino County, on its own authority, finally took action and limited the number of trout a person could catch to 50 per day. The State of California did not take similar action until 1905, when the harvest was limited to 50 trout per day and 25 total pounds. By then, the native stocks had already become depleted in the Santa Ana River watershed.

Each of the aforementioned factors have acted in concert over a long period of time to reduce the native fish community of the Santa Ana River watershed to that which remains today. The Santa Ana River Watershed Plan recognizes that history cannot be undone and the aquatic community cannot be restored to its presettlement condition; however, a conservation strategy can be implemented that will ensure the long-term viability of the watershed's aquatic communities.

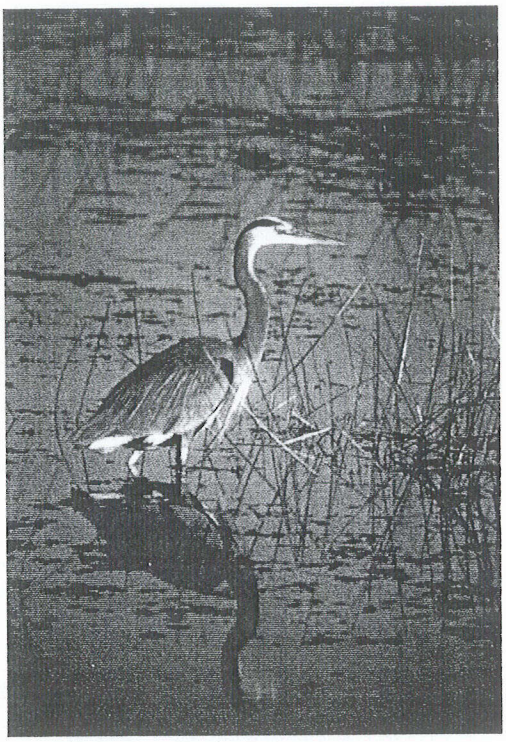
C. Open Space and Recreation

The Santa Ana Watershed possesses a wealth of natural resources affording numerous outdoor recreational opportunities. On a given day, it is possible to snowboard Big Bear in the morning and surf the "Wedge" in Newport Beach in the afternoon without leaving the Watershed. Varied terrain and a mild climate combine to create the perfect backdrop for outdoor recreation possibilities.

Parkland Ratios

Within the Watershed, parkland totals 75 square miles (48,000 acres) of the Watershed while forest/wilderness areas total 850 square miles. Undeveloped land, while technically open space

but not included in open-space calculations, totals 687 square miles. Refer to Figure 2-7 for a map of current open space, based on 1993 Southern California Association of Governments land use information.



Wetlands areas, such as the Bolsa Chica Ecological Reserve Park shown here, provide vital habitat for migrating birds.

Photo courtesy of EIP Associates

The U.S. Department of Housing and Urban Development (HUD) recommends 2.5 acres of parkland for every 1,000 residents, although many consider this ratio to be low. Overall, the Watershed residents experience a ratio of 100 acres of parkland to every 1,000 residents. Two facts make it difficult to compare this number to HUD recommendations. First, HUD recommendations are for urbanized areas, and much of the Watershed is not urbanized. With such a large land area, disparities exist between the ratio of parkland to residents and the accessibility of parkland to residents. That is, not all watershed residents have access to 0.1 acre of parkland. The second fact that makes comparison difficult is that forest/wilderness lands are not taken into account in this calculation.

Public Access

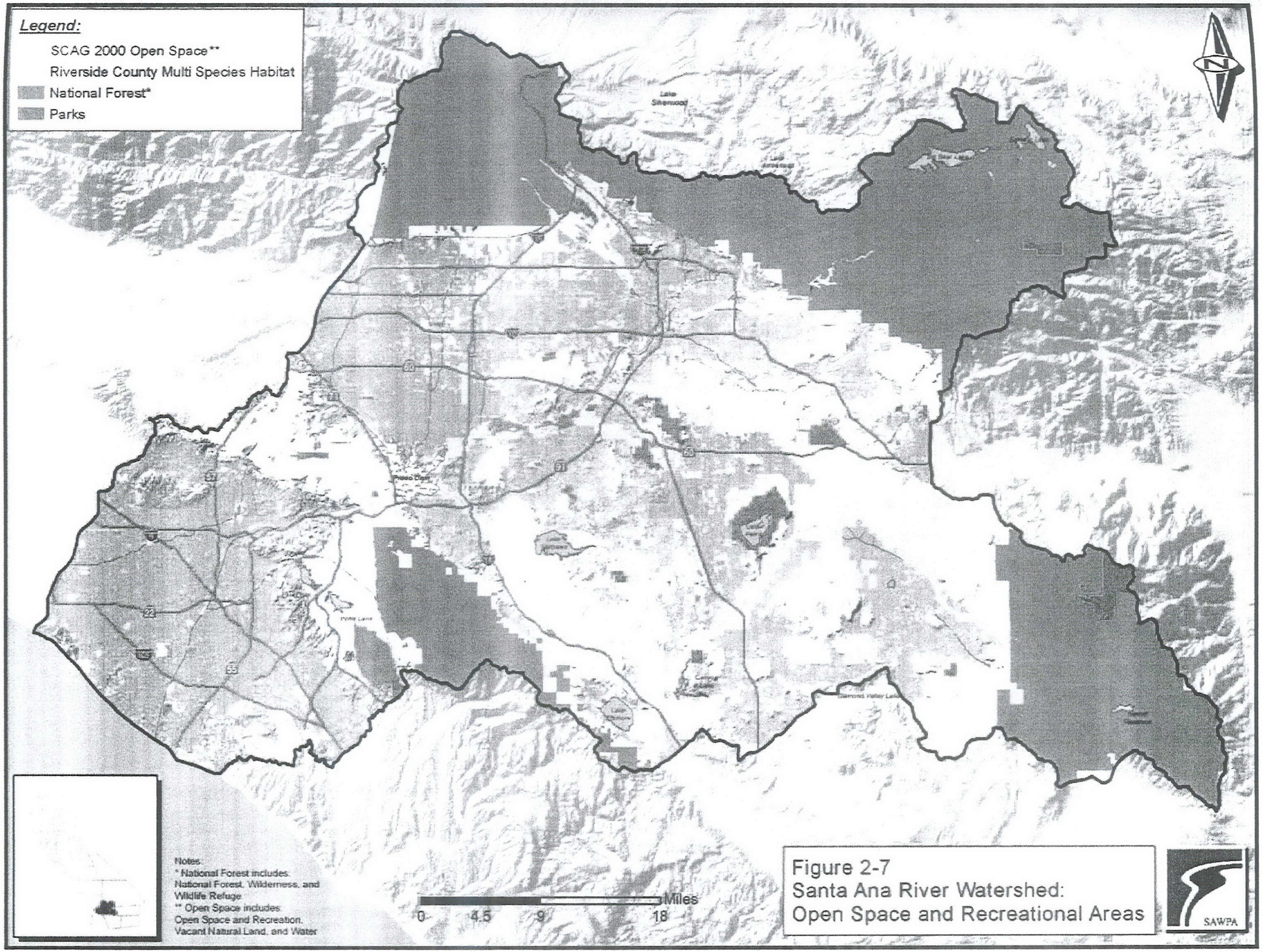
An important aspect of preserving recreational opportunities is to ensure access to local waterways. The Watershed's rivers, streams, lakes, and beaches are heavily used by watershed residents and visitors. A visit to the Santa Ana River near Van Buren Bridge on a summer afternoon may reveal families picnicking, wading, and swimming in the River, although swimming in the River is not necessarily recommended. Beach access is mandated by the Federal Coastal Zone Management Act, and is a primary mandate of the California Coastal Commission. However, access to lakes and rivers is not given as much attention as beach access, and in some cases, river access is prohibited due to water quality issues. Lake and river access should be monitored as the Watershed continues to urbanize to ensure that homes and commercial development dedicate lateral easements for public access to Watershed resources.

Forest Land

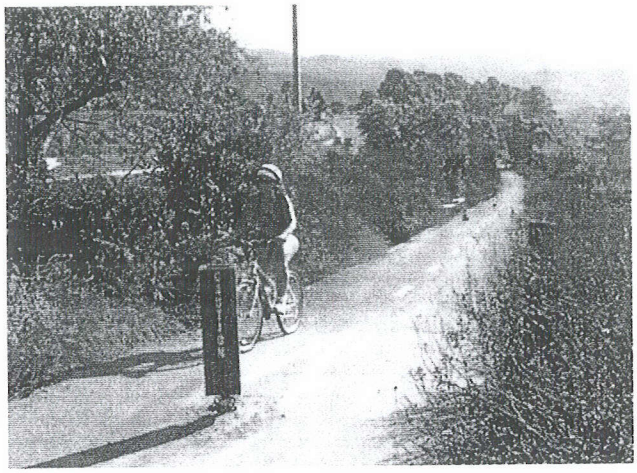
The Santa Ana Watershed is fortunate to include two national forests: San Bernardino National Forest and Cleveland National Forest. The San Bernardino National Forest includes the wilderness areas of Cucamonga, San Jacinto, San Gorgonio, and Santa Rosa. The National Forests, managed by the U.S. Department of Agriculture, provide recreational opportunities for watershed residents and visitors, such as hiking, camping, and mountain biking. The Santa Ana River headwaters are in the San Bernardino National Forest. Since most of this land is undeveloped, the high water quality at the headwaters of the River provides high-quality habitat for native wildlife.

Santa Ana River Trail

Many recreational efforts are focused on the Santa Ana River Trail, an important regional recreational element. First conceived over a century ago and formally proposed in 1955, the Santa Ana River Trail is a much-anticipated project with watershed-wide support. Within the Santa Ana Watershed, no other issue seems to spark as much enthusiasm or inspire as much collaboration between diverse interests as trail planning. Trails are viewed as valuable resources providing connectivity, transportation alternatives, scenic relief to urban dwellers,


Legend:
SCAG 2000 Open Space**
Riverside County Multi Species Habitat
National Forest*
Parks
Notes:
* National Forest includes: National Forest, Wilderness, and Wildlife Refuge
** Open Space includes: Open Space and Recreation, Vacant Natural Land, and Water
0
4.5
9
18
Miles
Figure 2-7
Santa Ana River Watershed:
Open Space and Recreational Areas
SAWPA

recreational activities, and linear parkways with opportunities for environmental restoration as well as education. Opportunities for multi-benefit projects that incorporate trail planning, open space acquisition, wetlands/habitat enhancement, and educational/interpretive components are desirable.



Trails are a valuable public resource.

Watershed planning participants agree that the trail should provide access for a wide variety of users, including walkers, hikers, joggers, bicyclists, horseback riders, users in wheelchairs, rollerbladers, and skateboarders. Some of these users require special features, such as wheelchair access or equestrian staging areas.

While the 110-mile trail is not yet complete, several segments totaling approximately 40 miles have been constructed. Plans are almost complete for the remaining 70 miles (as well as a number of feeder trails and connections), and full funding has been secured for some segments. One goal of the Santa Ana Integrated Watershed Plan is to assist in securing funds for those trail segments that have not yet received funding.

The City of Corona has just completed a draft trail alignment through the Prado Basin, one of the most challenging linkages remaining. Completion of this linkage is contingent upon the USACOE completing the Prado Dam project. It is likely that the existing SARI line easement along Chino Hills State Park will provide an important link in this system.

Challenges and Opportunities

The Santa Ana Watershed is rapidly urbanizing. As more and more land is developed for homes and commercial enterprises, ratios of parkland to residents become more difficult to maintain. First, there is the direct challenge of maintaining parkland ratios while the number of people increases. Second, planners face an indirect economic challenge: urbanization tends to drive up land prices, making land preservation cost-prohibitive. Watershed wide, cities and counties should consider the issue of retaining the ratio of 100 acres of parkland for every 1,000 residents. This requires a commitment from park planners and other City and County staff, developers, and nonprofit organizations to maintain or improve current open space ratios, even as populations burgeon. One of the most challenging aspects of park and trail development is securing the funding for maintenance of these amenities. A well educated professional workforce often chooses to locate in a region based on the availability of well-maintained park and open space areas. In addition, urban and park planners should work to ensure access to waterways including lakes, streams, rivers, and the ocean. Several opportunities exist within the Santa Ana Watershed to expand recreational opportunities. Many of these are either in project development stage or currently underway. Notable examples of these projects include the following.

San Timoteo State Park

This undertaking of the Riverside Land Conservancy among others would involve the creation of a new State park centered in San Timoteo Creek Watershed. In addition to other restoration activities in the area will increase water quality in San Timoteo Canyon and subsequently the Bunker Hill Basins, a major source of drinking water. The park, once developed, will provide a number of linkages with other habitat areas in Riverside County, as well as reestablishing, creating, restoring, and protecting wetlands in the floodplains of the canyon and its major tributaries from Loma Linda to I-10.

Orange Coast River Park

The Friends of Harbors, Beaches, and Parks, with cooperation from many partners, including local cities, Orange County nonprofit organizations, and private entities, have proposed a large park at the mouth of the Santa Ana River. The Orange Coast River Park would link several existing parks, incorporating ponds, boardwalks, and restoration.

The project's vision is broadening to include Banning Ranch, which could potentially increase the Park from 1,000 to 1,400 acres. Implementation of this project will involve coordination with many agencies, such as the Orange County Sanitation District.

Santiago Creek Parks

Restoration efforts have been underway in and along Santiago Creek, the Santa Ana River's major tributary in the lower watershed. Local cities and organizations are acquiring land to add new parks along the Creek. These parks would provide recreational and educational benefits, in addition to habitat and water quality benefits. The City of Orange has recently acquired land including eight acres within the Santiago Creek just north of Chapman Avenue. This land will be included in the 42-acre Grijalva Park at Santiago Creek. The City also owns Yorba Park that borders the Santiago Creek just south of Chapman Avenue and Hart Park, which includes several acres of open space in the creek. The County of Orange and City of Santa Ana contribute additional park acreage upstream and downstream from the City of Orange. These three agencies, along with the City of Villa Park, are working to connect these parks with a contiguous recreational trail system.

Chino Creek Park

The Inland Empire Utilities Agency, Orange County Water District, and the Wildlands Conservancy are developing an integrated recreational plan that will link Prado Basin with the Santa Ana River Trail System providing habitat, recreational and educational opportunities. Long-term plans for the park include an educational center at Chino Creek Park and a nursery designed specifically to grow native plants for restoration projects. This project utilizes a wide-angle integrated planning approach to integrate habitat protection and recreational opportunities for the trail system in the Prado Basin.

D. Water Supply

Groundwater supplies meet most of the direct water demand in the basin, providing 68 percent of the consumptive water needs. Groundwater comes from the inland and coastal aquifers in the region, which range from a few hundred to over one thousand feet in thickness. Inland aquifers, upstream from Prado Dam, underlie about 1,200 square miles of the Watershed, while coastal aquifers downstream from Prado Dam underlie about 400 square miles. Imported water from Northern California and the Colorado River provides about 23 percent of consumptive water demand. Other sources of supply include surface water derived from precipitation within the basin (5 percent) and recycled water (4 percent), refer to Figure 2-8.

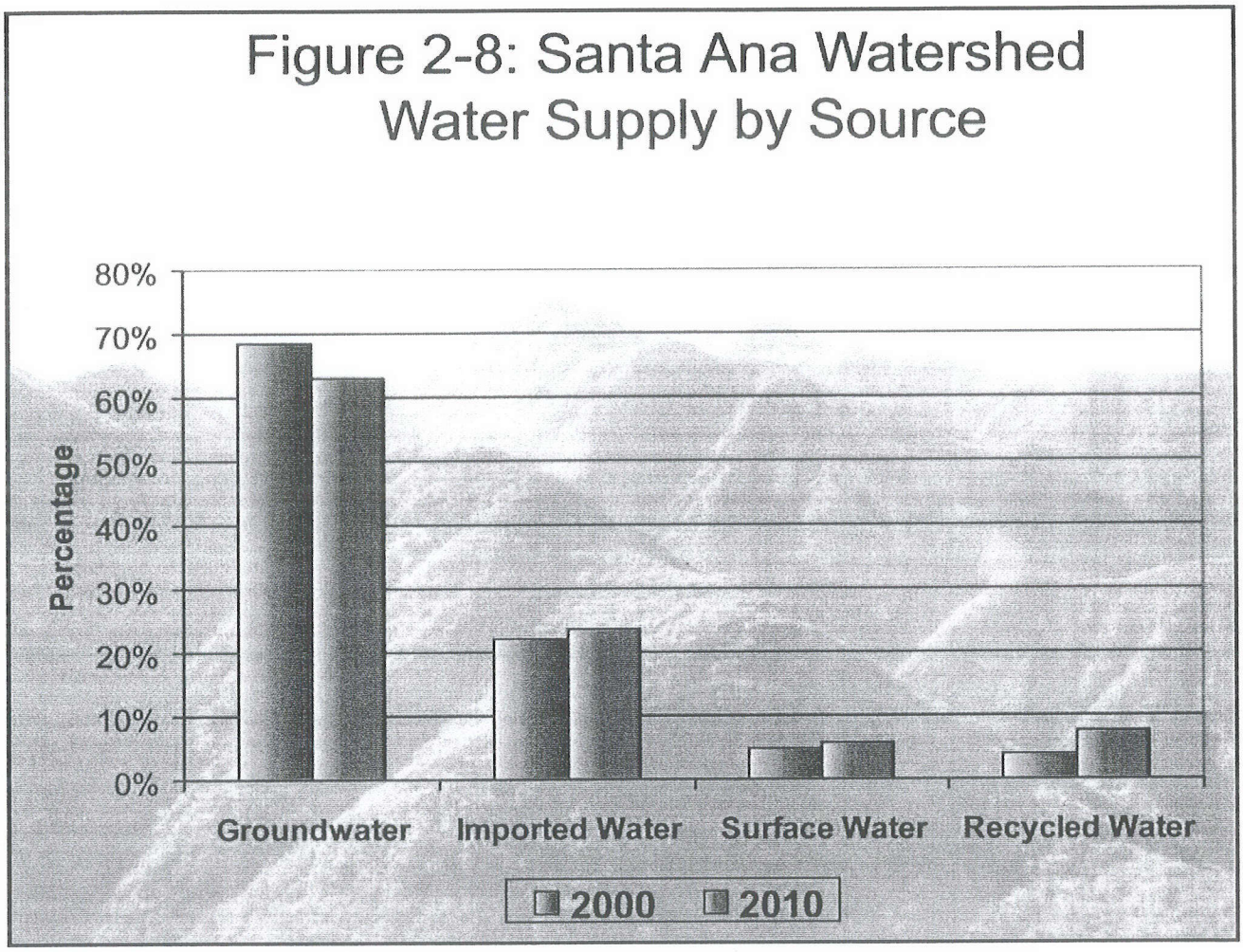
Groundwater

Groundwater continues to be the primary water supply source available to the SAW. Groundwater production is supported by incidental and artificial recharge of recycled water, imported water, and storm water supplies. Groundwater production levels are expected to gradually increase by modification of operational rules of existing facilities, providing new facilities, salvaging presently impaired groundwater by installing well head and regional treatment systems, and new sources of water for replenishment (e.g., recycled water).

Groundwater replenishment occurs both naturally and within constructed groundwater recharge and replenishment facilities within the watershed. Replenishment facilities percolate or inject storm water, recycled water, and/or imported water. Also, in some basins within the SAW, in-lieu replenishment may occur, i.e., available imported water is used in-lieu of groundwater, storing the groundwater for times when imported water is not available.

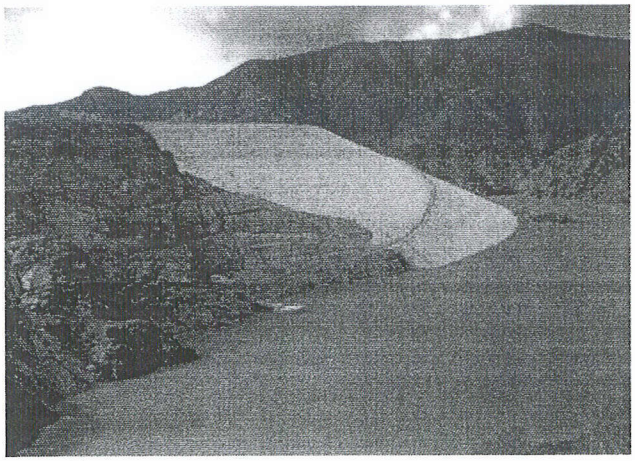
Imported Water

Imported water is the second largest water supply source to the SAW, accounting for approximately 23% of the total water demands. Metropolitan Water District's (MWD) Colorado River Aqueduct (CRA) and the Department of Water Resources' (DWR) California Aqueduct provide imported water to the SAW. Four of the five SAWPA member agencies (the exception being SBVMWD) have historically relied primarily on MWD for imported water. According to MWD, SAWPA agencies imported approximately 450,000 AFY, or 33% of total water consumption, in recent years. It is anticipated that MWD's IRP Update will emphasize the goals of reducing dry-year dependence on



supplies from the California Aqueduct and increasing reliance on groundwater storage. These very goals are consistent with those of the SAW.

Surface Water



The Seven Oaks Dam provides for the seasonal storage for the Upper Santa Ana River Watershed

Surface water accounts for approximately 5% of the total water demands. Natural sources of surface flow within the watershed are seasonal, provided through a vast network of largely ephemeral rivers and streams, which are dependent entirely upon annual rainfall and runoff from snowmelt. Typically, much of this flow, especially during large storm events is lost to the ocean through storm drain channels. In fact, only a fraction of captured surface water is used directly; in large, this water is used to recharge groundwater basins. Today, the watershed is still largely dependent on large reservoirs and dams to provide for surface storage demands.

Recycled Water

Recycled water currently represents the fourth largest water supply source to the SAW, accounting for approximately 4% of the total water demands. This figure includes only direct use applications such as landscape and agricultural irrigation, as

well as commercial and industrial uses. As infrastructure is developed recycled water is projected to surpass surface water to become the third largest supply source for the SAW.

Demand Projections

Future water supply projections indicate a shift from reliance on groundwater and imported water to increases in use of recycled and surface water as depicted in Figures 2-9 and 2-10 (Husing, 2005). The amount of groundwater recharged to the Watershed's aquifers is only 37 percent of the volume pumped. Given the imbalance between water pumped and water recharged, it should not be surprising that, under such intense settlement pressures and water demands, future supplies will depend upon increased groundwater recharge. Future water supply planning includes increased groundwater recharge and measures to reduce impacts to native aquatic communities, while meeting increased water demands due to regional population growth.

E. Water Quality

Almost a century of agricultural and industrial land use has resulted in salts and other pollutants infiltrating many aquifers and streams within the Santa Ana Watershed. These sources of water quality degradation can be classified into point and nonpoint sources. Point sources are confined to point discharges to the soil, groundwater, or stream systems. Examples include conventional wastewater and industrial discharges to streams or ponds, and leaky underground storage tanks. Nonpoint sources are area wide discharges to soil, groundwater, and surface waters, such as land application of waste and fertilizers, and atmospheric deposition of contaminants to the soil and water bodies. Point sources can be traced back to a single source, such as the end of a pipe, while nonpoint sources can rarely be traced back to an individual origin, and require regional solutions, including region wide behavioral changes, to reduce pollutants.

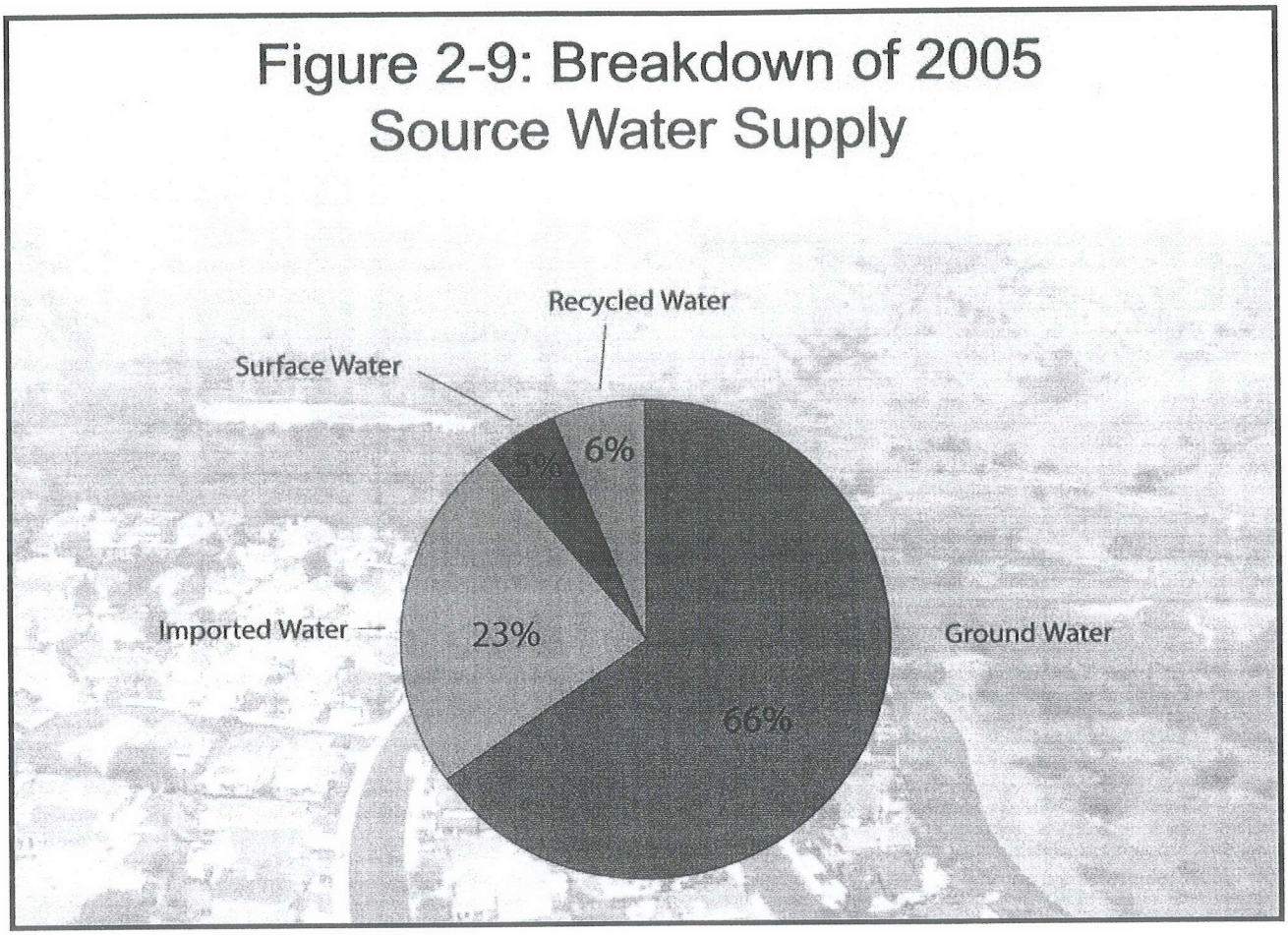
The SWRCB and its RWQCB are responsible for enforcing water quality standards within the state. As mandated by Section 303(d) of the Federal Clean Water Act, the RWQCB maintains and updates a list of "impaired waterbodies" that exceed State and federal water quality standards. These impaired waterbodies are shown for the Santa Ana Region in Figure 2-11.

Within the Santa Ana Watershed, water quality is generally better in the headwaters and upper watershed, lessening as the distance from the Pacific Ocean decreases. In the upper Santa Ana Watershed, including the Santa Ana River and Lytle Creek, the primary water quality concern is the presence of excessive levels of bacterial indicators from unknown nonpoint sources. Downstream water quality is further degraded by runoff from urban development and agricultural operations including dairies, which contribute high levels of bacterial indicators, as well as, elevated nutrient levels (especially nitrates), suspended solids, and high salinity. In coastal areas, common pollutants include metals from urban runoff and boatyards, pathogens from urban runoff and storm sewers, nutrients from agriculture and urban runoff, and pesticides from agriculture, contaminated sediments, and other unknown nonpoint sources.

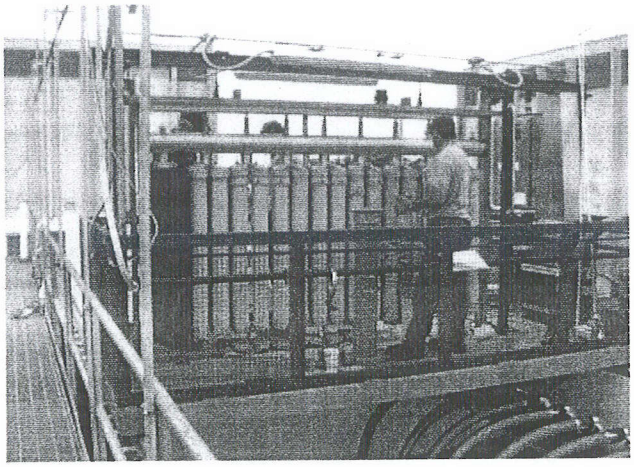
In 1994, OCWD initiated the Santa Ana River Water Quality and Health (SARWQH) Study to evaluate the use of the Santa Ana River to recharge the Orange County groundwater basin due to the poor quality of Santa Ana River baseflow. The goal of the SARWQH Study was to characterize the quality of the Santa Ana River water and the quality of the groundwater basin it recharges. The multidisciplinary study design included an examination of hydrogeology, microbiology, water chemistry, toxicology and public health. An integral component of the SARWQH Study was independent review of the research design and study findings by the Scientific Advisory Panel, established by the National Water Research Institute to provide expert guidance for the study. The results of the extensive study have helped to confirm that current recharge practices using Santa Ana River water are protective of public health.

As the Santa Ana Watershed continues to grow, cities encroach ever closer to dairies and other agricultural operations. To counter this added stress to the surface and groundwater supplies, dairy producers and water agencies are working together to develop advanced methods of reducing the dairies' impacts to water quality. Technologically advanced wastewater control techniques have been rigorously employed and negative impacts from agricultural runoff continue to be minimized. In fact, the Santa Ana

Figure 2-9: Breakdown of 2005 Source Water Supply



Watershed is considered to be a world leader with respect to implementation of innovative technology to improve water quality and manage organics from the dairies.

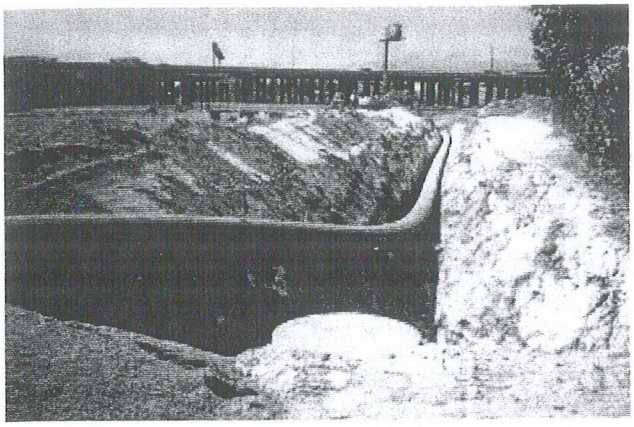


The Groundwater Replenishment System will purify 70,000 acre-feet of water per year

For example, Orange County Water District and Orange County Sanitation District state-of-the-art Groundwater Replenishment System scheduled to be completed in 2007 will purify for reuse 70,000 acre-feet per year of wastewater that is currently discharged into the ocean. Using water treatment methods including microfiltration, reverse osmosis, and UV disinfection, secondarily treated wastewater from the Sanitation District's sewage treatment plant will be purified to levels that far exceed drinking water standards. The water will then be stored in the Orange County Groundwater Basin either by injection along the coast or by percolation in ponds near the Santa Ana River. The underground basin provides 75 percent of the water used by north and central Orange County cities.

The Chino Basin Dairy Program and Organics Management Center is an example of world-class technology where a closed loop waste management system tackles agricultural waste, produces energy, and provides high-quality fertilizer products. Nevertheless, the existing salts and contaminants present in the watershed and adjacent groundwater basins from past practices still need to be removed, as improving water quality is inextricably linked to improving water

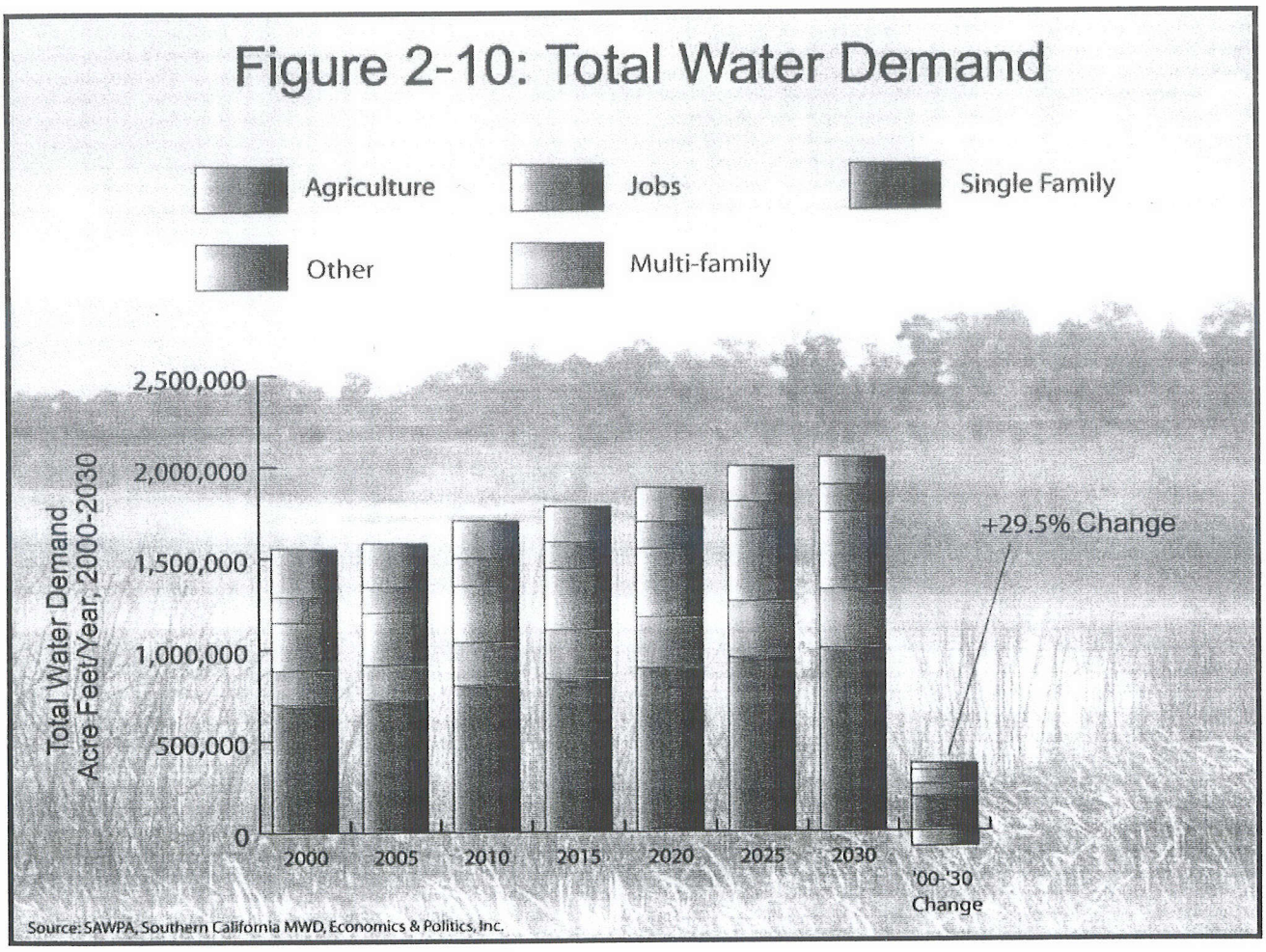
supplies and implementing a comprehensive groundwater storage program. As regional water leaders seek to develop further groundwater storage in the Santa Ana Watershed, steps must be taken to pump contaminated water from underground, purify the water, and perform groundwater recharge with the purified water.

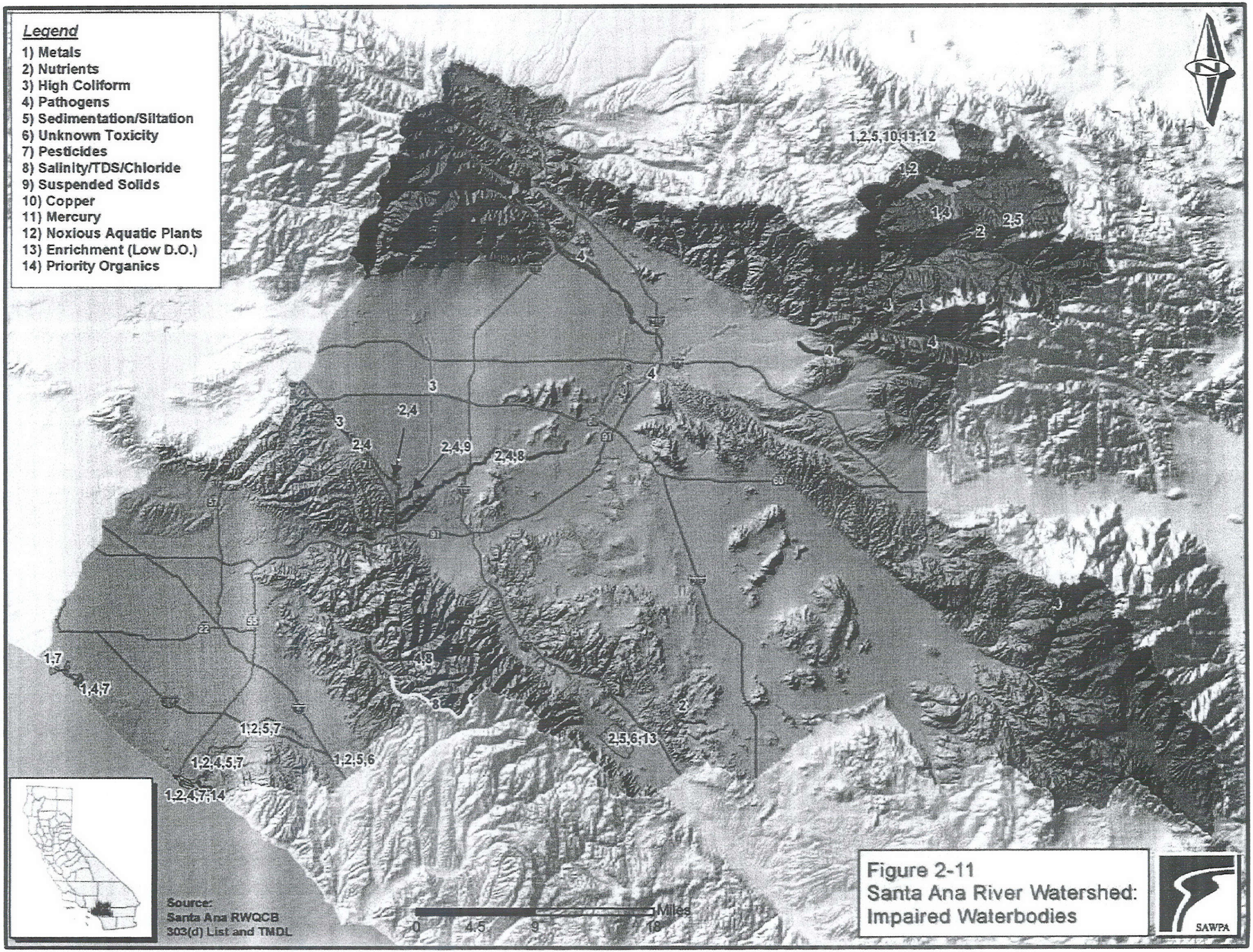


2001–Construction of Reach V of the SARI line.

The Santa Ana Regional Interceptor (SARI), a regional brine line, is designed to convey 30 million gallons per day (MGD) of non-reclaimable wastewater from the upper Santa Ana River basin to the ocean for disposal, after treatment. The non-reclaimable wastewater consists of desalter concentrate and industrial wastewater. Domestic wastewater is also received on a temporary basis. To date over 73 miles of the SARI line have been completed. The most recent extension (23 miles in length), the Temescal Valley Regional Interceptor (TVRI) line (Reach V) was completed in 2002. The upstream extension (Reach IV D and IV E) was completed in 1995 to the City of San Bernardino Wastewater Treatment Plant. Reach IV A serves the Chino Basin area and Reach IV B serves the southwestern portion of the City of Riverside.

The Santa Ana Watershed's potential for groundwater banking is substantial, but the volume of clean water that can be stored may be hindered by the high salt concentrations and constituents of concern in the existing




Legend
1) Metals
2) Nutrients
3) High Coliform
4) Pathogens
5) Sedimentation/Siltation
6) Unknown Toxicity
7) Pesticides
8) Salinity/TDS/Chloride
9) Suspended Solids
10) Copper
11) Mercury
12) Noxious Aquatic Plants
13) Enrichment (Low D.O.)
14) Priority Organics
1,2,5,10,11,12
1,2
1,3
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2,4,9
2,4,8
1,7
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1,2,5,7
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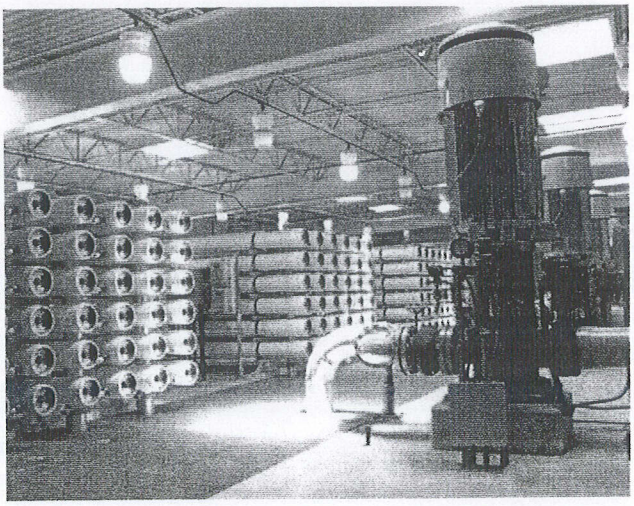
1,2,4,7,14
1,2,5,6
2,5,6,13
Source:
Santa Ana RWQCB
303(d) List and TMDL
0
4.5
9
18
Miles
Figure 2-11
Santa Ana River Watershed:
Impaired Waterbodies
SAWPA

groundwater. To reverse the pollutant impacts, water quality clean up technologies are being utilized to pump and remove the contaminants from groundwater in order that it may be used for potable purposes. In the Santa Ana Watershed, local agencies have taken the lead to preserve and protect its valuable groundwater resources. Two desalters have been constructed by SAWPA in the Arlington and Chino areas and are producing a total of 14 MGD. The current Chino Desalter is undergoing expansion, and a second 10 MGD Chino Desalter will be in operation by 2006. In addition, the Temescal Desalter, constructed and operated by the City of Corona, has a capacity of 10 MGD and will be expanding to 15 MGD. There are numerous additional desalters that will be installed as part of the SAWPA program. The Chino Basin Optimum Basin Management Plan prepared by IEUA and the Chino Basin Watermaster estimate that the Chino Basin will need additional desalting and ion exchange capacities to stop the spread of salt contamination and assure adequate groundwater yield for the Chino Basin. Other components relating to the transport of desalted water, including 22 miles of pipeline and 10 pumping stations will also need to be installed to get the treated water to the entities that can best use it.



Desalters enable the upper Santa Ana Watershed to utilize treated wastewater.

One of the most challenging problems associated with maximizing the use of local water resources in the basin will continue to be addressing water quality elements that exceed public health or public acceptance standards, such as a high level of pathogens. The water quality problems can be addressed by a variety of strategies including wellhead treatment, blending, dilution or flushing, or even by natural processes such as native or constructed treatment wetlands. Wellhead treatment can include a variety of approaches including desalination, anion exchange, and carbon absorption to name a few. In many cases, multiple contaminants can be addressed through a single-treatment strategy.

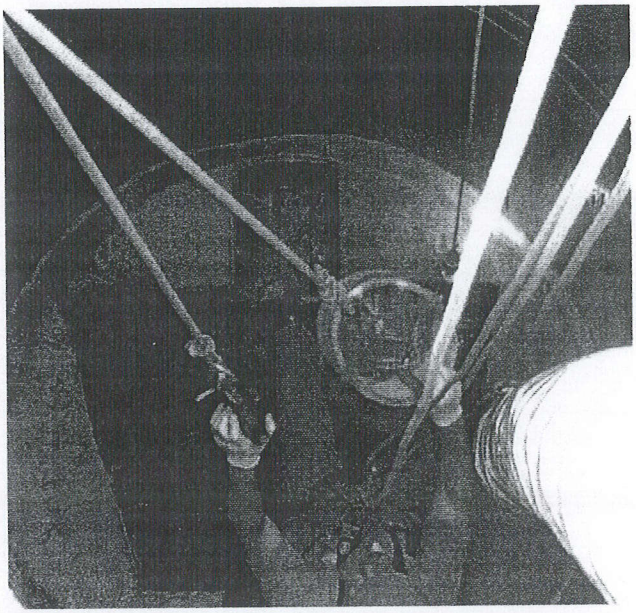
Constituents of Concern

Total Dissolved Solids

"Dissolved solids" refer to any minerals, salts, metals, cations or anions dissolved in water. Total dissolved solids (TDS) comprise inorganic salts (principally calcium, magnesium, potassium, sodium, bicarbonates, chlorides and sulfates) and some small amounts of organic matter that are dissolved in water. TDS in drinking-water originate from natural sources, sewage, urban run-off, industrial wastewater, and chemicals used in the water treatment process, and the nature of the piping or hardware used to convey the water, i.e., the plumbing.

In the Santa Ana River watershed, increases in groundwater TDS concentrations are a function of the recharge of saline water originating from storm flows, urban runoff, imported water, and incidental recharge. They are also attributed in part to the legacy of salt contamination from past agricultural and land uses. The TDS impacts of agriculture on groundwater usually originate from fertilizer use on crops, consumptive use, and dairy waste disposal.

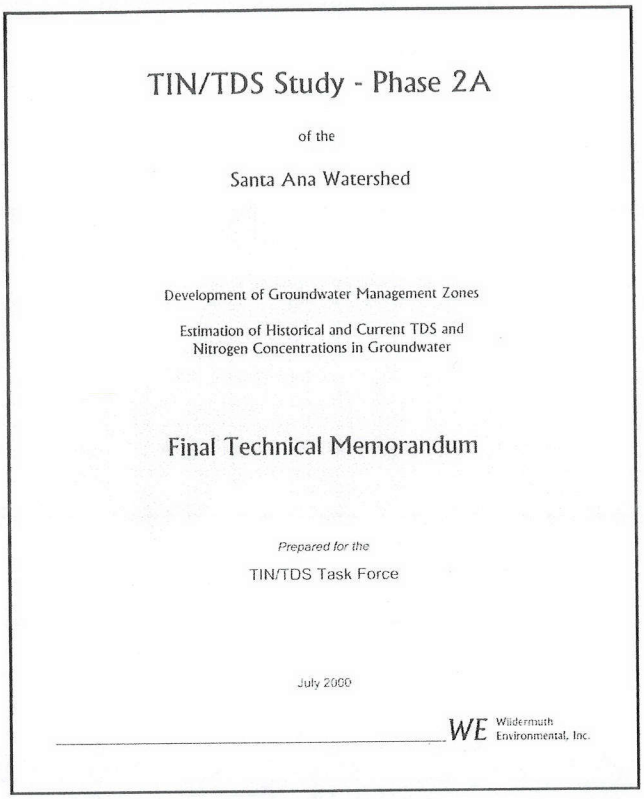
Water quality, as it pertains to higher salinity supplies, is another significant issue. On average, about 80 percent of Metropolitan water delivered to the Watershed comes from the Colorado River, which has a high salinity content, expressed in terms of total dissolved solids (TDS). Colorado River water has an average TDS of 700 mg/l while State Project Water averages about 250 mg/l. Water with a TDS greater than 500 mg/l is problematic to many of the subtropical crops grown in the region, as they do not produce well and irrigation management is more difficult when irrigated with high TDS water.



Water quality monitoring is an important aspect water projects.

Higher TDS source water also poses a special problem for water recycling facilities because conventional treatment processes are designed to remove suspended, but not dissolved, particles. TDS removal, or demineralization, requires an advanced treatment process, which can significantly increase project costs. Residential use of water typically adds 200 to 300 mg/l of TDS to the wastewater stream, and self-regenerating water softeners can add another 60 to 100 mg/l. Infiltration of brackish groundwater into sewer lines can also cause an increase in TDS. If an area receives a water supply that has a TDS of more than 700 mg/l, and residents add 300 mg/l or more through normal use, the recycling facility will produce recycled water with a TDS concentration of 1,000 mg/l or higher.

In general, TDS over 1,000 mg/l becomes problematic for industrial reuse customers and virtually unusable for many crops. This greatly limits the potential uses and marketability of recycled water, particularly for agricultural purposes, because certain crops and nursery stock cannot be irrigated with high TDS water. A five-year study by U.C. Cooperative Extension indicated that if avocados were irrigated with recycled water from City of Escondido's Hale Avenue Resource Recovery Facility, a 40 percent reduction in yield could be expected compared to avocados irrigated with the City's surface supplies.



TIN/TDS Study - Phase 2A

of the

Santa Ana Watershed

Development of Groundwater Management Zones

Estimation of Historical and Current TDS and Nitrogen Concentrations in Groundwater

Final Technical Memorandum

Prepared for the

TIN/TDS Task Force

July 2000

WE Wildermuth Environmental, Inc.

Santa Ana River Watershed TIN/TDS Phase 2A Study

Nitrates

Nitrogen is one of the most abundant elements. About 80 percent of the air we breathe is nitrogen. It is found in the cells of all living things and is a major component of proteins. Inorganic nitrogen may exist in a free state as a gas N2, or as nitrate NO3-, nitrite NO2-, or ammonia NH3+. Organic nitrogen is found in proteins and is continually recycled by plants and animals.

The major routes of entry of nitrogen into bodies of water are municipal and industrial wastewater, septic tanks, feed lot discharges, animal wastes (including birds and fish), discharges from car exhausts, as well as, from nonpoint sources such as fertilized cropland, parks, golf courses, lawns, and gardens. Bacteria in water quickly convert nitrites [NO2-] to nitrates [NO3-].

Similar to TDS, areas with significant irrigated land use or dairy waste disposal histories overlie groundwater with elevated nitrate concentrations. Wells impacted by nitrates are usually shallow wells that draw from groundwater that may receive incidental run-off or have been impacted from years of fertilizer use for agriculture. Nitrogen-containing compounds act as nutrients in streams and rivers. Nitrate reactions [NO3-] in

fresh water can cause oxygen depletion. Thus, aquatic organisms depending on the supply of oxygen in the stream will die.

The Federal water quality standard for nitrate-nitrogen is set at 10 mg/L. Water containing nitrate concentrations higher than 10 mg/L must either be treated or blended with another water source in order to reduce nitrate levels.

Pathogens

Waterborne pathogens are disease-causing bacteria, viruses, and protozoans that are transmitted through untreated or inadequately treated water. Their consumption can lead to severe problems of the digestive system, which can be life-threatening to the very young, very old, or those with damaged immune systems. In addition to the human health risks from pathogens, these organisms can decrease water clarity, cause unpleasant odors, and consume dissolved oxygen.

Litter and solid waste provide an environment for waterborne bacteria and pathogens to survive.

Sources of pathogens which can lead to the contaminate surface and groundwater sources include untreated sewage, failing septic overflows, manure applied as agricultural fertilizer, as well as, feces from wildlife and pets are permitted to run-off or seep into coastal marine or fresh water resources. Pathogen survival depends on many factors. These factors include: temperature, pH levels, ultraviolet light, as well as, the persistency of the pathogen itself.

Arsenic

Arsenic is a naturally occurring element in the environment. Its presence in groundwater largely is the result of arsenic-bearing minerals dissolving naturally over time as certain types of rocks and soils are weathered. Arsenic is also used commercially in alloying agents and wood preservatives. Arsenic in groundwater is largely the result of minerals dissolving from weathered rocks and soils.

Arsenic is classified by the USEPA as a known human carcinogen that contributes to cancers of the skin, bladder, and lung. It is also suspected of causing dermal, neurological and cardiovascular complications, although the new regulation is based upon arsenic's carcinogenic effects. In drinking water arsenic primarily exists in two inorganic forms, arsenite (As[III]) and arsenate (As[V]). Both are oxyanions, although As(III) has no charge at drinking water pHs and As(V) is a mono- or di-valent anion at drinking water pHs. Organoarsenic compounds may also be present in natural waters, but their concentrations are typically negligible in drinking water sources.

Several types of cancer have been linked to arsenic in water. In 2001 the U.S. Environmental Protection Agency lowered the maximum level of arsenic permitted in drinking water from 50 micrograms per liter (ug/L) to 10 ug/L.

Volatile Organic Compounds (VOC)

TCE and PCE were examples of two widely used industrial solvents. TCE was commonly used for metal degreasing and was also used as a food extractant. PCE is commonly used in the dry-cleaning industry. About 80 percent of all dry cleaners used PCE as their primary cleaning agent (Oak Ridge National Laboratory, 1989). 1,1-Dichloroethane, 1,1-Dichloroethene, cis-1, 2-dichloroethene, 1,2-dichloroethane, and vinyl chloride are degradation byproducts of PCE and TCE.

Within the Santa Ana Watershed, the RWQCB has identified several contaminant plumes that are considered a threat to groundwater supply quality. A number of these plumes, which have impacted some of the highest producing well fields in the watershed, exist within the Bunker Hill groundwater basin.

Perchlorate

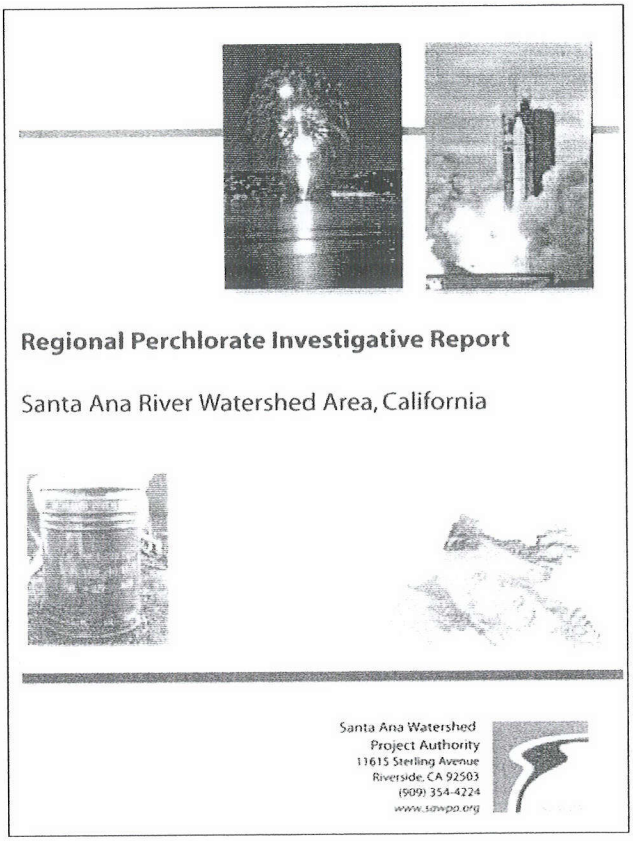
Perchlorate (ClO4 -) originates as a contaminant in the environment from the solid salts of ammonium perchlorate (NH4ClO4), potassium perchlorate (KClO4), or sodium perchlorate (NaClO4). The perchlorate salts are quite soluble in water. The perchlorate anion (ClO4 -) is exceedingly mobile in soil and groundwater environments. It can persist for many decades under typical groundwater and surface water conditions, because of its resistance to react with other available constituents.

Perchlorate has been detected in over 170 municipal drinking water supply wells throughout the Santa Ana River Watershed and this number appears to be growing (SAWPA, November 2004). In the watershed perchlorate contamination can be linked directly to past aerospace industry activities, which used ammonium perchlorate and potassium perchlorate in the manufacturing and testing of solid rocket propellants and can possibly be linked to the manufacturing of pyrotechnics and other products. Additionally, groundwater sources in the SAW have been contaminated in the past by the banking of water imported from the Colorado River and low levels of perchlorate have been detected in areas historically dominated by agriculture, leading to the speculation that chemical fertilizers imported from Chile in the early 1900's are a possible source of contamination.

MTBE

There is statewide concern that groundwater contamination could occur due to the widespread use of methyl tertiary butyl ether (MTBE) a gasoline additive used to improve air quality by reducing emissions and increase octane ratings. A Lawrence Livermore National Laboratory (LLNL) report, released in 1996 reported detections of MTBE in groundwater at 78 percent of the leaking underground fuel tank (LUFT) sites in the State.

Many LUFT sites are under passive bioremediation to address the hydrocarbon release. However, water utilities are encouraged to manage groundwater resources with consideration of the mobility and recalcitrant nature of MTBE.



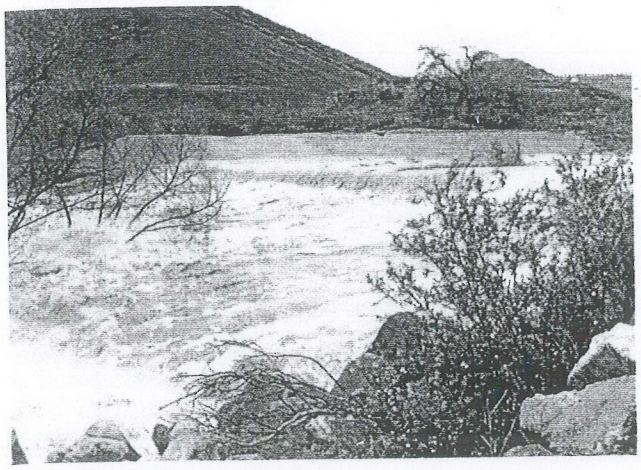
Regional Perchlorate Investigative Report, Santa Ana River Watershed.

Pharmaceutical and Personal Care Pollutants (PPCP)

A United States Geological Survey (USGS) report, released in June 2002, showed results from the analysis of water sample tests taken from 30 states for 95 common compounds, considered an emerging class of contaminants, known as pharmaceutical and personal care pollutants (PPCP). Study results mirrored those of similar studies of PPCP in both Europe and Canada, which showed that these chemicals persist in the environment, although in low concentrations. Among these substances are caffeine, contraceptives, painkillers, insect repellent, perfumes, and nicotine, as well as, a number of compounds linked to birth control and hormone supplements.

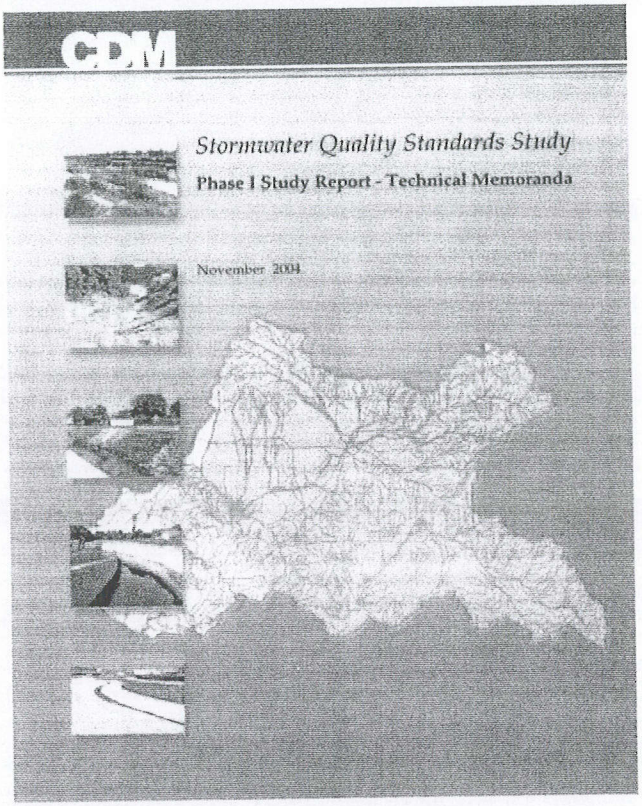
Little is known about PPCP potential health and environmental effects, because their use and disposal almost entirely unregulated. PPCP represent the "next big unknown" in environmental contamination and it is likely that the EPA will decide over the next few years how to regulate PPCP.

F. Flood Control



Santa Ana River storm flows

Many of the Santa Ana's tributaries are what Australians would call billabongs and North Africans and Middle Easterners would call wadis dry riverbeds that only hold water during the rainy season. These riverbeds are completely parched throughout most of the year, but can quickly become raging torrents. The Santa Ana Basin is an arid environment and even qualifies as a desert in some areas. But the Watershed's close proximity to both the ocean and the mountains at times brings heavy rainfall, which are problematic from a flood control standpoint. Historically, efforts to deal with flooding in the region focused on damage control to reduce the threat to properties of floodwaters. As the area became urbanized, city planners simply channeled the periodic deluges into the ocean. Urban Southern California's concrete-lined creeks and rivers are a legacy to this way of thinking. While effective at preventing flooding, flood control channels that are concrete-lined are absent of riparian vegetation and provide little benefit in the way of groundwater recharge, wildlife habitat, or water quality improvements. Additionally, these flood control channels are considered an eyesore and a potential danger by local homeowners. Fortunately, 80 percent of the Santa Ana River is not a concrete channel, which is credited to forward thinking conservationists in the 1960s and 1970s. In urbanizing Southern California, efforts to control flooding must be balanced by water supply needs, habitat protection, and human enjoyment of wetland and riparian areas.



Stormwater Quality Standards Study, Phase 1 Study Report.

Flood protection agencies, including the U.S. Army Corps of Engineers and local flood control districts, are charged with the task of ensuring that floodwaters do not endanger life and property. It is evident that floodwaters can be physically devastating to homes, farms, and wetlands. Although wetlands are frequently inundated under natural conditions, major flooding events can damage wetlands by causing massive sedimentation, substrate disturbance, and periods of inundation that last substantially longer than many wetlands are capable of withstanding. Floods in agricultural and industrial regions also elevate the potential for hazardous discharges into the Santa Ana River and its tributaries. However, given the new era of groundwater storage, it is no longer recognized as advantageous to move floodwaters through an area as quickly as possible. Instead, filtering stormwater runoff through constructed wetlands or native riparian habitat provides both groundwater recharge possibilities and habitat opportunities.

Flood control agencies have adopted a more holistic approach to curbing flooding issues while

caring for the environment. In fact, flood control agencies throughout California and North America are undergoing a paradigm shift with respect to structural flood control. Although some areas are still paving their channels, communities such as Berkeley and Santa Barbara are ripping out concrete and restoring streams to their natural flow. The most radical example of this type of restoration is "daylighting," which involves the deliberate exposure of a previously covered river, creek, or stormwater drainage. The Santa Ana Watershed has not seen any daylighting to date, but several excellent restoration opportunities are in the conceptual stage, including projects in Chino Creek, the Santiago Creek alluvial fan, and Lytle Creek. The portion of the Santa Ana River that is a concrete channel is relatively small when compared to other Southern California rivers. However, the channelized portion provides opportunities for the River to improve both flood control and its own aesthetic interest, while providing habitat and recreational benefits to watershed residents.

Major flood control facilities on the Santa Ana River include the Prado Dam and the Seven Oaks Dam. The Prado Dam, located near the intersection of Orange, Riverside, and San Bernardino Counties, was constructed in reaction to the flood of 1938 and completed in 1941. Prado Dam is a key component for maintaining local water supplies in Orange County. In the past, storm flows from the Santa Ana River have been lost entirely to the ocean because flood control took precedence over water conservation. However, a series of agreements among the Orange County Water District, the U.S. Army Corps of Engineers, and the U.S. Fish and Wildlife Service have allowed the District to conserve additional water behind the dam in a seasonal storage pool. The Seven Oaks Dam, located upstream of the City of San Bernardino, was completed in 1999 against some opposition from environmental groups and with accolades from the engineering community. The Dam, constructed in reaction to both the 1938 flood and the later Santa Ana River flood in 1969, was selected as one of six merit finalists for the American Society of Civil Engineers 2002 Outstanding Civil Engineering Achievement Award due to its flood protection capacity. The Seven Oaks Dam is the largest dam in the country built strictly for flood control, and will save Watershed property owners millions of dollars in flood insurance premiums.

G. Watershed Demographics and Growth Pressure Impacts

Growth Pressures

In recent years there has been a shifting of the demographics and economics of counties that make up the Santa Ana Watershed. People are migrating from areas with a high cost-of-living to areas that have a more affordable cost-of-living; and in-turn businesses have opened offices in areas with available land and qualified people to staff the offices. The economies of the three counties that comprise the watershed are intrinsically linked together due to their proximity; in that there is a large portion of people who earn their living in one county and reside in an adjacent county.

The Orange County economy existed in the shadows of Los Angles and San Diego counties for many years being a suburban bedroom community. In recent years the economy has come into its own with a diversity of industries, from construction to high-technology. Today, Orange County is home to many major industries and service organizations. It is part of the second largest market in America, but Orange County has also seen some high-paying manufacturing jobs relocate to neighboring counties such as San Bernardino and Riverside; where businesses are searching out more reasonably priced land and accommodations (Caltrans, 2004). High home prices have made affordability a major problem for workers; driving many to seek lower priced housing in neighboring counties. These, and other factors, have caused the economic growth in Orange County to slow significantly in recent years.

Orange County, being in a position of limited future growth, is faced with the task of maintaining the region's water infrastructure and resources, as regulations on water quality become more stringent. This has not only put tremendous pressure on the available local water supply, but has brought about serious water quality concerns. Over pumping of groundwater resources has caused the encroachment of sea water along the coast and accelerated the migration of constituents of concern into the deeper, higher quality groundwater. Additionally, past banking of imported Colorado River water has affected large portions of the groundwater basin with low

levels of perchlorate. In recent years water agencies within the County have been working hard to rectify these issues with the development of barrier wells and a more intensive groundwater recharge program. However, as growth in the County slows it will become difficult for water agencies to be able to divert the resources needed to correct the mistakes of the past.

The western regions of Riverside and San Bernardino Counties located within the Santa Ana River watershed together are commonly referred to as the Inland Empire. This region is frequently ranked among the top 10 fastest growing metropolitan areas in the nation. Economic expansion has been prolific in the Inland Empire from both internal growth and migration of firms, principally from Los Angeles and Orange Counties. In recent years the region has been Southern California's employment growth leader. Manufacturers have accounted for the majority of the large expansion, attracted by available and affordable commercial space, and the lower costs of labor and housing. The housing market is especially strong in the Inland Empire, due in large part to these aforementioned conditions.

The Riverside County population is growing at the highest rate of the 25 largest counties in California. The population in the county has reached 1.7 million people and it is expected to continue to increase, with predictions of approximately 36,000 people, or more, per year migrating to the county for the next 20 years (Caltrans, 2004). The fastest growing cities in the county include Murrieta, Temecula, and Coachella; where people are drawn to by the availability (relative to Orange, Los Angeles, and San Diego counties) of moderately priced, affordable housing in all price categories. This availability of housing has attracted the skilled labor necessary to staff the multitude of technology companies that have moved to the area in an effort to reduce their operating costs.

San Bernardino is the largest county in the United States, with in excess of 20,000 square miles of land. The San Bernardino Mountains and the San Bernardino Valley occupy 10 percent of the total county area; with the desert comprising the other 90 percent of land (Caltrans, 2004). The majority of the population is located in the western half of the county, due to the availability of water, developable land, proximity to Los Angeles County, and the access to major transportation facilities. The fastest growing municipality in San Bernardino County is Rancho Cucamonga, with a population growth rate of nearly 7 percent in 2002. The net migration into the region over the next 5 years is predicted to be 24,000 persons per year (CSBEDA, 2004). In recent years, businesses looking to expand in Orange and Los Angeles counties have moved to the area for more reasonably priced land and accommodations in Ontario, Fontana, and Rancho Cucamonga.

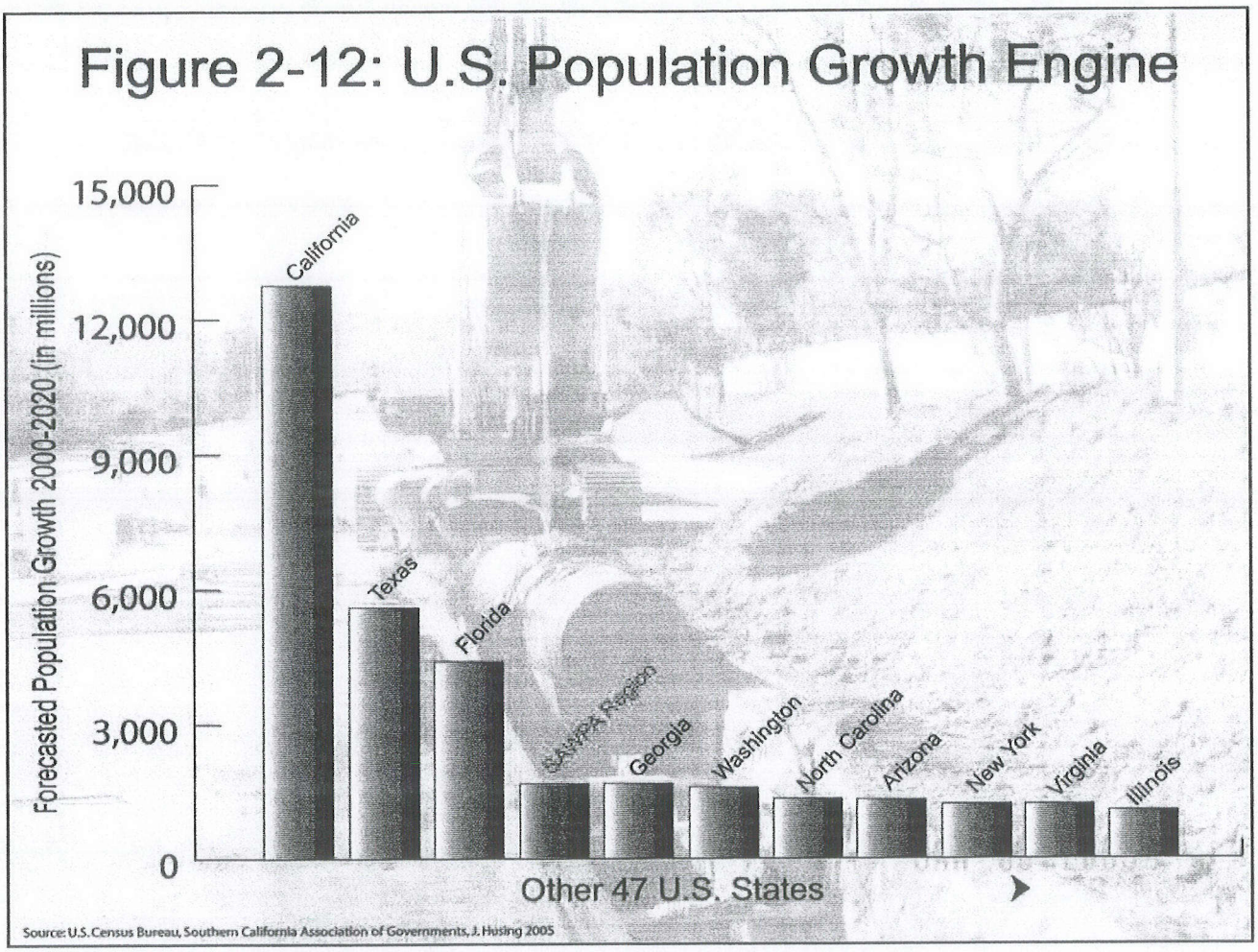
Growth in the Inland Empire has also created concerns among members of the region's water community. A steadily growing population not only requires additional water, but additional capital infrastructure to store, treat and deliver greater supplies of water to an expanding service area. In preparation, agencies have been working with SAWPA to develop strategies to expand the region's precious water resources, while maintaining water quality. However, the funding required to construct and maintain the necessary infrastructure to keep pace with future population growth will be great. In addition, due to greater awareness and technological advancements in detection methods, numerous contaminant plumes from long gone military and industrial operations have been detected throughout the region.

At the same time, it is becoming increasingly difficult to meet the demand for new infrastructure to keep pace with growth. A full range of public buildings, parks, roads and utilities also must be financed. Traditional funding vehicles for such infrastructure, such as bond measures, assessment districts, community facilities districts, and developer contributions and exactions, have experienced extreme stress or failure in recent years.

Population Projections

The Watershed has experienced rapid population growth over the past century relative to the rest of the nation, as shown in Figure 2-12, and will continue to grow more rapidly than the rest of the State or nation over the next 50 years, as shown in Figure 2-13 (Husing, 2005). Currently, watershed residents are concentrated in Orange County, with smaller population centers around the City of Riverside and the San Bernardino-Los Angeles County border, as depicted in Figure 2-14.

Figure 2-12: U.S. Population Growth Engine



Source: U.S. Census Bureau, Southern California Association of Governments, J. Husing 2005

Mountainous areas and National Forest areas are sparsely inhabited, excepting recreational areas such as Lake Arrowhead and Big Bear.

The watershed population, 5.1 million in 2002, is expected to reach 9.9 million by 2050. This population growth will be concentrated mainly in San Bernardino and Riverside Counties, as Orange County is basically "built out" (i.e., most available land has been developed). Unavailable land includes those areas protected as open space or unbuildable due to steep slopes or other geographic constraints. However, redevelopment projects such as one that has been proposed in the City of Anaheim have the potential to increase population in areas that are considered built out. The conversion of agricultural lands to urban areas will fuel population growth, particularly in Chino and Ontario.

Without proper planning, rapid population growth can lead to habitat fragmentation, waste disposal issues (i.e., solid waste, biosolids, and wastewater treatment and disposal), water shortages, and increased pollution. However, planners within the Santa Ana Watershed have the opportunity to balance population growth with open space preservation and implementation of green infrastructure to ensure sustainable growth in the region. It is very important to be proactive in combating these future pressures by projecting population growth impacts on existing infrastructure and environmental resources. Integrated watershed planning provides a means by which these impacts can be addressed.

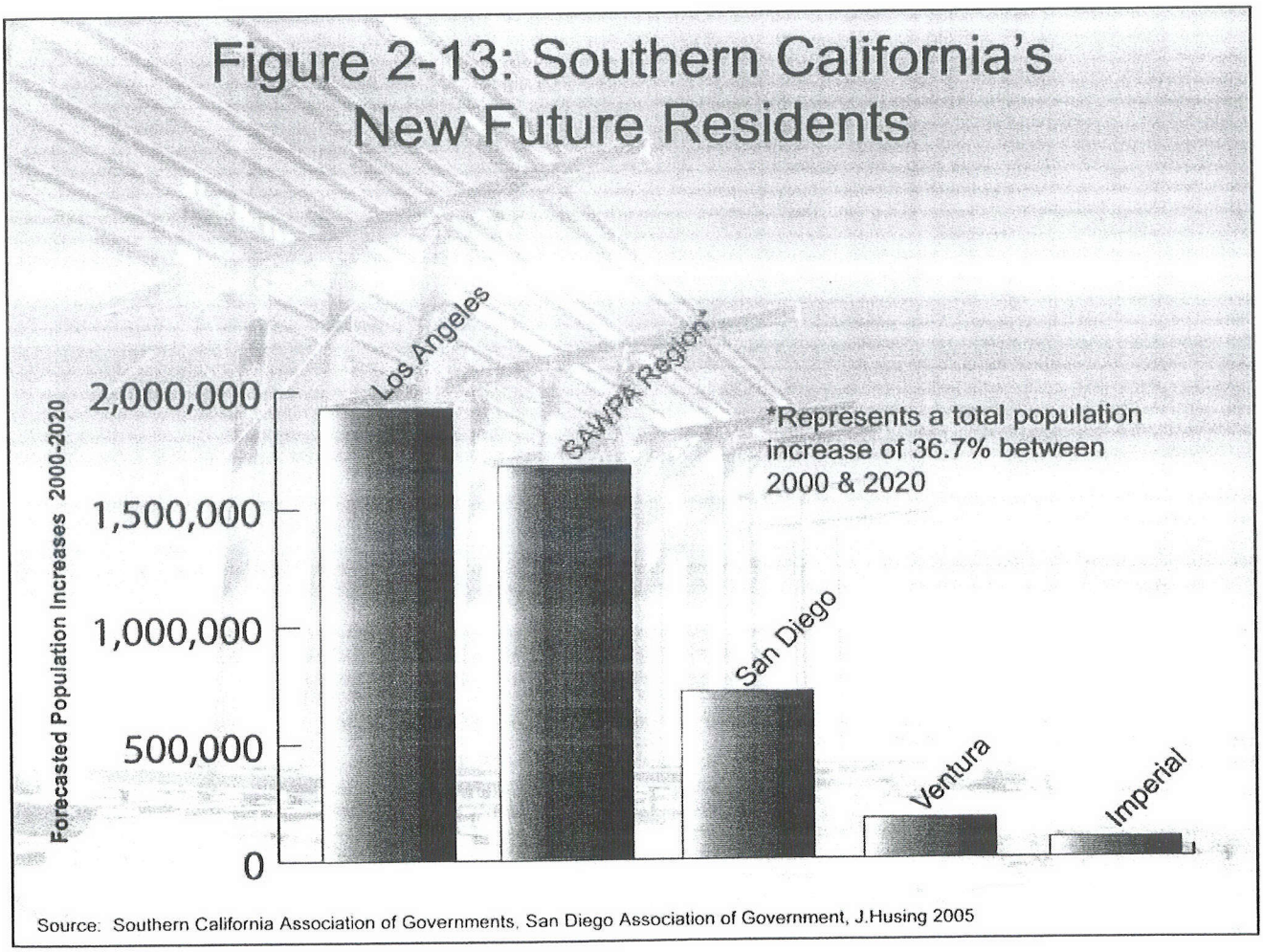
Figure 2-15 demonstrates the overall projected watershed population growth from 1990 to 2050 while Figure 2-16 compares 1990 population by county with 2025 population projections. Most notable trends: population in SAW is expected to almost double in the next 45 years; there is expected to be a net migration from Orange County to Riverside and San Bernardino Counties, increasing the combined percentage of people in Riverside and San Bernardino Counties to over 50% of the total population in the SAW.

In 1990, approximately 4.2 million people resided in the Santa Ana Watershed: approximately 2.08 million in Orange County, 1.1 million in San Bernardino County, 0.9 million in Riverside County, and 0.2 million in Los Angeles County. By 2010, the population of the Watershed is expected to reach 5.9 million. The rate of growth in San Bernardino and Riverside Counties will be much higher than that in Los Angeles and Orange Counties. While in 1990 and 2000 the majority of the population resided in the Los Angeles and Orange Counties portion of the region, by 2010 the population split is expected to even out between Riverside-San Bernardino Counties and Los Angeles-Orange Counties. This balance would be due to a decline in the level of population growth in the two coastal counties while the level of growth remains high in the two inland counties.

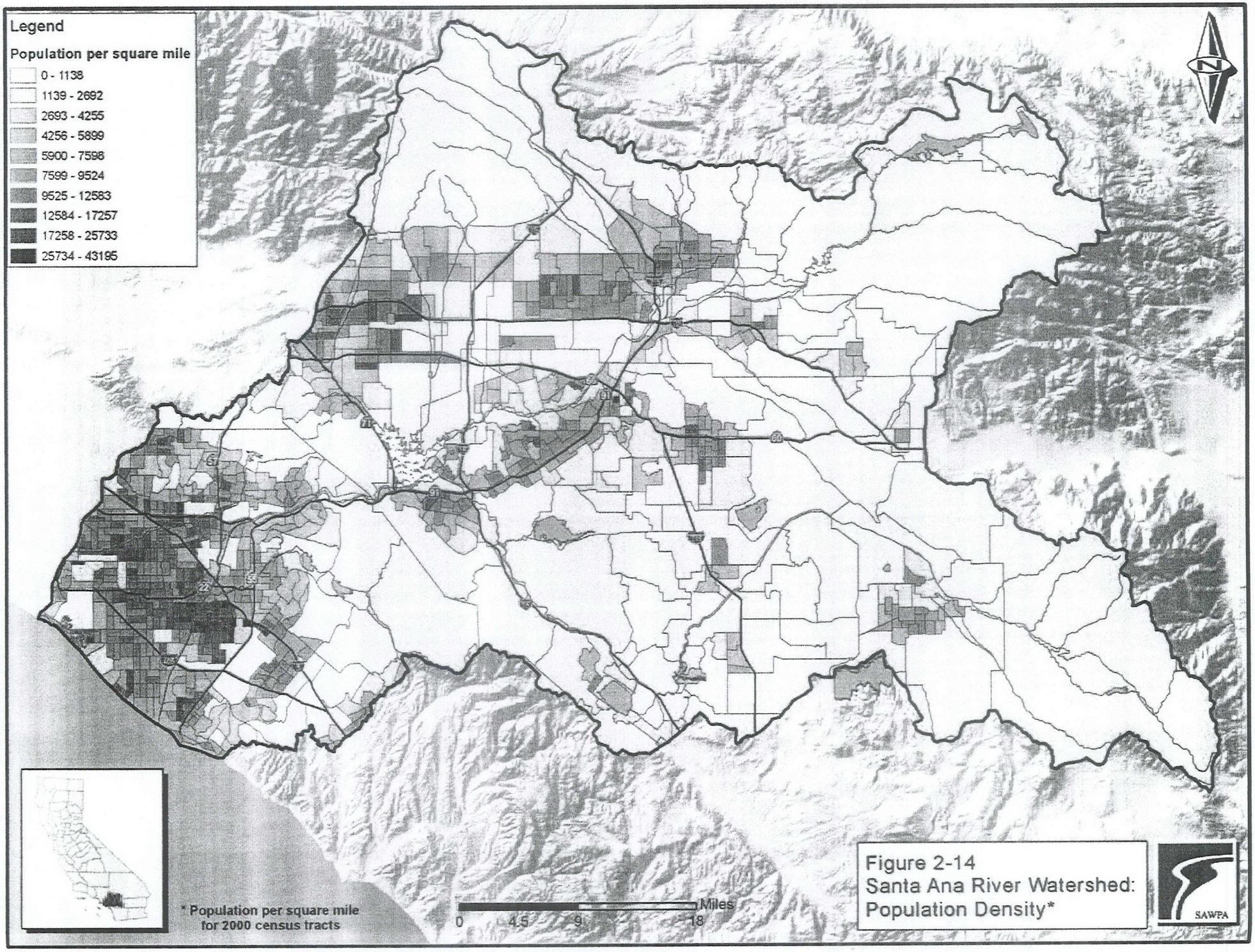
From 2010 to 2025, the population is expected to grow by 1.41 million people, reaching 7.3 million. Much of this can be attributed to the availability of land in the eastern portion of the region in relation to the unavailability of land in southern and central Los Angeles County and most of Orange County. By 2025, the majority of the population in the Watershed will be in Riverside and San Bernardino County. Of the total population, 4.2 million will be located in these two counties, while the remaining 2.9 million will be located in Orange and Los Angeles Counties.

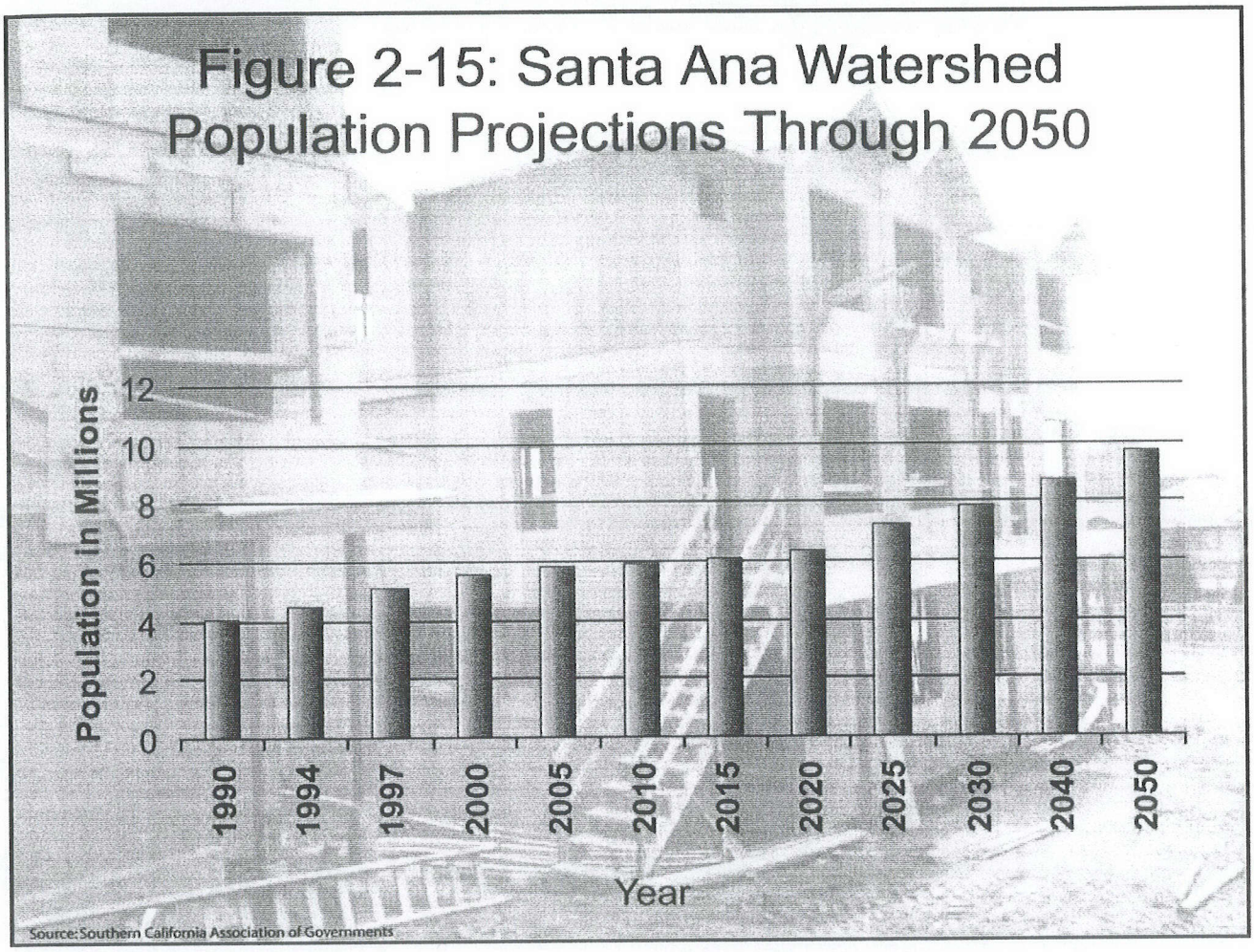
By 2050, the population of the region is projected to reach 9.9 million. This figure appears startling at first, because it would mean that the population will nearly double from what it is today. The California State Department of Finance also projects the populations of both Riverside and San Bernardino to each exceed that of Orange County. (Currently, their combined populations are about equal to that of Orange County.) A significant portion of the growth in Orange and Los Angeles Counties will be outside of the Santa Ana Watershed, while a significant portion of the growth in Riverside and San Bernardino Counties will be within the Watershed region.

Figure 2-13: Southern California's New Future Residents



Source: Southern California Association of Governments, San Diego Association of Government, J.Husing 2005


Legend
Population per square mile
0 - 1138
1139 - 2692
2693 - 4255
4256 - 5899
5900 - 7598
7599 - 9524
9525 - 12583
12584 - 17257
17258 - 25733
25734 - 43196
* Population per square mile for 2000 census tracts
0
4.5
9
18
Miles
Figure 2-14
Santa Ana River Watershed:
Population Density*
SAWPA



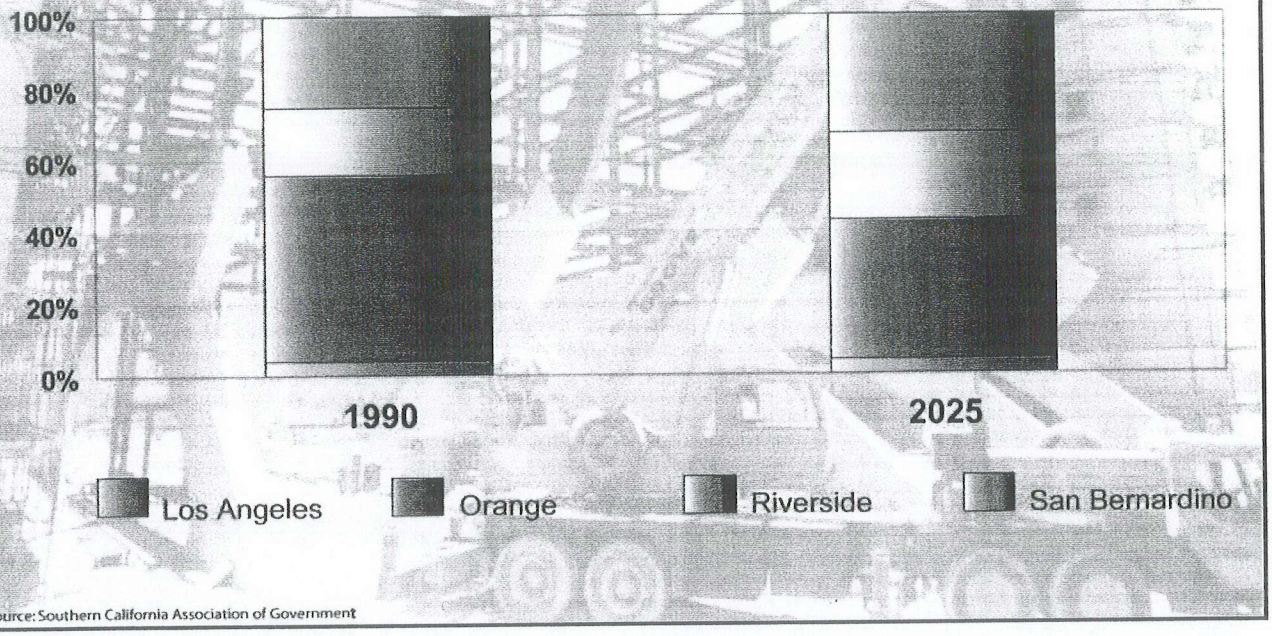
Disadvantaged Communities

The Inland Empire, one of the fastest growing regions of California is also one of its poorest. In 2000 the per capita income of the Inland Empire was about 25% below the State average (Schreiber, 2003). Figure 2-17 depicts watershed income in the Santa Ana River watershed by census tract, based on 1999 incomes as collected by the U.S. Census Bureau in 2000.

The State of California defines a Disadvantaged Census Tract as a census tract with household income less than 80% of the California State median household income. As reported by the U.S. Census Bureau (USCB, 2002) for 2002, the California median household income was $48,113. Within the Santa Ana River watershed of the 104 Cities/Communities in the watershed 72, presented in Figure 2-18 and listed in Table 2-1, are considered disadvantaged or contain disadvantaged tracts. This is equivalent to approximately 69% of the Cities/Communities within the watershed as being considered disadvantaged or containing disadvantaged tracts. In terms of watershed population within the watershed of the 5.4 million residents in the watershed 1.4 million people are considered disadvantaged or approximately 26%.

Social justice and providing support to disadvantaged communities is a concern of SAWPA and is an important part of the SAIWP's vision of, *"A sustainable Santa Ana River Watershed supporting economic and environmental vitality, and an enhanced quality of life"*. Watershed strategies are developed through inclusive, public/private, multi-jurisdictional processes that ensure that the interests of all the stakeholders in community development are considered. In addition, these strategies consider the most equitable and efficient use of resources, as well as, opportunities for conservation or recycling to provide the maximum benefit at the lowest cost to society.

Figure 2-16: Santa Ana Watershed Projected Population Distribution by County

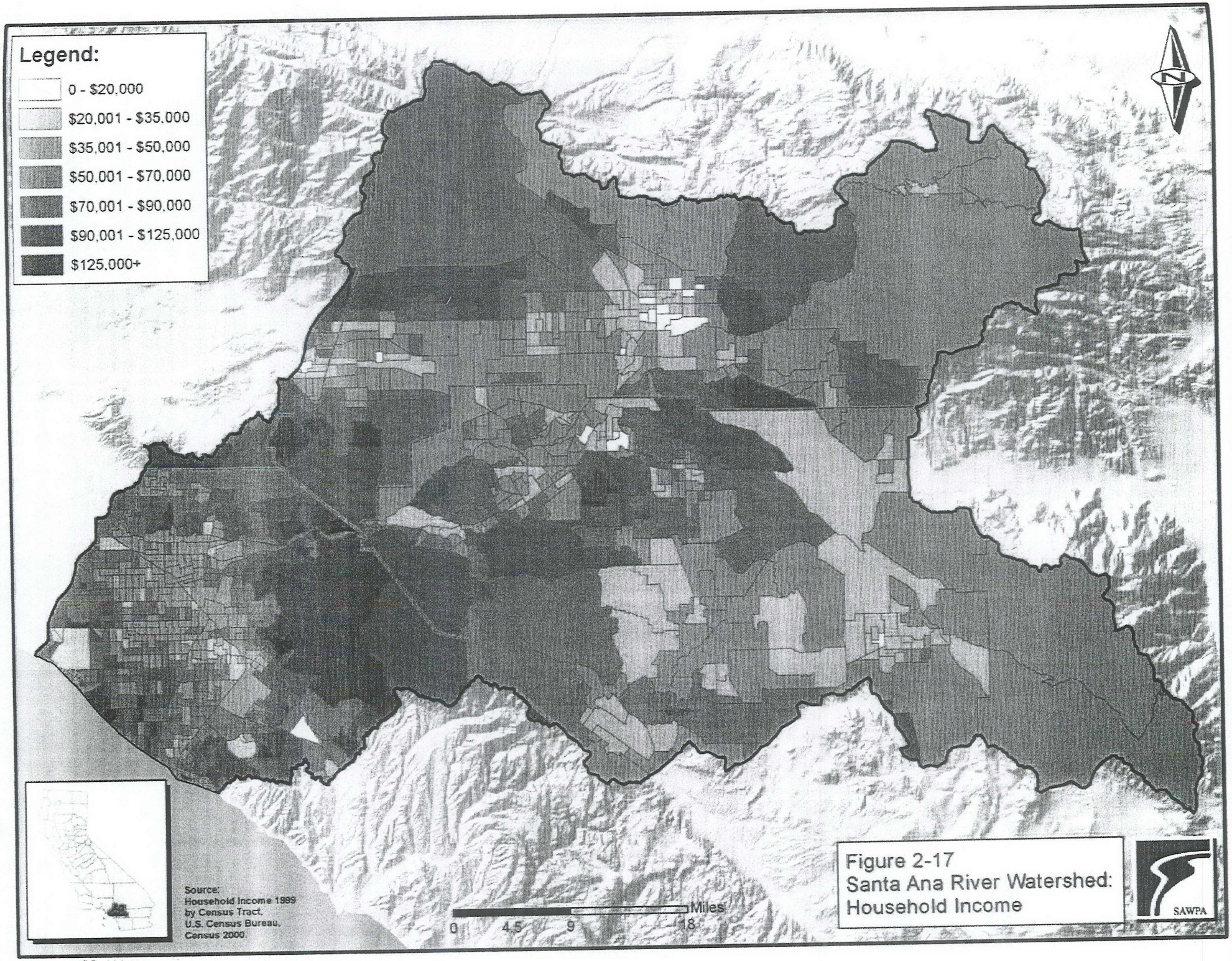


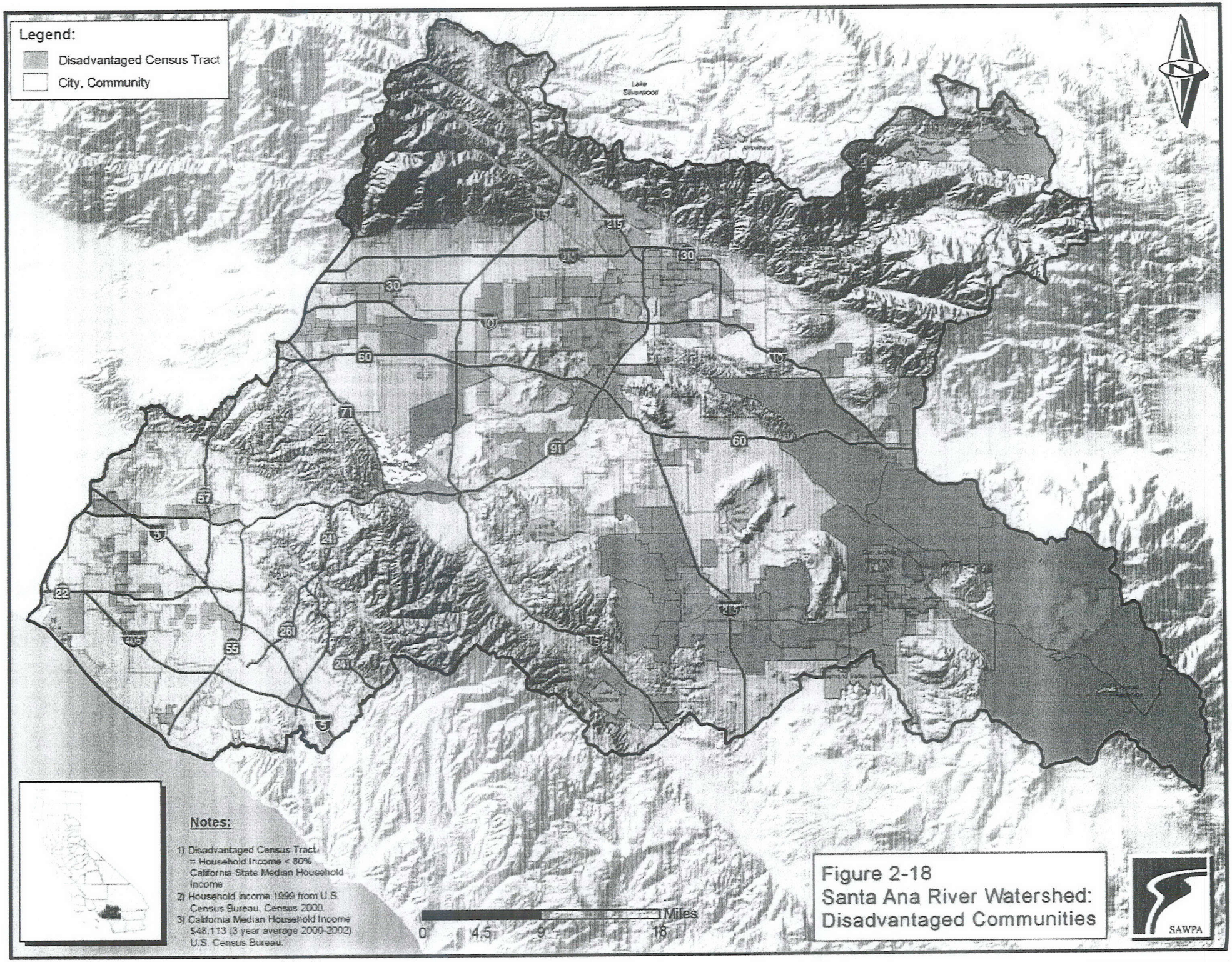
Source: Southern California Association of Government

Table 2-1 Disadvantaged or Partially Disadvantaged Communities

(i.e., communities with disadvantaged tracts)

Anaheim	El Toro	Irvine	Newport Beach	San Bernardino
Banning	Fontana	La Habra	Norco	San Jacinto
Beaumont	Fullerton	La Mirada	Nuevo	Santa Ana
Big Bear City	Garden Grove	La Palma	Ontario	Seal Beach
Big Bear Lake	Glen Avon	Laguna Hills	Orange	Sedco Hills
Bloomington	Grand Terrace	Lake Elsinore	Placentia	Stanton
Buena Park	Hemet	Lakeland Village	Pomona	Sun City
Calimesa	Highgrove	Loma Linda	Quail Valley	Sunnyslope
Cherry Valley	Highland	Long Beach	Rancho Cucamonga	Upland
Chino	Home Gardens	Los Alamitos	Redlands	Valle Vista
Claremont	Homeland	March AFB	Rialto	Westminster
Colton	Huntington Beach	Mira Loma	Riverside	Wildomar
Corona	Idyllwild-Pine Cove	Montclair	Romoland	Winchester
Costa Mesa		Moreno Valley	Rubidoux	Woodcrest
East Hemet		Muscoy		Yucaipa


Legend:
0 - $20,000
$20,001 - $35,000
$35,001 - $50,000
$50,001 - $70,000
$70,001 - $90,000
$90,001 - $125,000
$125,000+
N
Source:
Household Income 1999
by Census Tract.
U.S. Census Bureau,
Census 2000.
0
4.5
9
18
Miles
Figure 2-17
Santa Ana River Watershed:
Household Income
SAWPA


Legend:
Disadvantaged Census Tract
City, Community
Lake Silverwood
Arrowhead
15
215
210
30
10
60
71
91
57
5
22
405
55
241
Notes:
1) Disadvantaged Census Tract = Household Income < 80% California State Median Household Income
2) Household income 1999 from U.S. Census Bureau, Census 2000
3) California Median Household Income $48,113 (3 year average 2000-2002) U.S. Census Bureau
0
4.5
9
18
Miles
Figure 2-18
Santa Ana River Watershed:
Disadvantaged Communities
SAWPA

Part 3: Integrated Regional Water Management Strategies

A. Introduction

SAWPA's Integrated Regional Water Management Plan is formed based upon the individual management strategies of a large number of agencies located throughout the watershed, each of which have a primary focus on the needs of the individual agency. It is SAWPA's role within the watershed to consider the various components of these individual management strategies and incorporate them together into an overall regional strategy, which remains focused on SAWPA's long term regional program goals. This results in an approach, which considers a broad mix of watershed objectives including projects to reduce imported water, conjunctive use storage projects, groundwater storage projects, surface water storage projects, water transfers, storm water capture, water and wastewater protection, treatment and improvement, non-point source pollution control, groundwater desalination, water recycling balanced with multi-purpose flood control, environmental enhancement, ecosystem restoration and recreation projects to be implemented in the Santa Ana Watershed.

Stakeholder workshop

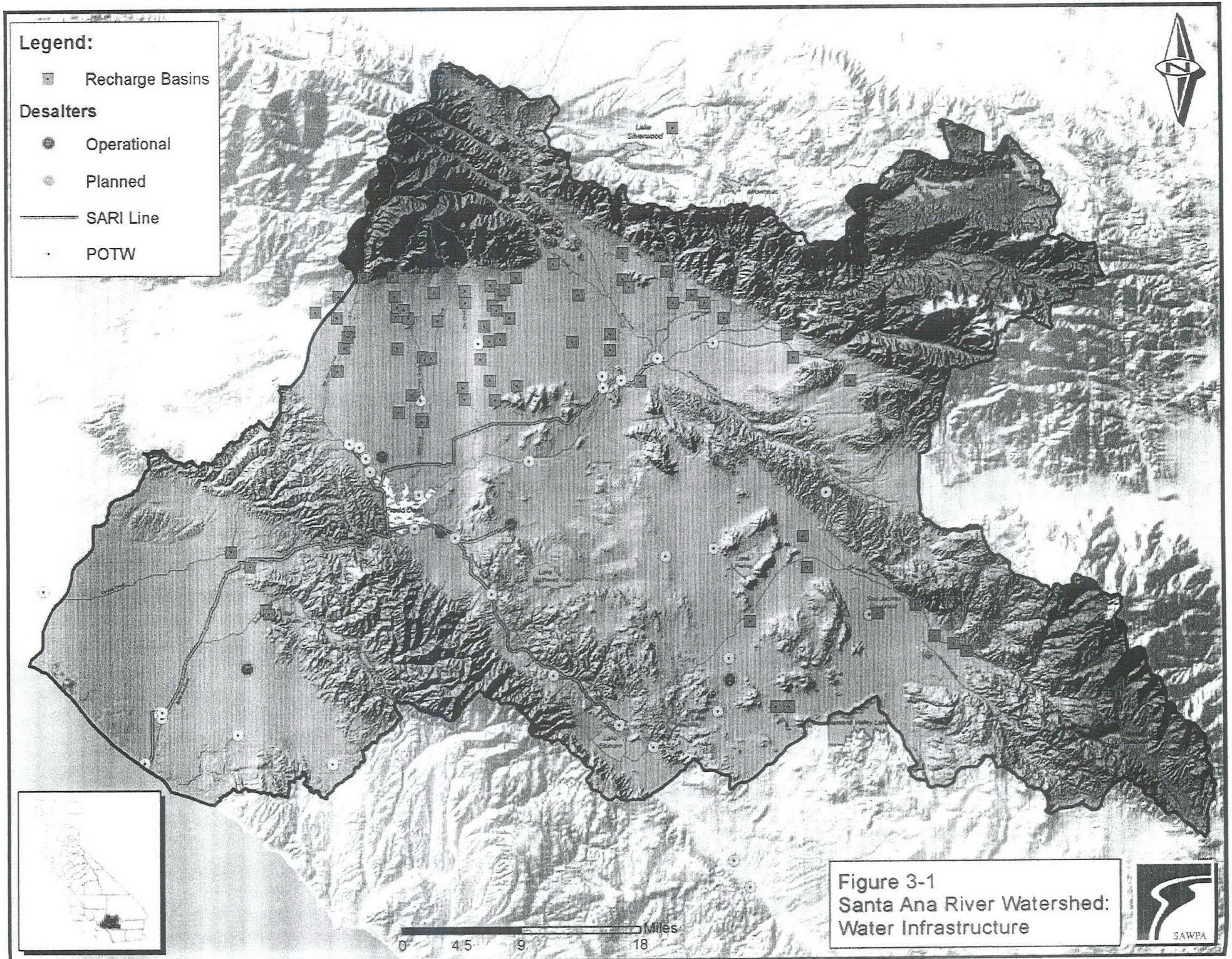
This chapter provides a snapshot of existing watershed infrastructure, depicted in Figure 3-1 and then takes a look at a series of potential new projects and studies to be incorporated into SAWPA's Integrated Regional Watershed Plan for the future, depicted in Figure 3-2. Each section describes a specific water management area or set projects with similar goals, although many of these are multi-objective projects serving two or more purposes. These projects have been proposed by watershed stakeholders including cities, counties, agencies, organizations, and individuals. These are projects that may be in need of partnering or funding. While some projects are further along than others, all of these projects would bring the watershed one step closer to its long term goal to make the region entirely self-sufficient during drought cycles, thereby firming up the region's ability to assure a stable economy, while improving water quality, and allowing more of the State's scarce water resources to be allocated to wildlife and agriculture during those times.

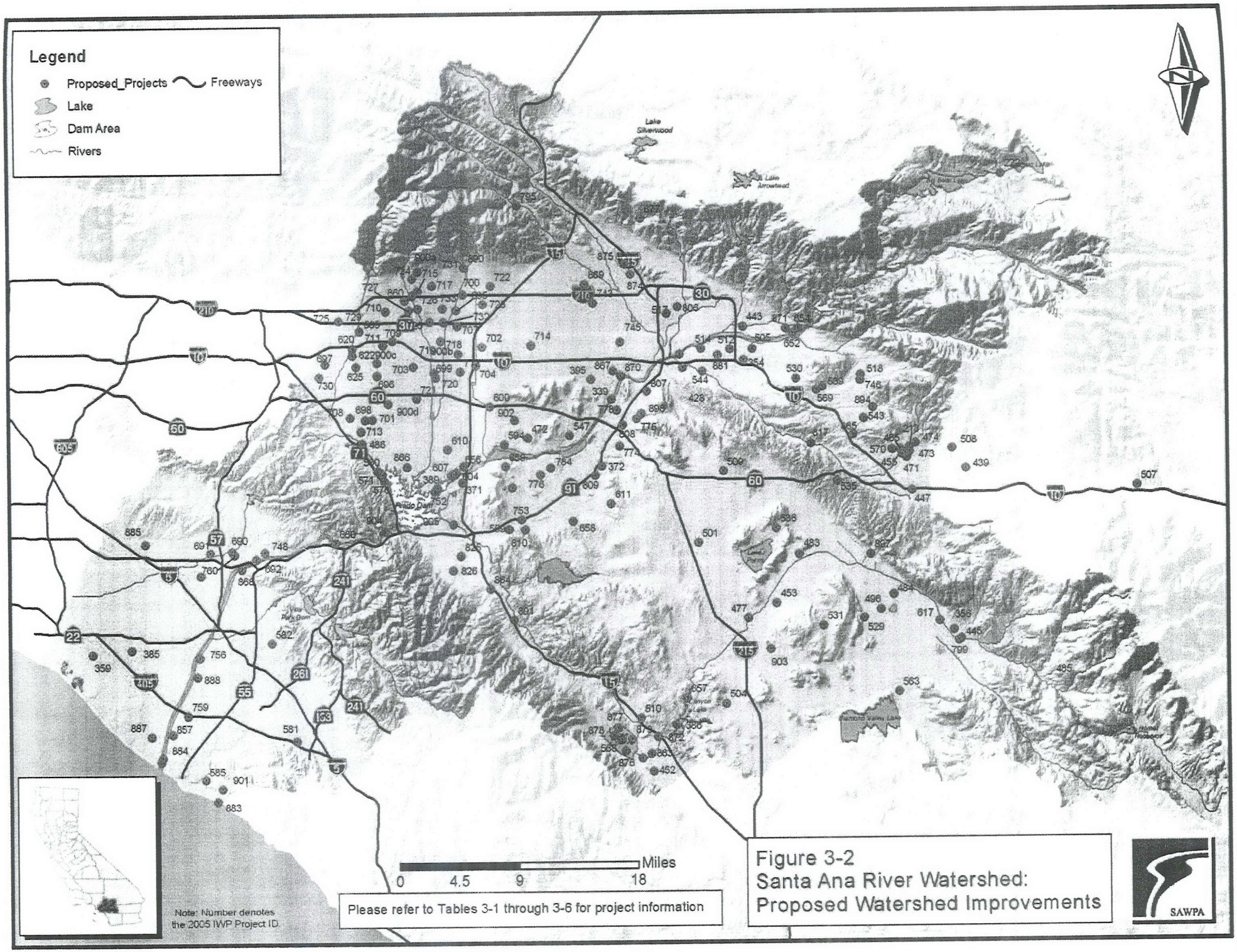
B. Water Storage

Water storage in the SAW is still largely reliant on large reservoirs and dams, such as the Diamond Valley Reservoir, Seven Oaks Dam, Prado Dam, and Bear Valley Dam, to meet local demands. Recently, however, lower costs of groundwater banking have become an economically attractive option for Southern California. Each area of the watershed is unique in its soil, geography, and history, and there is a wealth of knowledge amongst SAWPA's member agencies as to what steps can be taken for a comprehensive and region-wide water banking strategy.

The primary goal of the SAIWP is to ensure that a safe and clean water supply will be available to watershed residents and industries during all years, wet or dry. There is even potential for the SAW area to store water for other regions of Southern California as well. The full utilization of regional aquifers will enable us to meet our own needs and even make some storage capacity available to other urban areas in Southern California.

In order to ensure adequate water supplies in times of severe drought, sufficient water storage must be implemented. With Southern California's dependence on imported water to serve water demands, the need for local storage intensifies.

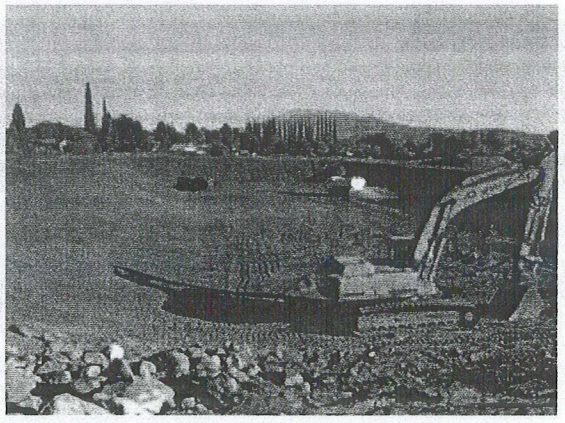

Legend:
Recharge Basins
Desalters
Operational
Planned
SARI Line
POTW
Lake Silverwood
Miles
0
4.5
9
18
Figure 3-1
Santa Ana River Watershed:
Water Infrastructure
SAWPA


Legend
Proposed_Projects
Freeways
Lake
Dam Area
Rivers
Lake Silverwood
Lake Arrowhead
Miles
0
4.5
9
18
Please refer to Tables 3-1 through 3-6 for project information
Note: Number denotes the 2005 IWP Project ID
Figure 3-2
Santa Ana River Watershed:
Proposed Watershed Improvements
SAWPA

One of the most effective forms of storage in a highly dry and arid climate such as ours is conjunctive use wherein water is stored under ground during wet periods and pumped out during dry or drought periods. Limitations to such storage are available resources such as basin storage capacity, recharge capacity, water quality, and institutional constraints. Despite these challenges, conjunctive use storage is cost effective and non-intrusive alternative to surface water storage.

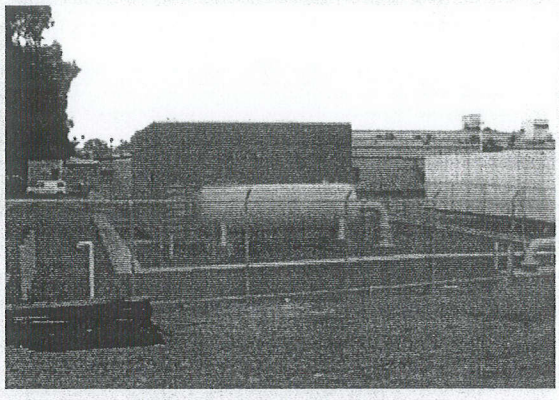
There are many impressive projects underway or under development within the Santa Ana Watershed to restore and expand groundwater basins, as well as, projects to develop additional groundwater recharge. Throughout the upper watershed agencies such as the San Bernardino Valley Water Conservation District (SBVWCD) and San Bernardino County Flood Control District (SBCFCD) are developing programs focused on expanding and enhancing groundwater recharge. These projects address State and regional priority goals for achieving self sufficiency and are consistent with recent legislation including Assembly Bill 1747 (Oropeza, Chapter 240, Statutes of 2003).

SAIWP SUCCESSES



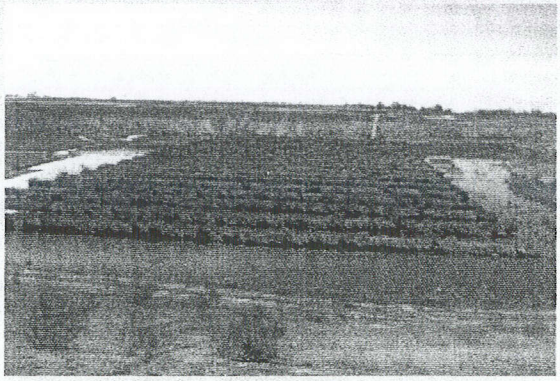
Construction of the Little San Gorgonio Creek Recharge Facilities

The San Gorgonio Pass Water Agency has completed its Little San Gorgonio Creek Recharge Facilities project in March 2003. This project is providing groundwater banking and conjunctive use of State Project Water and local water for the Beaumont Storage Unit groundwater basin. The facility consists of six surface recharge basins for surface spreading. The recharge basins are estimated to percolate approximately 120 to 130 acre-feet of water per month.



Agricultural Water Conveyance System Facilities

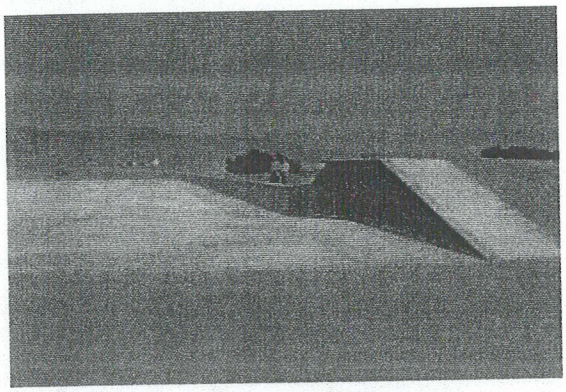
Construction on the Agricultural Water Conveyance System (Western Municipal Water District) is complete. The project installed nearly 7 miles of 24-inch diameter pipeline and constructed three pump stations. The project delivers up to 6,000 acre-feet per year of non-potable water to the WMWD service area, reducing demand for imported water.



Chino Basin Recharge Facilities

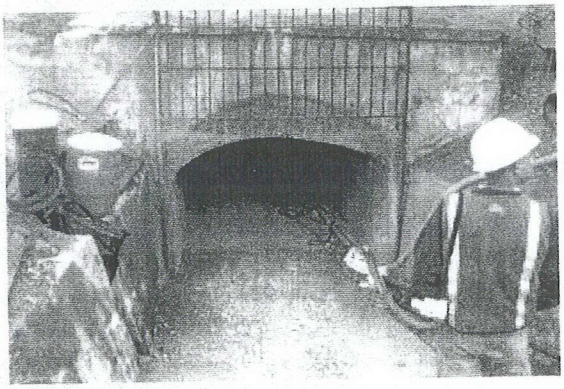
The Chino Basin Recharge Facilities Improvements project (Inland Empire Utilities Agency), completed in spring 2005, constructed two new basin sites and

configured 16 existing flood control basin sites for joint use as percolation basins, capable of percolating imported water and storm water.



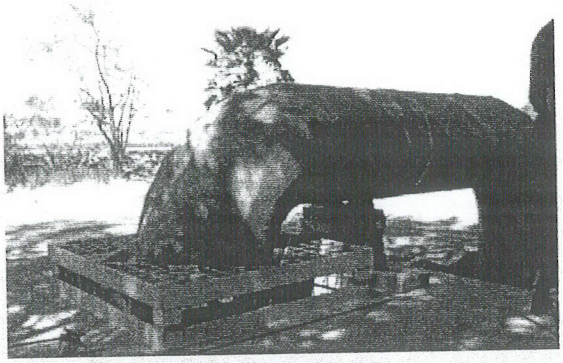
Construction of the San Jacinto Water Harvesting Project Facilities

The San Jacinto Water Harvesting Project constructed by Eastern Municipal Water District provided basin improvements consisting of inlet/outlet facilities, first-flush basin, diversion valve, and Line "E" Channel improvements. The facility has been percolating storm water since the fall of 2004.



Rehabilitation of the Riverside Canal and Tunnel

The Riverside Canal and Tunnel Reconstruction project constructed by the City of Riverside allows water transfers within the watershed with minimal water losses occurring during the transfer. This project involved the rehabilitation of approximately six miles of the existing canal and tunnel system.



High Groundwater Pump-out Project Facilities

The High Groundwater Pump-out Project, Phases I and II, undertaken by the San Bernardino Valley Municipal Water District was completed in the spring of 2005. The purpose of this project is twofold: first, to control water levels in the Area of Historic High Groundwater (AHHG) within the Bunker Hill Basin in San Bernardino and second, to deliver water from the AHHG to local water users and to Orange County for percolation into the groundwater basin. The canal will be used by the Agricultural Water Conveyance System and the High Groundwater Pump-out project.

Water used for recharge typically comes from three different sources: storm water, recycled water, and imported water. In IEUA, storm water is considered the primary source of water for recharge into recharge basins. In OCWD, recycled water is the primary source of water for the Groundwater Replenishment System (GWRS). Figure 3-3 presents a regional overview of new programs and projects proposed to further regional objectives toward increasing available supply and storage capacity within the Santa Ana River watershed.

A comprehensive detailed list of these newly proposed regional projects and programs follows in Table 3-1.

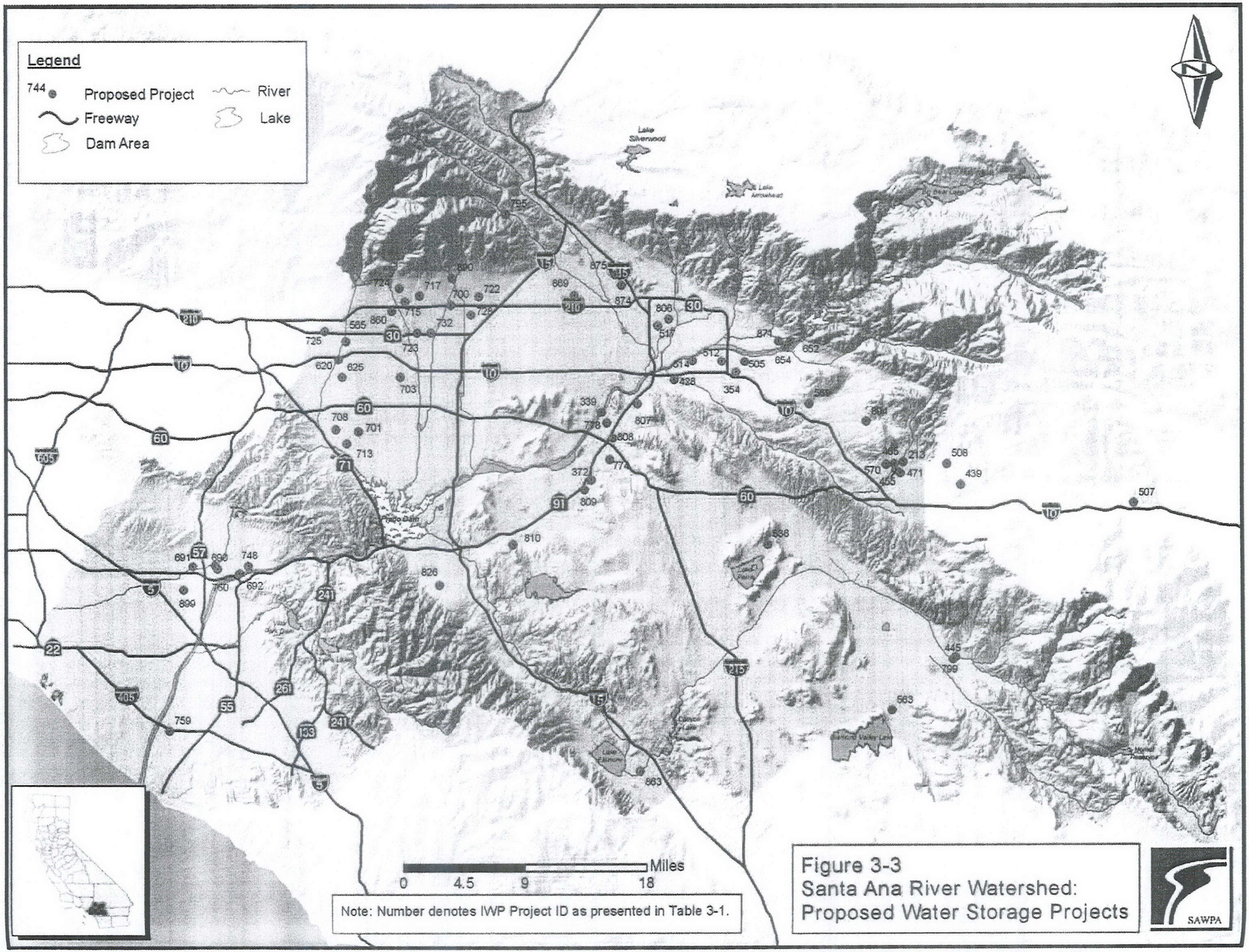

Legend
744 Proposed Project
River
Freeway
Lake
Dam Area
Lake Silverwood
Lake Arrowhead
Prado Dam
Lake Elsinore
Diamond Valley Lake
Miles
0 4.5 9 18
Note: Number denotes IWP Project ID as presented in Table 3-1.
Figure 3-3
Santa Ana River Watershed:
Proposed Water Storage Projects
SAWPA

Table 3-1 (15 pages)

ID#	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
EMWD Member Agency Area Projects																				
536	Eastern Municipal Water District	San Jacinto Wildlife Area Storage Project	Create an additional 2,000 AF of recycled water storage through the expansion of waterfowl habitat in the San Jacinto Wildlife area. Project includes construction of pipeline and pump station to allow seasonal use of stored water by local agriculture.	6,000,000		X	X				X		X	X		X	X	X		X
799	Eastern Municipal Water District	Hemet / San Jacinto Conjunctive Use (Phase 1)	Expand existing pump station capacity to utilize an existing pipeline to convey up to 40 cfs of untreated state project water to 35 acres of recharge ponds to be constructed in the bed of the San Jacinto River Construct 3 wells for the recovery of stored water. Project creates opportunity for up to 25,000 af/year (wet year) of groundwater recharge with a long average yield estimated at 15,000 AF/year. Additionally, this project serves as the basis for settling a tribal water rights claim.	10,000,000		X	X			X									X	
563	City of Hemet	Lyon Groundwater Retention Basin	Construct a 40-acre constructed wetlands groundwater recharge basin for the City of Hemet.	2,400,000		X	X						X	X	X	X	X	X		X
445	Eastern Municipal Water District	Hemet/San Jacinto Conjunctive Use (Phase 2)	Construct a pipeline to convey untreated State Water Project water from EM-17 to an additional 66 acres of recharge ponds to be constructed in the bed of the San Jacinto River. Construct up to six additional recovery wells, as well as, a transmission pipeline to convey recovered water to the western potion of the District. Project creates up to 20,000 AF/YR of seasonal storage and 45,000 AF of long term storage for drought relief.	40,000,000		X	X			X									X	X

ID#	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
IEUA Member Agency Area Projects																				
728	Cucamonga Valley Water District	Canyon Diversion Pipelines	Upgrade diversion structures and construct pipeline to a long-term average build-out yield capacity of 8,220 acre feet/year.	1,659,000	■	■	■						■							
890	Cucamonga Valley Water District	Deer Creek Integrated Enhancements Project	Restore the Deer Creek spreading basin to provide recharge of high quality water into the Cucamonga Basin. Project includes increased flood and debris protection, as well as, the restoration of natural habitat. Much of the land located on a large alluvial fan will become part of the Etiwanda Conservancy.	5,000,000		■	■					■	■	■			■			
625	Monte Vista Water District	New Well at Monte Vista Water District Plant 17 Facility	Construct new groundwater production well at the District's Plant #17 facility located on the west side of Monte Vista Avenue, immediately south of Interstate 10 in the City of Montclair to distribute product water to District pressure zones 1, 2, and 3, and to the City of Chino Hills.	1,100,000	■	■					■									
713	City of Chino Hills	City of Chino Hills Well 15 Treatment/Injection	Equip well for groundwater injection, install wellhead treatment to remove arsenic and construct a waste discharge line to SARI system to dispose of waste.	1,200,000	■	■					■									
723	Cucamonga Valley Water District	Lloyd Michael Water Treatment Plant Hydro Turbine	Install a 2,965 MW-hr capacity hydro turbine unit to generate power utilizing the pressure drop at the existing pressure reduction valve at the District's connection with the MWD Rialto Feeder pipeline.	1,950,000	■	■					■									
620	Monte Vista Water District	Monte Vista Water District Groundwater Injection/Nitrate Remediation Project	Construct two new ASR wells at existing District Plants 9 and 12, and upgrade District Well #1 for groundwater injection.	2,700,000		■	■													
701	City of Chino Hills	City of Chino Hills Well 18 Groundwater Injection	Equip well for groundwater injection and install approximately 300 feet of 12" water main.	50,000	■	■														
708	City of Chino Hills	City of Chino Hills Well 16 Groundwater Injection	Construct and equip new well for groundwater injection.	700,000	■	■														
725	City of Pomona	Well 38 C	Construct new groundwater production well.	1,000,000	■	■														

ID#	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
795	Cucamonga Valley Water District	Lytle Creek Collection and Diversion Tunnel Rehabilitation Project	Improve 120 years old 84" diameter subsurface tunnel which collects groundwater within the Upper Lytle Creek region of the San Gabriel Mountains and delivers it to the cities of Rancho Cucamonga, Fontana and Rialto. Install and extend 24" pipeline used to deliver water from the tunnel to an intake structure to prevent contamination of surface water flows.	750,000	■							■	■							
715	Cucamonga Valley Water District	New Water Production Well (#2)	Construct new 2,500 gpm water production well including equipment, piping and land acquisition.	1,000,000	■	■														
717	Cucamonga Valley Water District	New Water Production Well (#3)	Construct new 2,500 gpm water production well including equipment, piping and land acquisition.	1,000,000	■	■														
722	Cucamonga Valley Water District	New Water Production Well (#1)	Construct new 2,500 gpm water production well including equipment, piping and land acquisition.	1,000,000	■	■														
724	Cucamonga Valley Water District	Cucamonga Basin Recharge Project	Construct recharge basins and facilities necessary to deliver high quality recycled water and surplus State Project Water within the Cucamonga Basin in northwest Rancho Cucamonga.	7,935,000	■	■	■	■													
565	City of Upland	Upland Drainage and Aquifer Recharge Basin Improvements	Expand existing Upland Basin to provide for drainage retention and aquifer recharge including the acquisition of land, basin construction and system infrastructure construction to convey waters to the basin.	21,400,000	■	■	■					■	■							
700	Cucamonga Valley Water District	Construct a 2.5 Million Gallon Reservoir	Acquire land and construct a 2.5 million-gallon steel tank to facilitate the transmission of water from the east side to the west side of the District.	1,200,000	■	■				■										
732	Cucamonga Valley Water District	Reconstruct Inlets/Outlets at Reservoirs	Upgrade combination inlet/outlet lines at 14 reservoirs to create water circulation in the reservoirs and reduce Trihalomenthane formation, as well as, the potential for the nitrification within the distribution system due to the use of chloramines.	1,050,000							■									

ID#	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
703	City of Ontario	City of Ontario Seismic Assessment and Retrofit of Reservoirs	Project will expand on the seismic vulnerability assessment of the City's reservoirs identified in the City's Water Master Plan. Anticipated improvements include replacing and structurally securing roofing at reservoirs 5 and 7, providing more flexibility in piping connections to reservoirs and above ground piping, as well as, any additional repairs as determined necessary during the vulnerability assessment.	750,000															X	
OCWD Member Agency Area Projects																				
690	Orange County Water District	La Jolla Street Recharge Basin	Create an additional 9,000 AFY of groundwater recharge along the Santa Ana River through the development of the La Jolla Street property, an area approximately 10 acres in size in the City of Anaheim.	13,000,000	X	X	X				X	X		X					X	X
899	Orange County Water District	Burris Recharge Pit Recountouring	Increase both percolation and storage capacity in Burris Pit by excavated the shelf area; with the clay lenses removed and disposed of off-site. The remaining sand would be spread to create a uniform basin with a smooth sandy bottom. The Burris Pit is located adjacent to the Santa Ana River between Lincoln Avenue and Ball Road in the City of Anaheim. Its dimensions are approximately 5,800 feet long and an average of 1,300 feet wide. The average area and water storage capacity is approximately 134 acres and 2,600 acre-feet respectively. Of this area about 70 percent consists of a shallow shelf area to the west of the center levee. The center levee is an engineered earthen levee constructed by the ACOE, which separates the Santa Ana River and the Burris Pit Basin on its westside. Clayey soils present within the shallow shelf area slow infiltration rates of ponded water, while the deeper pond area appears to more readily allow the water to infiltrate into the groundwater basin.	3,500,000	X	X	X				X	X		X		X			X	X

ID#	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
748	Orange County Water District	Lakeview Recycled Water Pipeline	Construct Pipeline to transport recharge water from the Warner System to Anaheim Lake and other nearby basins.	4,500,000	■	■	■				■	■		■					■	■
692	Orange County Water District	Basin Cleaning Vehicles	Construct and install four Basin Cleaning Vehicles in four of the District's recharge basins. Basin Cleaning Vehicles will create an additional 30,000 acre-feet per year of recharge capacity. The Basin Cleaning Vehicle is designed to improve the capabilities of OCWD's recharge operations by continuously cleaning the basin bottom to increase the amount of water that percolates into the groundwater basin.	3,000,000		■	■							■							■
691	Orange County Water District	Anaheim/Fullerton VOC Cleanup Project	Construct groundwater extraction wells and wellhead treatment facility, to clean VOC plume then return water to the groundwater basin via recharge at nearby percolation basins. The project protects the usable storage of the groundwater basin, through controlling the spread of shallow contamination and provides a new source of non-potable water for industrial users.	8,000,000		■		■			■									■
760	Orange County Water District	Mira Loma Avenue Recharge Basin	Create additional groundwater recharge along the Santa Ana River through the development of the Mira Loma Avenue property, an area approximately 8.7 acres in size.	11,000,000		■	■							■						■
759	Orange County Water District	MCWD Colored Water Treatment Facility	Upgrade and expand Colored Water Treatment Facility to reduce pumping in the upper aquifers and reduce the pressure on the seawater intrusion injection barrier, thereby reducing the migration of the colored water into the clear water aquifers. The colored water treatment facility utilizes biologically-active filtration for the removal of organic carbon, and granular activated carbon for the removal of bromate.	10,000,000		■					■									

ID#	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
SBVMWD Member Agency Area Projects																				
652	San Bernardino Valley Water Conservation District	Seven Oaks Dam Borrow Pit Groundwater Recharge and Habitat Restoration Project	Construct approximately 7 groundwater recharge basins using approximately 200 acres of land in the Seven Oaks Dam pervious borrow pit to expand groundwater recharge and develop supporting native habitat. Project includes construction of canals, pipes, roads, and storage facilities, and re-vegetate the intervening land as native habitat.	7,000,000																	
213	Beaumont Cherry Valley Water District	Little San Gorgonio Creek and Noble Creek Naturalization, WRDP Phase 1	The District's Water Resource Development Program (WRDP) is split into five phases. Phase 1 includes development of facilities along Little San Gorgonio Creek to capture stormwater flows, desilt the flows, and transfer flows to the Phase 2 Recharge Facilities/Community Park (RF/CP). Phase 1 also includes naturalization of Noble Creek on the RF/CP in order to maximize groundwater recharge potential.	6,220,000																	
514	San Bernardino Valley Municipal Water District	Central Feeder, Phase 1	Construct 18,000 feet of 48 to 60 inch diameter pipeline with 100 CFS capacity, as well as, 100 cfs pump station and 5 million gallon storage tank. Project will enable SBVMWD to treat and convey contaminated San Bernardino Basin groundwater to the City of Redlands and the City of Loma Linda. The project improves reliability by providing a large capacity intertie between the City of Loma Linda and the City of Redlands. When all phases of the Central Feeder are complete, SBVMWD will also be able to convey "nuisance" high groundwater from the area of historic high groundwater to the far eastern portion of its service area; to the Metro	53,000,000																	

ID#	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
354	City of Redlands	Redlands Non-Potable Water Reclamation Project	Slip line 40,000 feet of gravity irrigation lines to utilize available water supplies of the Santa Ana River Watershed. The water produced by the slip lining project replaces potable surface water currently used for landscaping and citrus irrigation.	6,500,000	X	X	X		X										X	X
512	San Bernardino Valley Municipal Water District	Central Feeder East, Phase 2	Construct 14,000 feet of 48 to 60 inch diameter pipeline with 100 CFS capacity. Project will enable SBVMWD to convey San Bernardino Basin groundwater from the area of historic high groundwater (high groundwater) to the City of San Bernardino and the City of Loma Linda service areas. This project would improve water supply reliability by interconnecting the City of San Bernardino and City of Loma Linda water systems. The project also improves water supply reliability by making the large volume of "nuisance" high groundwater available as a supplemental supply. When all phases of the Central Feeder are complete, SBVMWD will also be able to convey "nuisance" high groundwater from the area of historic high groundwater to the far eastern portion of its service area; to the Metro	53,000,000	X	X	X			X		X							X	
875	San Bernardino Municipal Water Department	Ogden-Palm Transmission Line	Construct Ogden-Palm Transmission Line and Booster to provide a means of conveying water from lower elevations in the basin where we have sufficient sustainable water supplies and moving it to drought-impacted portions of our service area at higher elevations. Project consists of a 20,000-foot 36-inch ductile iron pipe conveyance line with a booster.	4,000,000	X			X												X
507	San Gorgonio Pass Water Agency	East Branch Extension To Cabazon	Extend the East Branch Extension to Cabazon. Project provides a multi -agency facilities able to store up to 500,000 acre feet of surplus water in the Cabazon Storage Unit for later recapture into MWD Colorado Aqueduct. Captures supplies will be available to help mitigate current overdraft in the adjacent storage units (Beaumont and Banning).	34,000,000	X	X	X													X

ID#	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
517	San Bernardino Valley Municipal Water District	Phase 1A Reservoir (Lakes and Streams)	Construct 460 acre-foot surface reservoir, as well as, 4,500 feet of 48 to 60 inch diameter pipeline with 100 CFS capacity, an 8 MGD treatment plant, and a groundwater production system consisting of production wells and plumbing to support SBVMWD Master Plan by providing 2,050 acre-feet of emergency storage and supporting the control of water levels in the high groundwater area.	115,000,000	X	X		X		X	X	X				X				
465	Beaumont Cherry Valley Water District	Engineered Facilities for Noble Creek Wetlands without Park Funds, WDRP Phase 3	Phase 3 includes facilities along Noble Creek to capture, desilt, and transfer stormwater flows to the Phase 2 Recharge Facilities/Community Park (RF/CP). Phase 3 also includes constructed wetlands along Noble Creek in order to reduce nitrogen loads once recycled water is implemented in the program.	5,000,000				X					X	X	X		X		X	X
471	Beaumont Cherry Valley Water District	Incidental Recharge Program	Construct percolation/recharge basins along several creeks to capture incidental stormwater runoff for percolation into the groundwater basin and percolate surplus recycled water during winter months when irrigation demands are low. The potential yield from this additional stormwater flow is estimated to be an average of 1,000 acre-ft/year and the total estimated amount of recycled water available for incidental recharge is up to 2,000 acre-ft/year. Basins will be constructed by excavating shallow ponds and/or installing rubber inflated dams across the creeks. The total gross area available for incidental recharge is estimated to be approximately 35 acres located on three creeks: Noble, Marshall, and Potrero Creeks.	1,850,000		X		X					X	X	X					X
570	Yucaipa Valley Water District	Plantation Sewer Interceptor	Construct 1.2 miles of 12 sewer interceptor pipeline to sewer failing systems at Plantation MHP in Calimesa to prevent nitrates and TDS from reaching the groundwater basin.	710,000								X	X						X	

ID#	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
455	Beaumont Cherry Valley Water District	Engineered Facilities for Recharge Facilities/Community Park (RF/CP) with Minimal Funding for Park, WRDP Phase 2	Phase 2 includes development of groundwater recharge facilities along Little San Gorgonio and Noble Creeks. Phase 2 also includes minimal funds for some park areas. A majority of the park improvements are in Phase 5.	7,800,000		■	■									■			■	■
505	San Bernardino Valley Municipal Water District	Central Feeder East, Phase 1	Construct 24,000 feet of 48 to 60 inch diameter pipeline with 100 CFS capacity, as well as, 100 cfs pump station and 5 million gallon storage tank. Project will enable SBVMWD to treat and convey San Bernardino Basin groundwater contaminated with Perchlorate to the Metropolitan Water District of Southern California (MWD); the eastern portion of the SBVMWD service area; and to San Gorgonio Pass Water Agency via the East Branch Extension, Phases I and II. When all phases of the Central Feeder are complete, SBVMWD will also be able to convey "nuisance" high groundwater from the area of historic high groundwater to the far eastern portion of its service area; to the Metro	33,000,000	■	■	■			■		■								■	
860	San Bernardino County Flood Control District	Cucamonga Basin #6 & Spreading Grounds	Upgrade flood control levees, channels, and basin areas in the Cucamonga Spreading Grounds to provide 100-year level flood protection and capture of storm flows for groundwater recharge.	20,000,000		■	■							■	■	■	■	■		
894	City of Yucaipa	Wildwood Creek Multi-Purpose Basin	Construct a series of spillover detention basins in the upstream reaches of the Wildwood Creek Watershed to justify the modification of the FEMA flood zone designation map for a number of downstream residential & commercial properties in the community. Project will detain silt and debris from entering into the Wildwood channel. This project does not include PCC lined channels; urban runoff will be filtered naturally, to provide groundwater recharge.	6,000,000		■						■	■	■	■					

ID#	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
428	City of Loma Linda	City of Loma Linda Water Reclamation Plant	Create groundwater recharge through the use of reclaimed water as irrigation; thereby allowing the earth natural filtration to further purifies the water. Project located at abandoned sewer treatment plant co-owned by the City of Loma Linda and Loma Linda University Medical Center.	11,000,000		■	■	■												
508	San Gorgonio Pass Water Agency	Edison Flume Rehabilitation Project	Upgrade portions of the existing Edison diversion and conveyance structures, enabling the San Gorgonio Pass Water Agency to capture surface water from the South Fork of the Whitewater River.	5,550,000	■	■	■							■						
569	Yucaipa Valley Water District	Western Regional Sewer Interceptor	Construct 3.4 miles of 18", 12", and 8" sewer interceptor pipeline and one sewer lift station in the unsewered portion of Dunlap Acres in Yucaipa to enable recovery of the Dunlap groundwater subsubbasin.	2,800,000							■	■						■		
871	San Bernardino Valley Water Conservation District	Installation of Groundwater Monitoring Wells in Santa Ana River Forebay	Construct two 400-ft deep dedicated monitoring wells in the Santa Ana River/Mill Creek Forebay area of the San Bernardino Valley. Siting and design of the new wells will be keyed into gaps in the existing District monitoring system and will tie down the ends of a north-south cross-section located below the confluence of the Santa Ana River and Mill Creek·and respective spreading grounds. Study to collect aquifer characteristic and water level data, including recharge pathways, allowing the District to better understand the effects of groundwater recharge on the Bunker Hill Basin.	400,000														■	■
869	City of Rialto	Rialto -Colton Basin Groundwater Recharge Study	Study to determine whether or not a 1.5 acre parcel of City-owned land would be a viable location to create an artificial recharge basin to replenish the groundwater aquifer.	250,000														■	■

ID#	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
654	San Bernardino Valley Water Conservation District	Security Fencing of Groundwater Recharge Facilities	Construct six-feet-high, heavy-duty chain link security fencing around the Santa Ana River and Mill Creek Recharge Facilities to provide security and reliability of the groundwater supply. Project includes approximately 8 miles of fencing with 6 double gates for the Santa Ana River recharge facility and 5 miles of fencing with 6 double gates for the mill Creek recharge facility. All the fencing is to be stripe-painted to deter theft.	1,029,600		X					X								X	
874	San Bernardino Municipal Water Department	Ogden Reservoir	Design and construct 12-million gallon reservoir, Ogden reservoir as a of a boosting chain to transmit water from the central area of the city to northern Verdemont areas. This reservoir is critical to the successful implementation of the Enhanced Reliability Schedule of Improvements (ERSI) project, a multi-phased series infrastructure improvements and is part of a set of tools that the ERSI Project will give us to manage our water source, the Bunker Hill Ground Water Basin.	8,500,000		X	X				X									X
439	San Gorgonio Pass Water Agency	Integrated Water Resources Plan	Conduct an evaluation of existing water resources, including safe yields of storage units other than Beaumont Storage Unit.	475,000															X	

ID#	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
WMWD Member Agency Area Projects																				
807	Western Municipal Water District	Riverside Corona Feeder Phase 2	Phase 2 of Project constructs infrastructure for the Northern and Southern ends of the Riverside/Corona Feeder including parts of the Ricethorn/Reche Canyon/Waterman Pipeline Replacement and Connection to Baseline Feeder; Arlington Desalter to Mockingbird Intertie; and Arlington Desalter to EVMWD intertie.	50,939,000	■	■	■		■	■	■	■								■	■
826	City of Corona Department of Water and Power	Temescal Groundwater Basin Recharge Phase 2	Construct pipeline from Recycled Water Project A, currently under construction to the Oak and Main Street Basins. Project includes construction of control and treatment facilities, as well as, the construction of the recharge basins. Project will utilize two existing Riverside County Flood Control debris basins for surface spreading of recycled water as a means of recharging the underlying groundwater basin with 5000 - 6500 AFY of recycled water.	3,000,000	■	■	■	■	■			■		■						■	■
810	Western Municipal Water District	C/RCF5:Arlington Desalter to Mockingbird Intertie	Phase 5 of Project constructs infrastructure for future Riverside/Corona Feeder and allow immediate displacement of imported water demand in Western's service area.	14,000,000	■	■	■				■	■		■	■						
808	Western Municipal Water District	C/RCF3:Ricethorn/Reche Canyon Waterman Pipeline; Arlington Desalter to Mockingbird Intertie	Phase 3 of Project constructs infrastructure for the Southern end of the Riverside/Corona Feeder including parts of the Ricethorn/Reche Canyon Waterman Pipeline; and Arlington Desalter to Mockingbird Intertie.	38,000,000	■	■	■				■	■		■	■						
809	Western Municipal Water District	C/RCF4:Ricethorn/Reche Canyon; Arlington Desalter to Mockingbird Intertie	Phase 4 of Project constructs infrastructure for parts of the Ricethorn/Reche Canyon; and Arlington Desalter to Mockingbird Intertie component of the Riverside Corona Feeder Project.	29,000,000	■	■	■				■	■		■	■						

ID#	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
806	Western Municipal Water District	C/RCF1:Central & Riverside/Corona Feeder & Water Treatment Project	The Riverside/Corona Feeder is a regional project which provides for the opportunity to treat and bank water for domestic & municipal purposes. During wet years the project taps relatively unusable poor quality water from the pressure zone of the Bunkerhill Basin, thereby increasing the hydraulic gradient of the basin by raising the water level in the upper basin and reducing high water levels in the pressure zone. This water is first treated and then distributed through approximately 30 miles of pipeline to Western MWD and its subagencies. When complete this project will be capable of providing more than 100,000 AF of groundwater storage during periods of drought. The Riverside/Corona Feeder project has been broken down into 5 phases. Phase 1 of Project constructs treatment facilities to remove contaminants, TCE, PCE, perchlorate, radon and others from the Bunkerhill Basin and in the Riverside/Colton Basin.	151,000,000	X	X	X					X		X	X					
339	City of Riverside	Artificial Recharge Facilities	Construct two artificial recharge facilities to recharge the Riverside groundwater basin. The project includes acquisition of the right to the land and construction of recharge basins, diversions and transmission facilities, and inlet and outlet structures for the basin. The City of Riverside has planned to increase its production from the basin and is currently, in cooperation with SAWPA, conducting a groundwater modeling study to analyze impact of additional production.	4,300,000	X	X	X							X					X	X

ID#	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
863	Elsinore Valley Municipal Water District	Back Basin Groundwater Storage Project	Construct six dual-purpose production wells and two monitoring wells in the Lake Elsinore Back Basin to support the Elsinore Basin Groundwater Management Plan (GWMP). Project will be operated such that, when excess imported supply is available, water will be stored in the groundwater basin. The stored water will be extracted during the summer months or dry years to meet increased demands.	18,300,000	■	■	■												■	■
778	City of Riverside	Elimination of Septic Tanks to Protect Water Supply	Construct approximately 12,200 feet of sewer lines in an area north of Riverside to extend the City's sewer system to replace the septic systems in the area. Project requires approximately 8,500 feet of 8 in., 2,400 feet of 10 in., and 1,300 feet of 12 in. sewer lines.	8,237,100		■					■	■								
372	City of Riverside and Western Municipal Water District	Riverside-Colton Basins Monitoring Wells	Install multi-level monitoring wells in Riverside groundwater basins and appropriate technologies to facilitate the development of geo databases, basin management models, as well as, a Source Water Assessment (SWA) to estimate expected additional yield. The proposed monitoring wells would be designed to USGS specifications to support Integrated Regional Watershed Management.	1,512,000														■	■

ID#	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
774	City of Riverside	Water System Security Improvement	The City of Riverside's Water system vulnerability assessment (VA) showed that security measures at Linden/Evans Reservoirs site require upgrades. Project includes the construction of walls and a roof for reservoirs, a chlorination station, and emergency electrical connections. The Linden/Evans Reservoirs are the most critical reservoirs for the City. The VA indicated that chlorination is the best measure to protect the water system from biological contamination. A backup chlorination station for the Gage Transmission Main is required to improved the integrity of chlorination system. The VA also indicated that most of the City's facilities have no backup power. Should the power is disconnected due to terrorist activities, the City will lose its ability either to pump water from aquifer, or to boost water to higher elevations. Thus, emergency electrical connections for generators should be installed at selected locations.	2,150,000																

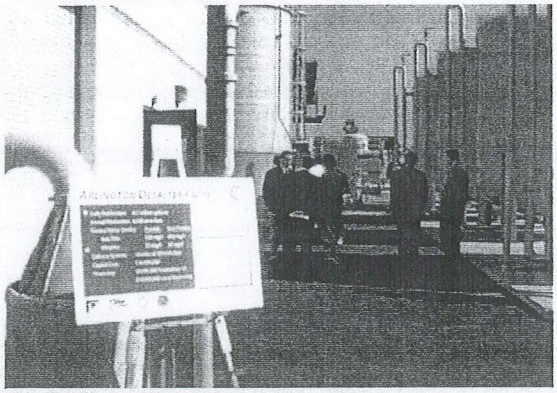
C. Water Quality Improvements

Almost a century of agricultural and industrial use has resulted in salts and other constituents of concern infiltrating many aquifers and streams within the SAW. These sources of water quality degradation can be classified into point and non-point sources. Point sources are confined to point discharges to the soil, groundwater, or stream systems. Examples include conventional wastewater and industrial discharges to streams or ponds, and leaky underground storage, such as leafing underground storage tanks (LUFT). Nonpoint sources are area-wide discharges to soil, groundwater, and surface waters, such as land application of waste and fertilizers and atmospheric deposition of contaminants to the soil and water bodies.

As the SAW continues to grow, cities encroach ever closer in proximity to dairies and other agricultural operations. To counter this added stress to the stream and groundwater supplies, producers have developed advanced methods of reducing potential conflicts. Technologically advanced wastewater control techniques have been rigorously employed and negative impacts from agricultural runoff continue to be minimized. Nevertheless, the existing salts and contaminants present in the SAW from past practices still need to be removed, as improving water quality is inextricably linked to improving water supplies and implementing a comprehensive groundwater storage program. As regional water leaders seek to develop storage in the Santa Ana Watershed, steps must be taken to pump contaminated water out and purify it.

The SAW's potential for groundwater banking is substantial, but the volume of clean water that can be stored is commensurate with the amount of salty water that can be removed, and the process of pumping and desalting this salty water takes time. Before the task can be undertaken, the necessary infrastructure must be constructed. Two desalters are already operational in the Arlington and Chino areas and are processing 14 million gallons per day (MDG).

SAIWP SUCCESSES

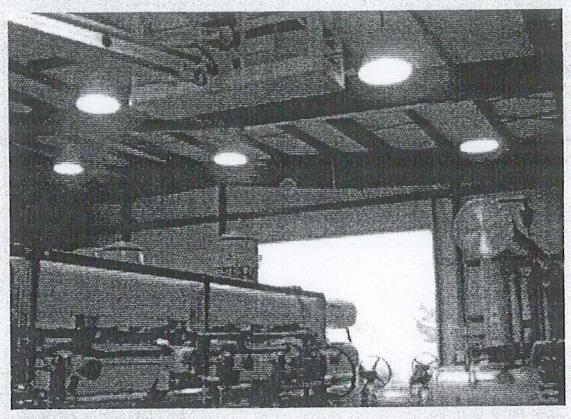


Dedication Ceremonies Arlington Desalter Enhancements project

The Arlington Desalter Enhancements Project, which involved $17M in upgrades, was completed in October 2003. The project included enhancements to the Desalter, and construction of approximately 53,300 feet of pipeline. Approximately 6,800 acre-feet of new water has been produced at the Arlington Desalter facility since project completion. The facility has also effectively increased salt removal rates by 29 percent to 905 tons/month since the start of potable water delivery to the City of Norco in November 2003.

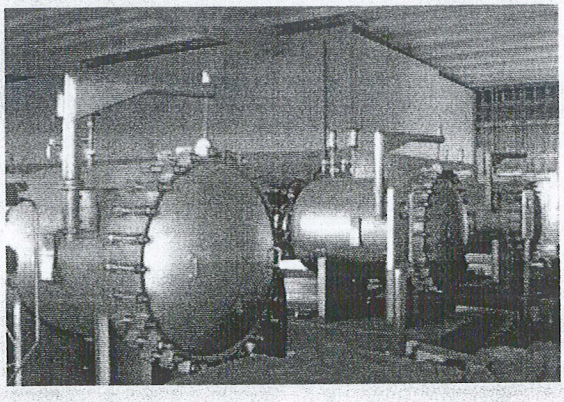
Dedication Ceremonies La Verne Mahnke Water Treatment Facility expansion project

The Rubidoux Community Services District reached a significant milestone in June 2003 with the completion of its La Verne Mahnke Water Treatment Facility expansion project. Major upgrades include plant capacity expansion from 500 gallons per minute (GPM) to 3,000 GPM and plant enhancements for manganese removal from raw groundwater.



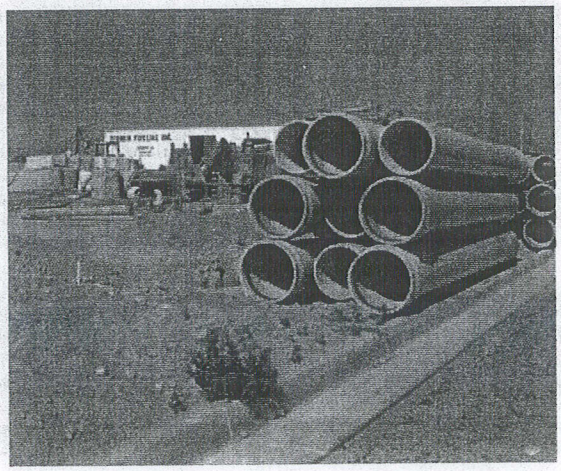
Perris Lakeview Desalter Project Facilities

The Perris Lakeview Desalter project, constructed at the Sun City RWRF, is the second in a series of three desalters to be constructed as part of the Perris South Desalination Program. The project involves constructing wells, pipelines, and a 4.5 MGD reverse osmosis treatment plant producing potable water and removing salts from the Western San Jacinto Groundwater Basin.



Chino I Expansion/Chino II Desalter project Expansion

The Chino Basin Desalter Authority (CDA) constructed the Chino I Expansion/Chino II Desalter project. The project consists of the expansion of the Chino I Desalter and the construction and startup of the Chino II Desalter. Construction activities began in April 2002 and completed in the summer of 2005. The goals of the Chino I Expansion are to provide wells, pipelines, distribution and treatment facilities including ion exchange treatment, and to achieve up to a 5 MGD increase in Chino I Desalter capacity. The new Chino II Desalter includes a 10 MGD Reverse Osmosis/Ion Exchange treatment system, a clearwell, and pumping and piping facilities. The two desalters will deliver product water to Jurupa Community Services District, City of Chino, City of Chino Hills, City of Ontario, City of Norco, and Santa Ana River Water Company.



Construction of the Chino I/II Intertie project

The Chino I/II Intertie project undertaken by the Jurupa Community Services District involved the construction of a new 24-inch diameter pipeline to connect two pressure zones within the Jurupa service area allowing water transfers from the zone supplied by the Chino II Desalter to the zone served by Chino I. The transfer capability will improve overall system reliability.

One of the biggest problems associated with maximizing the use of local water resources in the basin will continue to be water quality contaminants, which violate public health or public acceptance standards. Of particular concern is perchlorate, a highly mobile salt which to date has impacted over 180 municipal drinking water supply wells in the watershed.

The water quality problems can be addressed in a variety of strategies including wellhead treatment, blending, dilution or flushing or even by natural processes such as wetlands. Wellhead treatment can include a variety of approaches including desalination, anion exchange, and carbon absorption to name a few. In many cases, multiple contaminants can be addressed through a single treatment strategy.

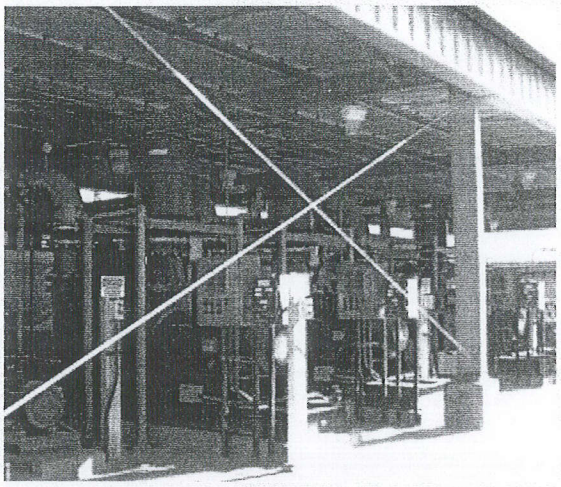
Figure 3-4 presents a regional overview of new programs and projects proposed to further regional objectives toward improving water quality within the Santa Ana River watershed.

A comprehensive detailed list of these newly proposed regional projects and programs follows in Table 3-2.

D. Water Recycling

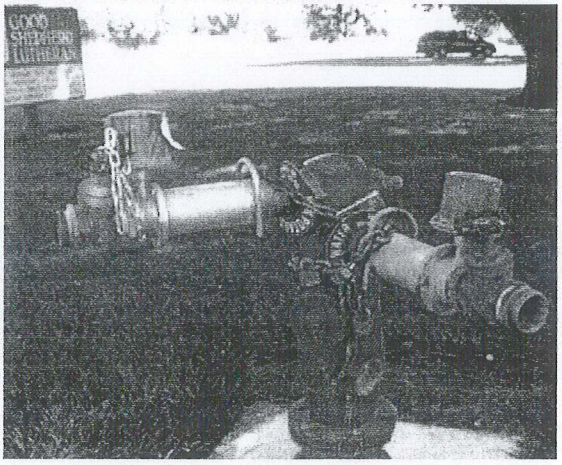
Recycled water has been used in the watershed for many years to supplement local and imported supplies. Water reclamation projects involve treating wastewater to a level that is acceptable and safe for many non-potable applications. Approximately 60,000 AFY of recycled water is currently used to meet water needs such as landscape, agricultural irrigation, groundwater recharge, and commercial and industrial applications within the Santa Ana Watershed.

SAIWP SUCCESSES



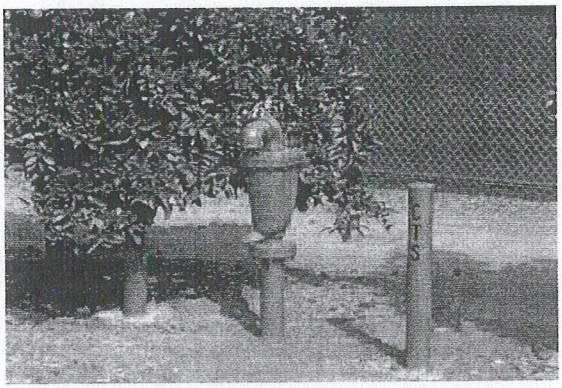
City of Redlands Facility Upgrades

The City of Redlands upgrades to the existing wastewater treatment plant, completed in winter 2004, included the construction of a distribution system for reuse of 3,000 to 6,000 acre-feet per year of treated effluent.



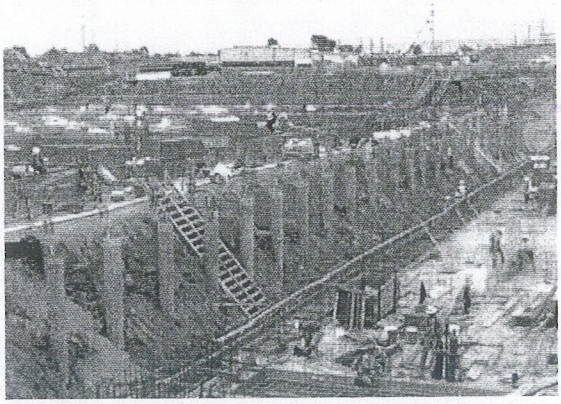
Yucaipa Valley Water District's Non-Potable Water Distribution System

The Yucaipa Valley Water District's Non-Potable Water Distribution System expands an existing non-potable system, adding over 10 miles of pipeline and a reservoir. It is estimated that at least 1,400 AFY of non-potable water will be used, reserving the highest quality water for potable use.



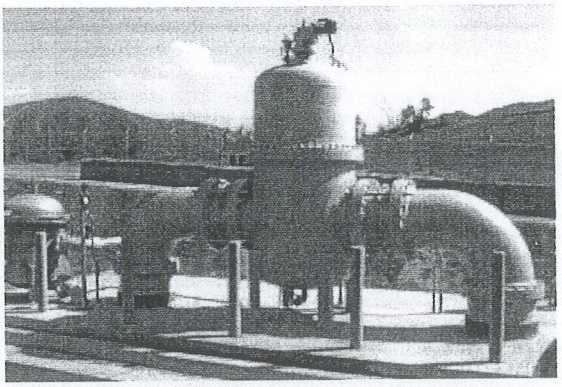
City of Norco Recycled Water Piping project

The City of Norco Recycled Water Piping project installed over 7 miles of pipeline, a small reservoir, and a pump station to create a new recycled water distribution system to deliver up to 895 AFY of recycled water.



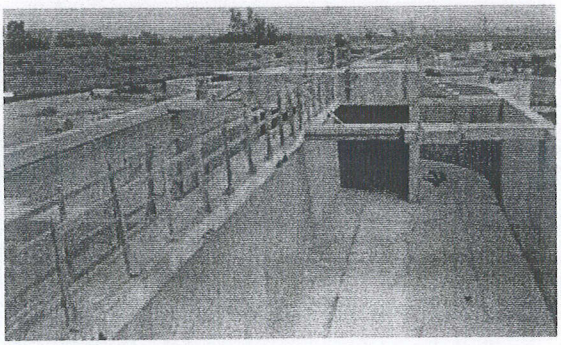
Construction of the Groundwater Replenishment System.

The Groundwater Replenishment System initiated by the Orange County Water District is a water supply project designed to reuse nearly 72,000 acre-feet per year of advanced treated wastewater. Significant progress has been made on construction of key components of the project including the completion of a 6 MGD Interim Treatment Facility. Overall construction completion is scheduled for mid 2007. When completed, the highly treated wastewater will be used in the saltwater barrier and percolation in the Orange County groundwater basin.



March Air Reserve Base (ARB) Groundwater Recovery Project

The March Air Reserve Base (ARB) Groundwater Recovery Project by Western Municipal Water District, projected to be completed in late 2005, consists of the installation of 3.5 miles of pipeline and a pump station to deliver 300 AFY of treated water from the Groundwater Extraction and Treatment System located on March ARB. The reclaimed water will be used by off-base irrigation users, primarily the Riverside National Cemetery.



Construction of the March ARB Wastewater Reclamation project

Western Municipal Water District has also undertaken the March ARB Wastewater Reclamation project to upgrade and rehabilitate the existing wastewater treatment plant. The treatment plant upgrade permits reuse of up to 1.0 MGD of plant effluent for irrigation of the Riverside National Cemetery and a local golf course.

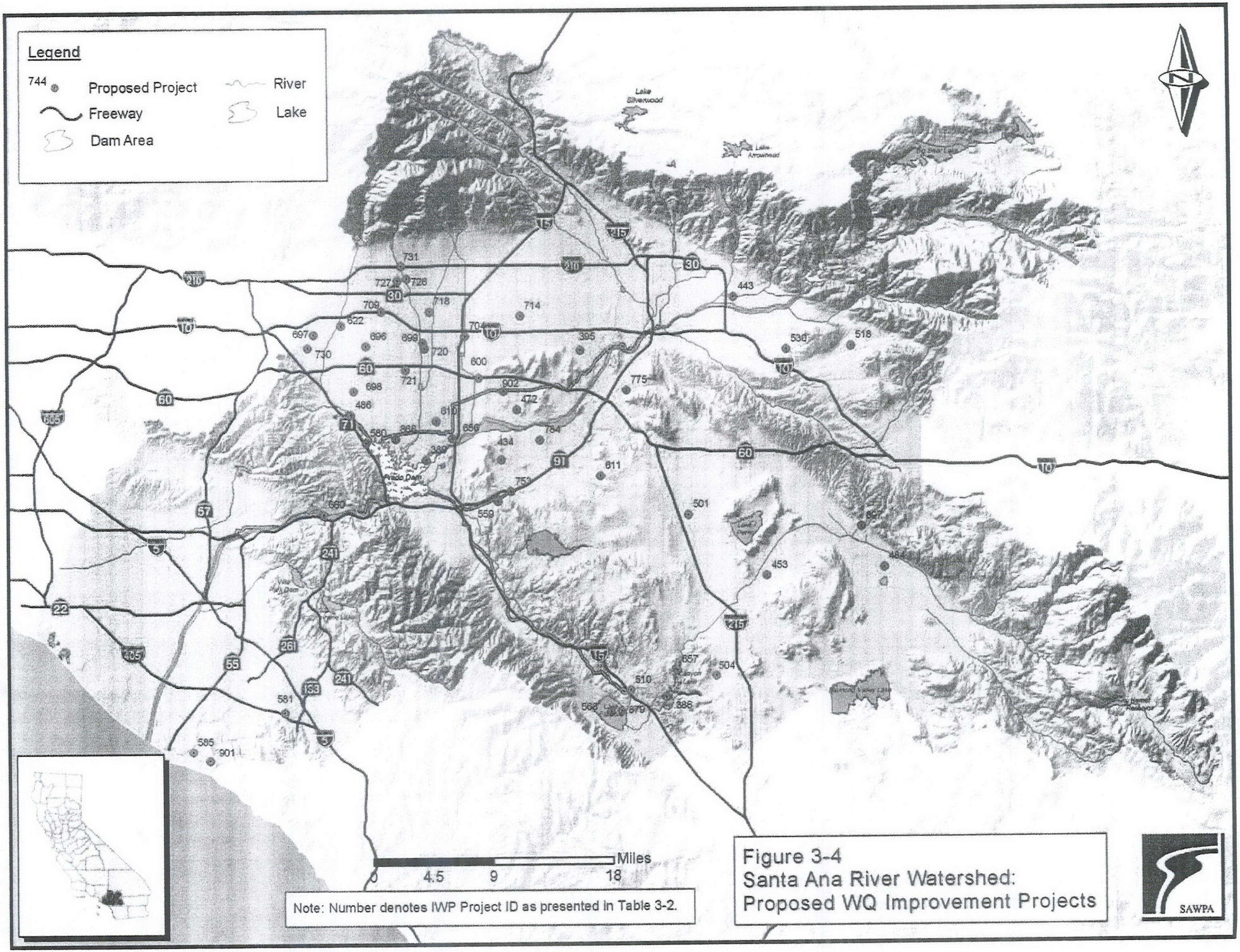

Legend
744 Proposed Project
Freeway
Dam Area
River
Lake
Lake Elsinore
Lake Matthews
Prado Dam
Miles
0 4.5 9 18
Note: Number denotes IWP Project ID as presented in Table 3-2.
Figure 3-4
Santa Ana River Watershed:
Proposed WQ Improvement Projects
SAWPA

Table 3-2 (13 pages)

ID#	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
EMWD Member Agency Area Projects																				
510	Eastern Municipal Water District	Temecula Valley Brine Line	Construct regional brine lines linking Murrieta, Temecula and Lake Elsinore areas to the District's non-reclaimable waste pipeline at the Menifee Desalter. Project provides cost-effective disposal of non-reclaimable brine wastes from industrial and water treatment facilities, as well as, protect the District's water recycling program from high-salinity wastes and assist in long-term salinity management in the District's service areas.	9,300,000																
501	Eastern Municipal Water District	Moreno Valley Brine Line	Construct regional brine lines linking the Moreno and Perris Valley areas to the District's non-reclaimable waste pipeline at the Menifee Desalter. Project provides cost-effective disposal of non-reclaimable brine wastes from industrial and water treatment facilities, as well as, protect the District's water recycling program from high-salinity wastes and assist in long-term salinity management in the District's service areas.	9,300,000																
504	Eastern Municipal Water District	Winchester Brine Line	Construct regional brine lines linking the Hemet and San Jacinto areas to the District's non-reclaimable waste pipeline at the Menifee Desalter. Project provides cost-effective disposal of non-reclaimable brine wastes from industrial and water treatment facilities, as well as, protect the District's water recycling program from high-salinity wastes and assist in long-term salinity management in the District's service areas.	4,800,000																

ID#	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
453	Eastern Municipal Water District	Perris II Desalter	Construct a 4 MGD Reverse Osmosis unit, up to four brackish groundwater extraction wells, a feed water pipeline, and portions of a brine line to connect to existing brine disposal facilities at the Menifee Desalter. Project will control rising groundwater in the Perris South subbasin, develop salinity offsets for water recycling, protect adjacent higher quality groundwater subbasins and develop a reliable local water resource from otherwise unusable local groundwater.	33,400,000		■		■				■									
657	San Jacinto River Watershed Council	Pollutant Trading Model	Develop pollutant trading model for the San Jacinto watershed in cooperation with the Santa Ana Regional Water Quality Control Board and local stakeholders. Model will be linked with ongoing TMDL efforts to provide planning level estimates for treatment costs, pollutant load reductions, and proposed institutional arrangements for successfully implementing a trading program.	175,000															■	■
484	Western Riverside County Agriculture Coalition (see SJWC)	Sustainable Ag Assessment with Nutrient Management and Air Components	Study to evaluate the regions ability to maintain sustainable agriculture based on effective management of livestock manure, manure amended soils, runoff and agricultural wastewater. Study includes a comprehensive assessment of nutrients and air components affecting the dairies and agricultural community in the San Jacinto Watershed. The nutrient management component includes animal feeding and management; innovative technologies for the collection, storage and treatment of manure; management tools for indexing and evaluating nutrient fate and transport; and farming systems and practices for efficient and balanced nutrient management. The air component assessment includes process-based models, scientifically sound emission factors and an assessment of technologies to reduce emissions.	330,000															■		

ID#	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
IEUA Member Agency Area Projects																				
622	Monte Vista Water District	Monte Vista Well 2 Nitrate Removal Facility	Construct Ion-Exchange (IX) facility at the District's existing Plant #2 site located on the south side of Grand Avenue between Ramona and Monte Vista Avenues.	1,200,000		■					■									
704	City of Ontario	City of Ontario Wells No. 30 & No. 37 Treatment	Evaluate and install wellhead treatment to remove Perchlorate and install about 5000 LF of piping between Wells 30 and Well 37.	4,500,000		■					■									
714	Fontana Water Company	Wellhead Treatment for Perchlorate Contamination	Install wellhead treatment to seven wells to remove Perchlorate and restore approximately 15,000 gpm of lost source capacity.	10,500,000		■					■									
721	City of Ontario	City of Ontario New Well Treatment	Evaluate and install wellhead treatment for new well located downstream of Upland Landfill Plume to remove VOCs and Perchlorate at Well.	3,000,000		■					■									
696	Inland Empire Utilities Agency	City of Ontario Well No. 15 Treatment	Install wellhead treatment to remove Perchlorate and Nitrates from District Wells No. 15.	160,000		■					■									
720	City of Ontario	City of Ontario Well No 44 & 1 new well Treatment	Evaluate and install wellhead treatment to remove Perchlorate at Well 36.	6,800,000		■					■									
580	Inland Empire Utilities Agency	Chino Creek Urban Runoff Treatment at RP-2	Upgrade RP-2 treatment plant to treat urban runoff flows in the adjacent Chino Creek, pre-treat flows to the SARI system to reduce solids treatment cost at the Orange County Sanitation District. In addition, RP-2 could be integrated into a secondary collection system to treat agricultural runoff in the surrounding area.	35,000,000							■	■	■	■		■	■			
698	City of Chino Hills	City of Chino Hills Well 19 Wellhead Treatment	Install wellhead treatment to remove arsenic and construct a waste discharge line to SARI system to dispose of waste.	1,200,000	■	■					■									
730	City of Pomona	Pomona's Well 4 Rehabilitation/Replacement	Evaluate and install wellhead treatment on City of Pomona's Well #4 or replace well if rehabilitation too expensive.	1,000,000	■	■														
697	City of Pomona	NDMA Removal at Anion Exchange Plant	Evaluate and install wellhead treatment to remove NDMA at Pomona's Anion Exchange Plant	2,000,000							■									

ID#	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
727	City of Upland	East Treatment Facility - 16th Street Well Field	Construct a combined wellhead treatment facility on the vacant reservoir site at 15th and 6th Ave. in Upland, to remove Dibromochloropropane (DBCP) and Nitrate being produced through Company wells 2, 3, 22, 24, and 31 (16th Street well field).	5,500,000		■					■									■
389	Santa Ana Watershed Project Authority	Chino Basin Pathogen and TSS TMDL Monitoring Program	Conduct a five-year water quality monitoring program to characterize the existing water quality conditions, the degree of impairment and ascertain the contribution of TMDL listed pollutants into the Chino Basin Area from the surrounding watershed. The water quality monitoring program will consist of extensive sampling and laboratory analysis to assess loading contributions from different regions and land uses within the watershed. Specific waterbodies to be included in the study include: Santa Ana River Reaches 3 and 4; Chino creek Reaches 1 and 2; Mill Creek and Prado Park Lake.	625,000															■	■
718	Cucamonga Valley Water District	Reservoir 1 - Wellhead Treatment Facility	Install wellhead treatment to remove Perchlorate and Nitrates from District Wells No. 1, 3, 4, 5, 30 & 38.	7,000,000	■	■					■									
726	Cucamonga Valley Water District	Reservoir 2A - Wellhead Treatment Facility	Construct 2,100 gpm wellhead treatment facility located at the Districts Reservoir 2A site for removal of Dibromochloropropane (DBCP) and Nitrate from the Districts Wells No. 8, 10, 12,20 & 22.	7,122,000	■	■					■									
731	Cucamonga Valley Water District	Reservoir 3A - Wellhead Treatment Plant	Construct a 2,100 gpm wellhead treatment facility located at the Districts Reservoir 3A site for removal of Dibromochloropropane (DBCP) and Nitrate from the Districts Wells Nos. 16,19, 21, 24 & 34.	7,400,000	■	■					■									
486	Inland Empire Utilities Agency	Headquarters Monitoring Program	Develop and implement a monitoring program to assess and document the removal efficiencies of the various BMPs built on our LEED Headquarters facilities. Project includes pilot studies using side by side technology to determine optimum monitoring techniques.	200,000								■						■		

ID#	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
699	City of Ontario	City of Ontario CBWM Perchlorate Source Study and Treatment	Study to investigate the sources and extent of Perchlorate contamination in the Chino Basin. Results of the investigation will be used to determine the most cost-effective treatment solution and technology to be employed.	500,000														■		
709	City of Ontario	City of Ontario Booster Station Backup Power	Provide backup power to the booster stations located at the well 9 and reservoir 7 facilities to increase reliability in the event of terrorist activity against the treatment plant or SCE facilities.	600,000							■									
OCWD Member Agency Area Projects																				
581	Irvine Ranch Water District	Irvine Desalter Project	Design and construct three new wells and rehabilitate one existing well to remove excessive salts and nitrates caused by natural geology and past agricultural drainage. Project includes construction of wellhead facilities, raw water pipelines, a reverse osmosis potable water treatment plant, disinfection facilities, product water pumping, a product water pipeline, brine pumping, and a connection to the South Irvine Brine Line.	23,500,000	■	■		■			■									■
585	Irvine Ranch Water District	South Irvine Brine Line	Construct facilities to convey brine generated by the Irvine Desalter Project (IDP) to an existing ocean outfall. Project will connect the IDP to IRWD's Los Alisos Water Reclamation Plant (LAWRP) in Lake Forest, which has existing piping and capacity ownership of 7.5 MGD in the Aliso Creek Ocean Outfall operated by the South Orange County Wastewater Authority. Project includes approximately 4 miles of new 12" diameter piping, slip-lining approximately one-half mile of existing piping, and a booster pumping station at the LAWRP.	9,000,000	■	■		■			■									■

ID#	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
901	City of Newport Beach	Newport Coast Watershed Groundwater Source ID and Management Project	Based on the findings of a groundwater seepage study completing by summer, 2005, this project will install 10 monitoring wells, extract groundwater samples and analyze samples for a suite of isotopes, metals and other constituents. Based on the sampling results, calculated groundwater movement and isotope chemistry evaluation, sources and locations of infiltrating surface water will be identified. Study results will be used in formulating a groundwater management program. This program will support watershed efforts to eliminate dry-weather flows and the associated pollutant loadings into the canyons.	400,000		■						■	■	■					■	
866	Orange County Water District	Bacterial Source Tracking in the Central Santa Ana River Watershed	Analyze bacteria in surface water, an indicator of general water quality and determine the presence of specific pathogenic species. This project will use a combination of standard and proven molecular methods to characterize the microbial communities and individual species of bacteria at established TMDL monitoring sites. OCWD and USDA as project partners are proposing to conduct a pathogen source evaluation study to influence the design of control strategies for optimal water quality within the central SAR watershed.	150,000															■	

ID#	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
SAWPA Regional Projects																				
660	Santa Ana Watershed Project Authority	SARI Protection/Relocation	Relocate and/or protect SARI below Prado Dam (Reaches 5-8) in Orange and Riverside Counties. This project must move forward as only a few feet of soil now cover the brine disposal line in this area as a result of scouring. The line must also be protected from imminent increased flows due to the planned raising of the Prado dam. The US ACOE is raising Prado dam approximately 30 feet, and constructing changes to the dame outlet channel. The changes resulting from these improvements will necessitate that portions of the existing SARI pipeline be protected and/or relocated. This project facilitates the process of separating domestic sewage and brine allowing for increased reuse of the domestic sewage.	50,000,000				■				■			■				■	
656	Santa Ana Watershed Project Authority	Arlington Desalter Expansion Project, Phase 1 (Santa Ana River Crossing)	Construct potable water supply line between the desalter and the City of Norco as part of the Arlington desalter enhancement project. Phase 1 pipeline project will cross to the north side of the Santa Ana River and connect with Jurupa Community Services District 870 zone to provide service to various cities and water agencies north of the Santa Ana River. The pipeline will be placed beneath the river using "jack and bore" techniques to avoid adverse environmental impacts. Additionally, WMWD owns capacity in the Arlington pipeline in excess of the Arlington Desalter requirement and this capacity is available for water transfers.	3,000,000	■	■		■				■								■

ID#	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
902	Santa Ana Watershed Project Authority	SARI Enhancements Program	SARI pipeline is under Prado Dam and per prior inspection and engineering evaluation is in need of significant repair. SAWPA has decided to replace line and has successfully negotiated with Army Corps of Engineers to route it through existing outlet conduit. Engineering design is complete and this portion is part of Army Corps' contract scope. The portion below Prado Dam to under Hwy 71 is being designed and construction arrangements are yet to be determined.	160,000,000		■	■	■	■			■								
753	Santa Ana Watershed Project Authority	Arlington Desalter Expansion Project, Phase 2 (Installation of 4th desalination train)	Install ion exchange to the Arlington Desalter as part of the Arlington desalter expansion project. Additional wells will be installed to take advantage of available water within the Arlington Basin which is not currently suitable for municipal usage.	20,000,000	■	■		■				■								
434	Santa Ana Watershed Project Authority	Santa Ana Watershed Data Management System	Implement a watershed-wide database management system to standardize data from numerous stakeholders in the watershed, to allow Internet access to the data by appropriate entities, and to be used as a tool to improve water quality in the watershed. This project will link numerous existing separate databases as well as provide a repository for other data currently not captured in a centralized system.	850,000															■	■

ID#	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
443	Santa Ana Watershed Project Authority	Recycled Water Research Center	Establish a regional research center where various new water resource related technologies could be developed and tested. Includes demonstration projects to evaluate, optimize performance, and document the technical feasibility of various integrated membrane processes. The facility is planned to house a novel integrated membrane treatment system for wastewater treatment and reuse known as the Integrated Membrane Anaerobic Stabilization Process (IMANSTM). This new approach is an attempt to integrate wastewater treatment and water reclamation into a single more economical approach. The approach involves incorporating microfiltration (MF) directly on primary wastewater effluent. Anaerobic biological treatment is used to treat the biological load in the concentrate.	5,000,000																	
395	Santa Ana Watershed Project Authority	Santa Ana Basin - Stormwater Quality Standards Study	Conduct a four-year review of water quality objectives and beneficial uses within the Santa Ana River Basin Water Quality Control Plan (Basin Plan) in conjunction Santa Ana Regional Water Quality Control Board (RWQCB) Staff. The primary focus will be on surface water quality objectives and designated beneficial uses of surface hydrologic units.	500,000																	
SBVMWD Member Agency Area Projects																				
518	Yucaipa Valley Water District	WTP Brine Line	Construct 24" brine line for YVWD Water Filtration Facility to enable the District to develop a desalination facility.	4,950,000																
530	Yucaipa Valley Water District	Redlands Brine Line	Construct 24" brine line from Yucaipa through Redlands to SBVMWD in San Bernardino to enable the District to develop a desalination facility.	16,323,500																

ID#	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
WMWD Member Agency Area Projects																				
600	Jurupa Community Services District	Ion Exchange Expansion	Upgrade JCSD's Ion Exchange Plant from 4.5 mgd to 12.7 mgd.	3,500,000		■														
879	Lake Elsinore & San Jacinto Watersheds Project Authority	Lake Elsinore Water Quality Improvement Project Phase II	Upgrade the Elsinore Valley Municipal Water Districts (EVMWD) Regional Water Reclamation Facility to remove phosphorus and deliver 15,000 acre-feet of treated effluent to Lake Elsinore. Construct granular media filtration system at Elsinore Valley Municipal Water District's (EVMWD) Regional Water Reclamation Facility to remove phosphorus. Discharge treated effluent to Lake Elsinore via the delivery pipelines constructed in Phase I.	4,518,000								■				■	■	■	■	■
559	Home Gardens County Water District	Home Gardens Raw Water Supply to Arlington Desalter	Construct 3 miles of 12-inch raw water pipeline from Home Gardens well field to Arlington Desalter and upgrade of existing wells. Project will enable Home Gardens CWD to expand service operations, as well as, provide an additional raw water supply from the basin to serve as a backup for existing operations.	2,400,000	■	■		■				■								
784	City of Riverside	Groundwater Contamination Remediation	Construct Permeable Reactive Barrier (PRB) to perform in-situ reduction of the contaminant plume and to prevent plume expansion at the Riverside Airport Complex. Project includes the use of zero-valent iron (ZVI) and fill materials installed perpendicular to the flow line of the plume. As the groundwater flows through the PRB, aqueous COCs react with the ZVI and undergo reductive dechlorination resulting in non-toxic by-products. Both upstream and downstream monitoring would be implemented to evaluate the effectiveness of the PRB.	3,000,000		■						■							■	■

ID#	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
386	Lake Elsinore & San Jacinto Watersheds Project Authority	San Jacinto Watershed Pathogen and Nutrient TMDL Monitoring Program	Conduct five-year water quality monitoring program to characterize the existing water quality conditions, the degree of impairment and ascertain the contribution of TMDL listed pollutants due to direct discharge into Lake Elsinore and Canyon Lake from the surrounding watershed. The water quality monitoring program will consist of the bi-monthly sampling and laboratory analysis of key water quality parameters for the Lakes and local storm drains as specified in the RWQCB's Sampling Plan and a stormwater monitoring program for three major storm events to assess loading contributions from multiple land uses within the watershed. In addition, to assure accurate data collection, the study also includes a program to maintain Stream Gauging Stations located throughout the watershed.	2,100,000															X	X
775	City of Riverside	Palmyrita Perchlorate Treatment Plant	Construct perchlorate Ion Exchange plant and SARI line connection to enable the City of Riverside to treat 10,000 gpm of perchlorate tainted water from the Riverside Groundwater Basin. Project will employ ion exchange (IX) treatment including an on-site resin regeneration process which generates a brine waste stream. Due to the Santa Ana River discharge limit on total dissolved solids, the waste brine cannot be discharged into the local sanitary sewer. Disposal alternatives include discharge it to SARI line or Calgon's ISEP+ system to reuse the brine.	45,000,000	X	X						X							X	

ID#	Acting Agency	Project Name	Project Description	Total Project Cost
568	Lake Elsinore & San Jacinto Watersheds Project Authority	Lake Elsinore and Canyon Lake In-lake Water Quality Modeling Study	Conduct a two year lake modeling study to simulate hydrodynamic and water quality related processes to characterize the existing water quality conditions in Lake Elsinore and Canyon Lake. Both Lakes have shown relatively high in-lake nutrient and pathogen loads, which are believed to be released from the bed sediments. The study will consist of two phases, the first of the study will entail an in-lake water quality monitoring program to sample both the water column and sediment bed and laboratory analysis of key water quality parameters for the Lakes. This will be followed up by applying the monitoring data to a comprehensive dynamic lake model to analyze the various components of the nutrient cycle and pathogen processes.	450,000
472	Riverside County Flood Control & Water Conservation District	Non-point Pollution Source Study of Uncurbed Roads	Study the potential of non-curbed roads/streets in an urban setting as a source of non-point pollution.	50,000
610	Riverside County Flood Control & Water Conservation District	Evaluate criteria for MS4 maintenance and inspections	Study to evaluate and improve the inspection and maintenance practices of public agencies with a focus on Urban runoff management. Study will develop model maintenance procedures for the implementation of BMPs to reduce and/or eliminate pollutant from urban runoff and develop a program for cleaning-out open channels, catch basins, retention/detention basins, wetlands created for Urban Runoff treatment.	150,000
611	Riverside County Flood Control & Water Conservation District	Database Development for MS4 Inspection Program	Develop software (database) to document inspections for construction, industrial, and commercial activities with their potential to generate Urban Runoff (point or non-point source generated) in the Santa Ana/San Jacinto River Watersheds.	15,000

ID#	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
568														■	■	
472														■		
610														■		
611														■		

ID#	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
897	Riverside County Flood Control & Water Conservation District	Nutrient/Pathogen BMP Effectiveness Study in support of TMDLs	Study the effectiveness of available BMP technologies to address nutrient and pathogen discharges in an arid environment from urban and mixed land use sources to Canyon Lake and Lake Elsinore. Project includes literature research to select BMPs capable of addressing nutrients/pathogens, including estimation of costs and potential cost/benefit. Based on budget, several of the highest potential BMPs will be selected for test projects. District will do research to locate appropriate sites for implementing various BMPs, including non-proprietary and proprietary structural BMPs. Influent and effluent to the BMPs will be monitored to determine % reduction and overall effectiveness of BMP to address nutrients and pathogens. Final report would identify costs to implement BMPs, effectiveness for nutrient/pathogen removal, and a description of watershed wide applicability/costs to address urban, and if appropriate, other sources.	1,000,000								■	■					■		

The largest use of recycled water in the Watershed is for groundwater recharge. During summer months, the Santa Ana River flow becomes primarily treated effluent. This effluent or recycled water coming from upstream water reclamation facilities flows through the Prado Dam and is diverted to the river recharge basins in Orange County. Also, many golf courses, cemeteries, schoolyards, parks, street medians, and freeways in the Santa Ana Watershed are irrigated with recycled water. Other reclamation projects in the watershed include innovative uses such as toilet flushing in high rise buildings and residential landscaping, as evidenced by recycled water programs in the Irvine Ranch Water District. Figure 3-5 presents a regional overview of new programs and projects proposed to further regional objectives toward water recycling within the Santa Ana River watershed.

A comprehensive detailed list of these newly proposed regional projects and programs follows in Table 3-3.

E. Flood Protection

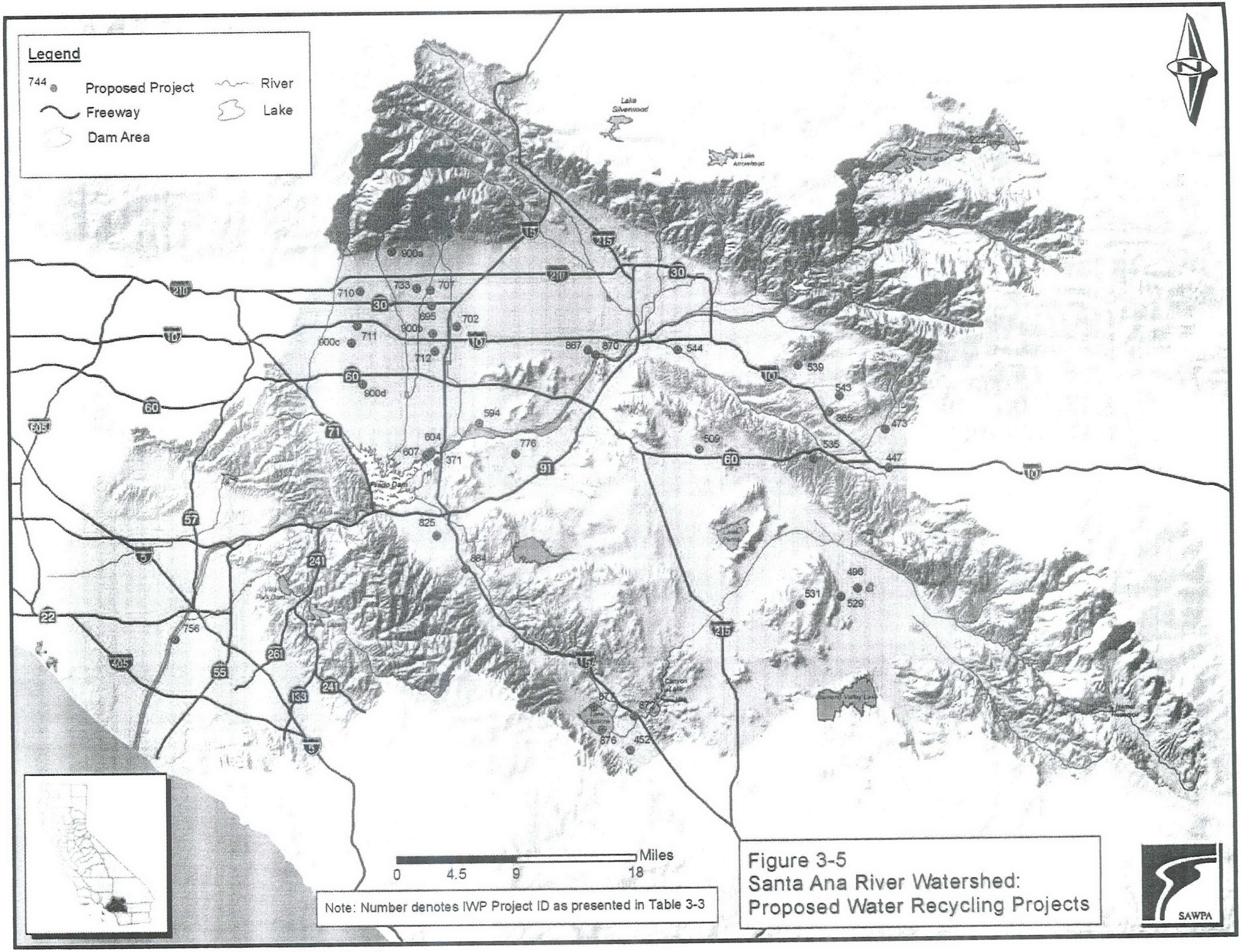
Many of the Santa Ana's tributaries are dry riverbeds that only have water in them during the rainy season. These are completely parched throughout most of the year, but one major storm system can quickly turn them into raging torrents. While the Santa Ana Basin is an arid environment, its close proximity to the ocean and mountain ranges brings heavy storms at times, and these are problematic from a flood control standpoint. Historically, efforts to deal with flooding on the South Coast focused on damage control. As the area became urbanized, city planners simply channeled the periodic deluges into the ocean. This usually prevented floodwaters from inundating the cities, but it had little benefit for local water supply. Though many of the SAW's creeks and rivers are lined with concrete, today storm water is seen more and more as a resource that has not been fully tapped.

The SAIWP considers the construction of multi-purpose facilities that would divert floodwaters to recharge basins, converting what has in the past been seen as a dangerous nuisance into a precious commodity. IEUA has been particularly aggressive in the development of recharge basins to capture stormwater flows, while other SAWPA member agencies have a number of stormwater capture projects planned as well. More projects throughout the watershed, however, are necessary to maximize this intermittent yet valuable resource. With the evident benefits of groundwater recharge, capturing stormwater and using this very high quality water to meet the region's rapidly growing needs makes flood protection projects more important than ever. At the same time, it is still important to ensure that floodwaters do not endanger life and property. It is evident that they can be physically devastating to wetlands, farms and houses, while floods in agricultural and industrial regions also elevate the potential for hazardous discharges into the river.

SAIWP SUCCESSES

Groundbreaking ceremonies for the Riverside Drive Storm Drain Project.

The San Bernardino County Flood Control District has completed Phase II and III of the Riverside Drive Storm Drain Project. The project constructed nearly two miles of storm drain to divert rainfall runoff from the Chino Dairies to the Lower Cucamonga Spreading Grounds and the Cucamonga Creek Channel protecting the downstream wash from agricultural runoff.


Legend
744 Proposed Project
Freeway
Dam Area
River
Lake
Lake Silverwood
Lake Arrowhead
900a
900b
900c
900d
710
733
707
695
702
711
712
887
870
544
539
543
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535
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604
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371
776
825
384
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529
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872
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Miles
0 4.5 9 18
Note: Number denotes IWP Project ID as presented in Table 3-3
Figure 3-5
Santa Ana River Watershed:
Proposed Water Recycling Projects
SAWPA

Table 3-3 (7 pages)

ID#	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
EMWD Member Agency Area Projects																				
496	Eastern Municipal Water District	Hemet/San Jacinto RWRF Tertiary Expansion	Upgrade the Hemet/San Jacinto Regional Water Reclamation Facility to full tertiary treatment. Project creates recycled water for the Hemet/San Jacinto area, as well as, integrating recycled water use into the Groundwater Management Plan currently being developed by water users in the Hemet/San Jacinto Valley.	35,000,000	X	X	X	X		X		X				X	X	X		X
529	Eastern Municipal Water District	San Jacinto RWRF System Intertie	Construct a 24" pipeline to link the San Jacinto RWRF into the rest of the Districts recycled water distribution system. Project allows delivery of 900 AF/year of recycled water in lieu of critically over drafted groundwater.	4,400,000	X			X												X
452	Eastern Municipal Water District	Temecula Valley Regional Water Regional Facility Effluent Pipeline	Construct over 12 miles of 36"+ pipeline and a major pump station to connect the TVRWRF to the District's outfall pipeline near Lake Elsinore. Project allows surplus recycled water from the plant to be used for replenishment and stabilization of Lake Elsinore, as well as, provide recycling opportunities along the I-15 corridor between Temecula and Lake Elsinore.	38,000,000		X		X								X	X	X		
531	Eastern Municipal Water District	Distribution System Upgrade	Construct up to four steel storage tanks ranging from >1 to 3 MG. Project provides the elevated operational storage necessary to establish pressure zones, as well as, consistent flow and pressure control needed for planned municipal uses of the system required for expanded municipal recycled water use.	9,000,000	X			X			X									
IEUA Member Agency Area Projects																				
911	Inland Empire Utilities Agency	Recycled Water Line, Etiwanda Pipeline South Expansion	Project is a 24 and 36 inch pipeline extending on Etiwanda Avenue in the Eastern portion of the City of Ontario. The pipeline will deliver recycled water to direct reuse customers, primarily industry, which currently use water imported through the state water project. The deliveries from this project will be 1,000 acre-feet annually.	1,950,000	X	X	X	X	X					X						X

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913	Inland Empire Utilities Agency	Recycled Water Line, Chino and Chino Hills Pressure Zone 800 Improvements	Project will provided recycled water distribution pipelines and 10 million gallons of storage to supply 4,500 acre-feet of recycled water in the cities of Chino and Chino Hills. The 3.5 miles of pipelines will be 30 and 36-inch diameter.	8,900,000	X	X	X	X	X					X						X
912	Inland Empire Utilities Agency	Recycled Water Line, Euclid Avenue Interconnection and Reservoir	Project consists of a 7 mile, 20-inch diameter pipeline on Euclid Avenue, a 5 million gallon storage reservoir, and a 2 mile, 20-inch diameter pipeline connecting the reservoir to the distribution system. This project is located in the Northwest portion of the City of Ontario with the reservoir located in the City of Montclair. The project will deliver 6,000 acre-feet of recycled water annually to direct reuse customers in the Cities of Ontario, Montclair and Chino.	11,700,000	X	X	X	X	X					X						X
910	Inland Empire Utilities Agency	Recycled Water Line, San Sevine and Etiwanda Recharge Basins	Project consists of approximately 14 miles of recycled water pipelines ranging from 16 to 36 inches in diameter. The project also includes 10 million gallons of recycled water storage to meet daily operational flow needs. The project is located in the northwest portion of the City of Rancho Cucamonga in a alluvial area prime for groundwater recharge. Recycled water deliveries or yield from this project will be 7,500 acre-feet annually.	19,500,000	X	X	X	X	X					X						X
711	Cucamonga Valley Water District	Recycled Water Distribution Facilities – Zone 1 – 4th Street to I-10 Freeway	Install distribution facilities necessary to deliver recycled water to District customers including mains and services.	361,000	X			X												
710	Cucamonga Valley Water District	Wastewater Package Treatment Plant (Rancho Cucamonga's Red Hill Park)	Construct wastewater package treatment plants and pipeline to supply recycled water to Red Hill Park and other uses including recharge of the local groundwater basin.	3,000,000	X	X	X	X				X								
733	Cucamonga Valley Water District	Wastewater Package Treatment Plant (Rancho Cucamonga Central Park)	Construct 1 to 2 MGD wastewater package treatment plants and pipeline to supply recycled water to Central Park and other users including recharge of the local groundwater basin.	3,000,000	X	X	X	X				X								

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695	Cucamonga Valley Water District	Recycled Water Distribution Facilities - Zone 1 - Haven Ave. to Archibald	Install distribution facilities necessary to deliver recycled water to District customers including mains and services.	1,108,000			■													
702	Cucamonga Valley Water District	Recycled Water Distribution Facilities- Zone 1 - I-15 to Etiwanda Ave.	Install distribution facilities necessary to deliver recycled water to District customers including mains and services.	1,047,000			■													
707	Cucamonga Valley Water District	Recycled Water Distribution Facilities - Zone 1 - Milliken Ave. to Haven Ave.	Install distribution facilities necessary to deliver recycled water to District customers including mains and services.	1,302,000			■													
712	Cucamonga Valley Water District	Recycled Water Distribution Facilities- Zone1-Milliken Ave. to Rochester Ave.	Install distribution facilities necessary to deliver recycled water to District customers including mains and services.	1,401,000			■													
OCWD Member Agency Area Projects																				
756	Orange County Water District	Groundwater Replenishment System Phase 1B	Create 5,000 acre-feet per year of new water into the watershed by taking highly treated sewer water from the Orange County Sanitation District, water that is currently released into the ocean, and purify it with microfiltration, reverse osmosis and ultraviolet light and hydrogen peroxide. The purified water will then be injected into a seawater intrusion barrier, with the remaining water pumped to a recharge basin in Anaheim. The pipeline from the treatment plant in Fountain Valley to the recharge basin in Anaheim is 14 miles long, ranging in diameter from 60 to 78 inches.	15,000,000		■	■	■				■									■

ID#	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
SBVMWD Member Agency Area Projects																				
870	San Bernardino Municipal Water Department	RIX Facility Basin Levee Project	Construct several new percolation basins and extraction wells to restore capacity at the Rapid Infiltration and Extraction (RIX) Facility and extend the levee from the RIX Facility along the north side of the river to Riverside Avenue, making it several thousand feet in length. levee to be constructed of sand, rocks and large boulders, similar to the construction on the south side of the river. The RIX Facility is now separated from the river by a levee sufficient to protect it from 100-year flooding. The expansion will require similar protection from a levee that will not only protect the basins and wells from flood damage, but will protect the river from the affects of washing secondary treated effluent from the percolation basins into the river.	3,000,000		■	■	■						■	■							■
473	Beaumont Cherry Valley Water District	Recycled Water Facilities for Delivery into Bogart Park & Wetlands, WRDP Phase 4	Phase 4 includes tanks, pipelines, and booster stations to introduce recycled water into the program. The recycled water will be introduced to Noble Creek and Phase 3 wetlands for natural de-nitrification, enhancement of the creek, and transfer to Phase 2 facilities for groundwater recharge.	5,200,000	■	■	■	■					■	■	■	■	■	■	■	■	■
509	Yucaipa Valley Water District	Eastern Reclamation Pipeline	Construct 4.2 miles of 36" pipeline from YVWD Outfall to Ironwood Avenue to convey up to 12 MGD of reclaimed water to EMWD.	7,500,000	■	■	■	■				■									
222	Big Bear Area Regional Wastewater Agency	Water Conservation Through Wastewater Reclamation Study	Upgrade Big Bear Regional WWTP with microfiltration, reverse osmosis and ultraviolet disinfection and construct a recycled water distribution system to supply water for urban irrigation and groundwater recharge.	20,000,000	■	■	■	■													
535	Yucaipa Valley Water District	Beaumont Reclamation Line	Construct 4.86 miles of 30" pipeline to convey reclaimed water from the Oak Valley WWTP to YVWD outfall to provide up to 4 MGD of non-potable water for direct use and/or recharge water to Beaumont basin.	7,500,000	■	■	■	■													

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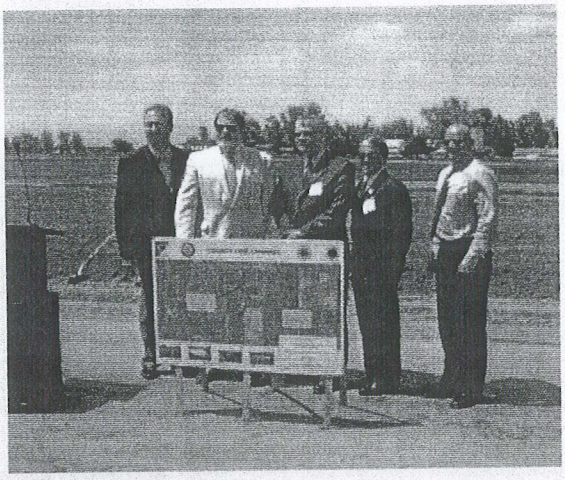
543	Yucaipa Valley Water District	Calimesa CC Reclamation Pipeline and Reservoir	Construct 2.75 miles of 24" reclamation pipeline and 4 MG reservoir to supply reclaimed/non-potable water to Calimesa schools, golf course, and parks to provide a reliable non-potable water source for irrigation, eliminating need to pump up to 2,180 ac-ft annually of potable groundwater.	9,000,000				■			■										
447	Beaumont Cherry Valley Water District	Recycled Water Facilities, Phase I	Install connections to deliver 2,500 AFY of recycled water to four golf courses (all currently exist and use potable groundwater for irrigation water supply) and ~1,000 AFY for groundwater recharge. Project requires construction of a booster station, pressure reducing station, storage tank, and transmission pipelines.	5,500,000	■	■	■	■													■
865	Yucaipa Valley Water District	Oak Valley MBR Treatment Plant	Construct a 4 MGD membrane (MBR) wastewater treatment plant in Oak Valley to provide a source of reclaimed water for landscape irrigation..	20,000,000				■			■										
867	City of Rialto	Tertiary Treatment Plant and Reclaimed Water Expansion Study	Master planning study to investigate the expansion of the existing tertiary treatment plant and reclaimed water system.	150,000															■	■
539	Yucaipa Valley Water District	Crafton Hills Reservoir Pipeline	Construct 2.52 miles of 24 pipeline to convey reclaimed water from YVWD WWTP to Crafton Hills Reservoir to eliminate the usage of municipal potable water supply for landscape irrigation.	3,000,000				■													
544	Yucaipa Valley Water District	YVWD/Loma Linda Reclamation Pipeline	Construct 8.14 miles of 30 pipeline to convey reclaimed water from YVWD outfall to Loma Linda to provide up to 0.25 MGD (252 ac-ft/yr) of reclaimed water for use in San Timoteo Canyon, Redlands, and Loma Linda.	12,000,000				■			■										

ID#	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
WMWD Member Agency Area Projects																				
371	City of Norco	Fifth Street Reclaim Water Line	Construct additional reclaimed water pipeline from existing sewer treatment plant to provide adequate supply the expansion of Ingalls Park, Crestlawn Cemetery and KB Homes development. Project includes installation of pumps and storage reservoir.	750,000		■	■	■				■									
877	Lake Elsinore & San Jacinto Watersheds Project Authority	Lake Elsinore Water Quality Improvement Project	Construct pipelines to deliver recycled water from Eastern Municipal Water District (EMWD) to EVMWD's Regional Water Reclamation Facility and deliver the treated effluent to Lake Elsinore through the outflow channel.	5,016,000				■				■				■	■	■	■	■
825	City of Corona Department of Water and Power	Project No. 1--Citywide Recycled Water Facilities Project B	Construct additional recycled water distribution mains to serve new customers within the City and retrofit existing irrigation systems to use recycled water. Project will reallocate 1,200 AFY of potable water currently used for irrigation.	50,900,000	■	■	■	■												
864	City of Corona Department of Water and Power	Project No. 3--Recycled Water Intertie	Construct approximately 8500 linear feet of pipeline to connect the existing recycled water distribution system from Wastewater Treatment Plant #3 (WWTP #3) to the newly constructed Phase 1 Citywide Recycled Water Facilities Projects distribution system from WWTP #1. Since the two systems operate at different hydraulic grade lines, it will be necessary to construct both a booster pump station and pressure reducing station as part of the intertie.	47,150,000		■		■												
876	Lake Elsinore & San Jacinto Watersheds Project Authority	Lake Elsinore Recycled Water Project	Construct 6,200 feet of 30-inch pipeline to deliver recycled water from Elsinore Valley Municipal Water Districts (EVMWD) Regional Water Reclamation Facility to Lake Elsinore.	1,760,000				■								■	■	■	■	■

ID#	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
872	Elsinore Valley Municipal Water District	Wildomar Recycled Water System	Construct pipeline, pump stations, and reservoirs to deliver approximately 2,400 AF/yr of recycled water from Eastern MWD's Effluent Disposal Pipeline to the Wildomar area. Project supports the Wildomar Service Area Recycled Water Master Plan through which the District recently purchased 1.5 MGD of recycled water flows capacity in the Effluent Disposal Pipeline.	18,856,781	■			■												■	■
594	Jurupa Community Services District	Indian Hills Water Recycling Project	Construct pipeline to deliver treated effluent from the Riverside Regional Water Quality Control Plant (RRWQCP) located southerly of the District's boundary to the Indian Hills area of the District and to an adjacent water purveyor.	2,900,000				■													
604	Jurupa Community Services District	Non-Potable Water System	Construct Non-Potable Water System to deliver tertiary treated effluent from the Western Riverside County Water Reclamation Plant to parks, school, grounds, and streetscapes within the western portion of Jurupa Community Services District.	15,000,000				■													
607	Jurupa Community Services District	Joint JCSD - IEUA Water Reclamation Project	Construct Conveyance Facilities from IEUA Water Reclamation Facilities to JCSD Eastvale area. The project includes the construction of transmission and distribution lines in the Eastvale area to supply reclaimed water for irrigation purposes on public lands.	5,000,000				■													
776	City of Riverside	Water Recycling Project - Phase I	Construct booster pump station and install over 31,000 feet of transmission pipeline raging in size from 12" through 30" to implement phase 1 of the Riverside water recycling project. Project replaces domestic water used by the City of Riverside and Jurupa Community Service District (JCSD) for landscape and park irrigation with recycled water.	12,300,000				■													



Groundbreaking ceremonies for the County Line Channel project.

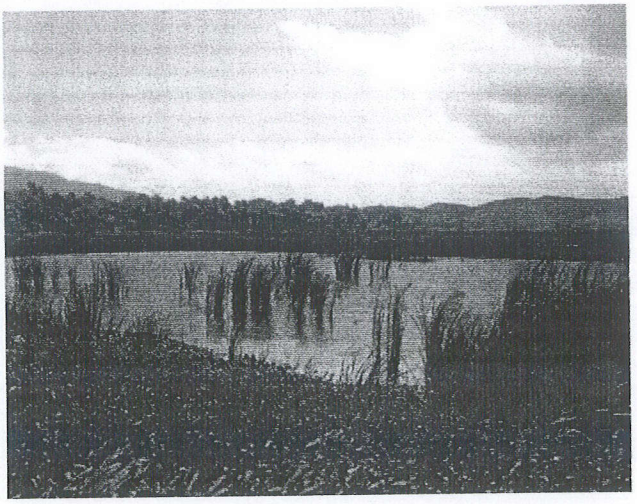
Storm water diversion around the dairy area will improve water quality in Cucamonga Creek and the Santa Ana River. With support from SCIWP, Riverside County Flood Control & Water Conservation District constructed the County Line Channel project which diverts rainfall runoff from the Chino dairy areas into a new 2.5 mile long storm channel.

Figure 3-6 presents a regional overview of new programs and projects proposed to further regional objectives toward providing multi-purpose flood protection within the Santa Ana River watershed.

A comprehensive detailed list of these newly proposed regional projects and programs follows in Table 3-4.

F. Wetlands, Environment and Habitat

The projects detailed in this section demonstrate that the water needs of people and those of wildlife can actually be compatible. OCWD, for example, has operated an artificial constructed wetland for almost a decade in the Chino area, and has realized estimated water treatment cost savings of more than ten million dollars annually. In the Santa Ana River watershed managers and planners realize that there is a need to develop systems such as these throughout the watershed to provide additional water treatment and watershed enhancement capabilities. Constructed wetlands are used to treat a variety of wastewaters, including municipal, industrial, and agricultural. Treatment wetlands are also commonly used to treat stormwater runoff. In addition to improving water quality, treatment wetlands may provide multiple benefits to an area. They provide habitat to a number of species, including a number of threatened and endangered species. Wetlands are generally much more aesthetically pleasing to the public than traditional wastewater treatment plants or stormwater detention basins and therefore have greater open space value. When planned in conjunction with regional trails or other recreational amenities, wetlands also provide recreational benefits to a region.



Prado wetlands

Rapid development often shortchanges waterfowl by building over scarce wetlands or diverting the water that would normally sustain them. This can be lessened, however, through the expansion of artificial wetlands along the course of the Santa Ana River; in fact, this negative trend can actually be reversed. Foliage in the artificial wetlands

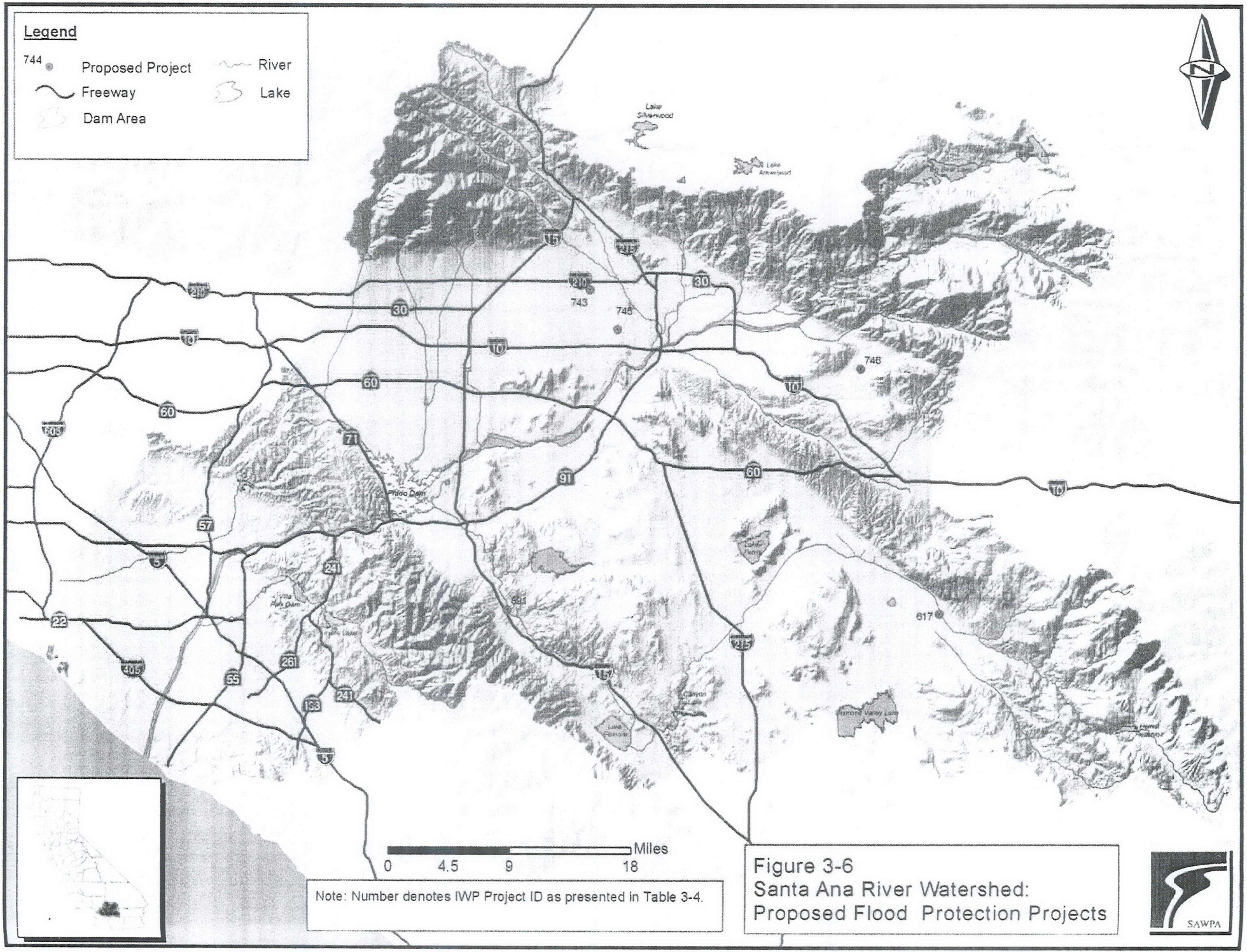

Legend
744 Proposed Project
Freeway
Dam Area
River
Lake
Lake Silverwood
Lake Arrowhead
743
745
746
748
617
Prado Dam
Villa Park Dam
Lake Elsinore
Canyon Lake
Lake Perris
Railroad Canyon Reservoir
Diamond Valley Lake
15
215
210
30
10
60
71
91
57
5
241
22
405
55
26
133
Miles
0
4.5
9
18
Note: Number denotes IWP Project ID as presented in Table 3-4.
Figure 3-6
Santa Ana River Watershed:
Proposed Flood Protection Projects
SAWPA

Table 3-4

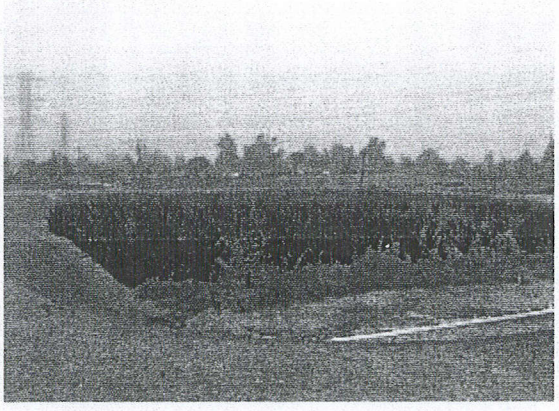
ID#	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
SBVMWD Member Agency Area Projects																				
745	San Bernardino County Flood Control District	Randall Basin Improvements	Upgrade hydraulic facilities to reduce downstream 100-year peak flows and intercept and/or recharge stormwater flows	1,400,000										X	X					X
746	San Bernardino County Flood Control District	Potato Creek Spreading Grounds/Basin	Upgrade levees and dikes within the existing spreading grounds area to capture storm flows for recharge and flood control purposes	3,000,000		X	X						X	X	X	X		X		
743	San Bernardino County Flood Control District	Cactus Basins #4 & #5	Upgrade existing basin facilities to accommodate existing flows conveyed by Cactus Channel, northerly of the new I-210 freeway.	13,800,000		X	X						X	X	X					
WMWD Member Agency Area Projects																				
891	Lee Lake Water District	Lee Lake Water District Flood Water Protection & Wetland Enhancement Project	Construct flood protection levee and wetlands habitat in Temescal Creek. Project provides for the capture and recharge of approximately 112 AF/yr of recycled water in the Bedford Basin.	1,000,000		X							X	X	X	X	X	X	X	
617	Riverside County Flood Control & Water Conservation District	Evaluation of the effect of Engineered Flood Control Structures along the San Jacinto River to reduce pollutants (primarily nutrients) in Canyon Lake/Lake Elsinore	Study of the San Jacinto River engineered levee system to evaluate the system's ability to control flow and prevent inundation of adjacent areas potentially contributing pollutants to Canyon Lake and Lake Elsinore. Each of these lakes are listed as CWA 303 (d) impaired waters due to nutrient loading.	200,000															X	

should be a tremendous benefit for removing nitrates in local water supplies. Unfortunately, not all plants are beneficial along waterways. For example, much of the SAR is inundated with a persistent species of non-native cane called *Arundo donax*. The huge bamboo-like grass reaches heights of 40 feet, and uses as much as 37,000 acre-feet of water every year. Reducing the cane presence in the watershed is a high priority project, and millions of dollars have already been allocated from the statewide water bond (Proposition 13) to help control it.

There are many impressive projects underway or under development within the Santa Ana Watershed. These include projects throughout the watershed to restore and expand riparian habitat, as well as, coastal projects to protect and preserve our marine habitats. These include groups such as the Orange County Coastkeeper (OCC), who are working to restore ecosystem function and improve water quality within coastal marshes.

However, while most project proponents are very familiar with their local planning area, very few groups or individuals within the Watershed understand or are aware the entire watershed. In general, as one expands outward from a planner's geographic area of expertise, his or her knowledge grows less certain about projects and important issues. Given the large geographic area of the Santa Ana Watershed, few understand the entire system.

SAIWP SUCCESSES



Dairy Washwater Treatment System

The Dairy Washwater Treatment System, developed by the Orange County Water District, is aimed at demonstrating the use of wetlands in treatment technology to reduce the impacts from dairy washwater on the Chino Groundwater Basin. The project was completed in May 2002 and has resulted in continuous treatment of the washwater from a dairy operation in Chino. The purpose of the demonstration project is to implement wetlands technology to treat liquid waste streams (dairy washwater) to generate a product suitable for on-site reuse, thereby reducing the amount of contaminants entering groundwater supplies as a result of percolation of washwater stored in ponds and sprayed on disposal lands.

Arundo Removal Program

The Arundo Removal Program funded by SCIWP aims to remove non-native invasive giant reed (*Arundo donax*) and other exotic plant species, which crowd out and eventually eliminate native riparian vegetation from the Santa Ana River. Arundo eradication efforts continue with approximately 3,000 acres removed. Since Arundo consumes nearly three times as much water as native riparian vegetation, its removal and replacement with native species is significantly increasing in the quantity of water flowing in the river.

Figure 3-7 presents a regional overview of new programs and projects proposed to further regional objectives toward improving and developing riparian ecosystems within the Santa Ana River watershed.

A comprehensive detailed list of these newly proposed regional projects and programs follows in Table 3-5.

G. Recreation and Conservation

Recreation projects not only create opportunities for the public to enjoy the area's waterways to the fullest extent possible, they also provide opportunities to enhance the local water supply through expanding regional wetlands and restoring riparian zones. Ensuring access to the region's wetlands, lakes, and streams will enable locals to see first-hand how the SAR and its tributaries make substantial contributions to waterfowl migration and wildlife in general.

Increased urbanization within the SAW has challenged local agencies to develop infrastructure for the future to meet water demands and to provide flood control for public safety. It is essential that the growth of urban areas occur in balance with the environment to maintain viable habitat for native species of plants and wildlife, and to maintain a high quality of life for the people in the community. An effective means of establishing this balance would be the development of open space corridors which promote the dual establishment of multiple species habitat, wetlands, stormflow capture and storage, aquifer recharge, water quality improvements, and passive and active recreational open spaces.

Some of the most rapidly growing regions of the Santa Ana Watershed that would benefit from this concept include the Santa Ana River, Newport Bay, and the new city sphere of influence expansions into the Chino Basin Dairy Preserve. In the Chino Basin Dairy Preserve, for example, approximately 15,000 acres of land will gradually be converted from dairy and agricultural development into an urbanized area. Concerns have been raised that the conversion to urban use includes an appropriate balance with other uses such as wildlife habitat, open spaces, and adequate floodplain along rivers and creeks. The establishment of multipurpose open space corridors would enhance the environment and facilitate efficient land use planning.

The following benefits of the open space corridors have been identified:

- Environmental Enhancement
- Habitat Creation: Riparian & Marsh
- Green Space
- Biodiversity
- Wildlife Propagation
- Recreation
- Hiking
- Jogging
- Cycling
- Equestrian Trails
- Water Resource Management
- Water Conservation
- Storm Flow Capture and Storage
- Water Quality Improvement
- Aquifer Recharge
- Emergency Storage
- Erosion Control
- Educational
- Bird Watching.
- Environmental Science Labs
- Public Awareness

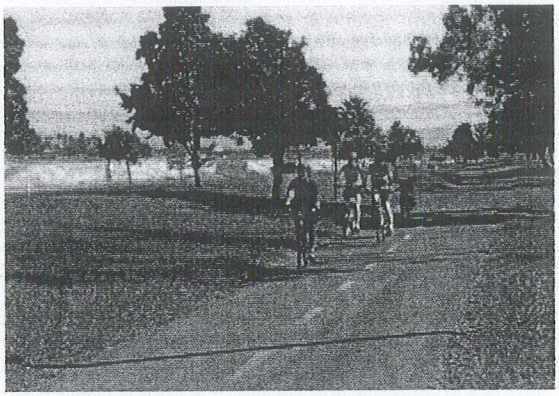
With regard to conservation, the SAIWP recognizes two primary categories of conservation. The first is defined as long-term programs that require investments in structural programs such as ultra-low-flush toilets, low-flow showerheads, or water efficient landscape irrigation technology, as well as ongoing public education and information. Long-term conservation programs should not be intrusive or require extreme life-style changes. The primary conservation strategy evaluated in this document involves the implementation of cost-effective long-term programs that have long-lasting savings.

Using MWD's terminology from their 1996 IRP, long-term conservation is further broken into two types of programs: programmatic and passive programs. Programmatic conservation represents savings requiring significant investments by water agencies in order to implement toilet and showerhead retrofit programs, landscape programs, commercial and industrial conservation, and distribution system leak repairs. Passive programs, such as plumbing codes, ordinances, and pricing require much less financial assistance from the water industry since these savings result from regulations resulting in changes in behavior.

The second category, short-term behavioral conservation, employs extraordinary conservation measures. This short-term behavioral conservation could include measures such as rationing or penalty pricing used during droughts. Extraordinary conservation measures would have a significant impact on consumers, and could account for as much as a 5% reduction in retail demands. Because extraordinary conservation measures would typically only be employed during severe or extreme shortages (as defined in MWD's 1999 Water Surplus and Drought Management Plan), these measures have not been included in the 2002 SAWPA IWP, 2025 and 2050 drought year scenarios. By only treating long-term conservation as a supply source, the SAIWP is mirroring the same logic adopted by MWD's 1996 IRP.

Eventually, SAWPA member agencies may need to consider conservation measures that would involve some significant lifestyle changes. These changes may be intrusive initially; the goal, however, would be to ultimately educate consumers in the way they view water usage. One example would be to promote xeriscape (drought-proof and/or hardscape landscaping), by either providing significant incentives for consumers that landscape their homes or businesses, or disincentives for consumers that use excessive water. Implementing improved landscape management through the use of evapo-transpiration (ET) controllers and encouraging native landscaping could also diminish water use. Another possibility would be to require that all commercial and industrial buildings, and all golf courses use solely non-potable water for irrigation.

SAIWP SUCCESSES

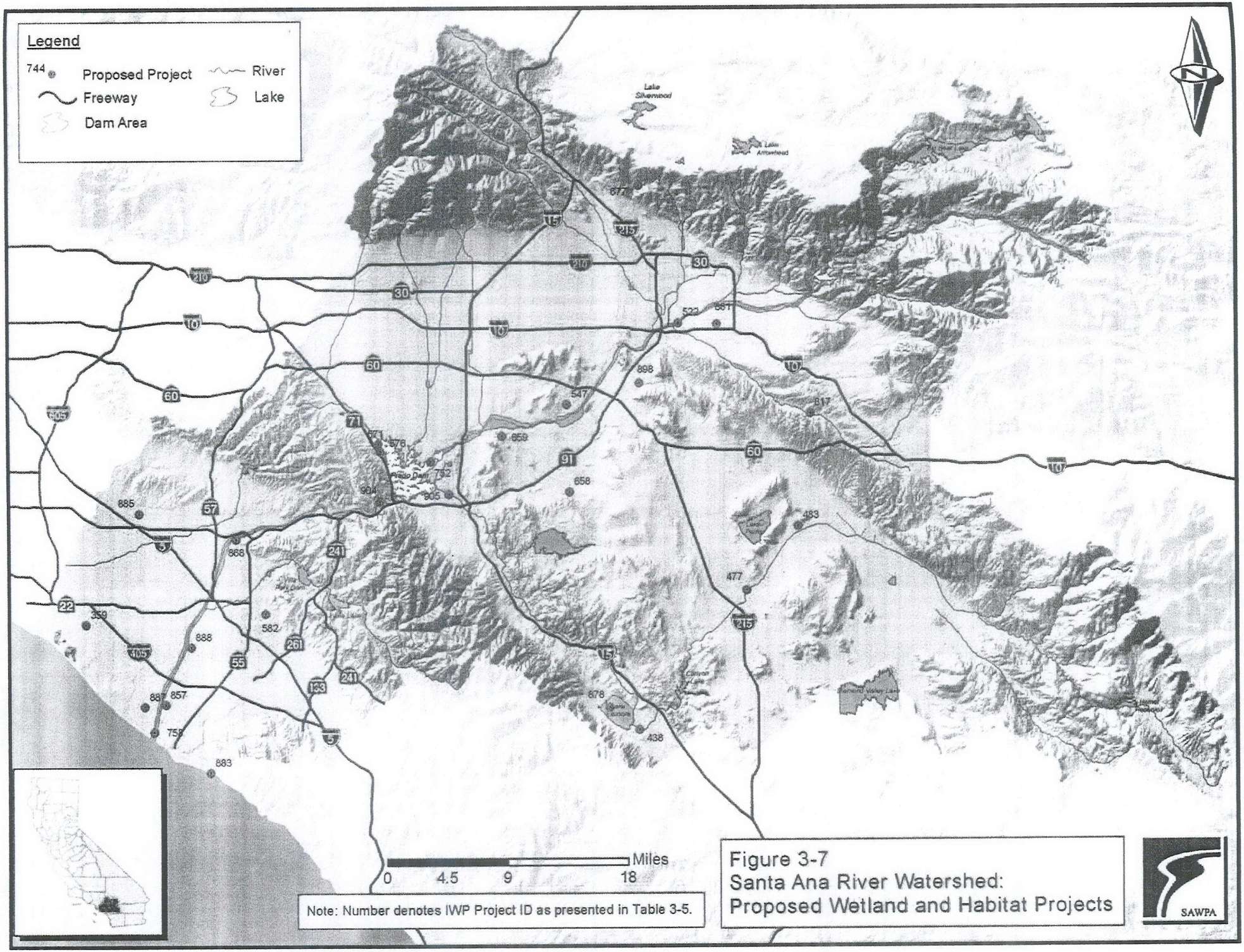


Santa Ana River Trail System.

Planning and initial construction of parts of the Santa Ana River Trail were performed in 1990. The trail is completed in Orange County and parts of Riverside and San Bernardino counties. This trail would connect important areas in the Inland Empire cities and counties, thus expanding regional access and availability to existing parks and riverfront areas, as well as providing alternative transportation and recreation opportunities.

Figure 3-8 presents a regional overview of new programs and projects proposed to further regional objectives toward expanding conservation and recreational opportunities within the Santa Ana River watershed.

A comprehensive detailed list of these newly proposed regional projects and programs follows in Table 3-6.


Legend
744 Proposed Project
Freeway
Dam Area
River
Lake
Lake Silverwood
Lake Arrowhead
Prado Dam
Lake Elsinore
Canyon Lake
Lake Perris
15
215
210
30
10
60
605
71
91
57
5
241
261
55
133
22
405
Miles
0 4.5 9 18
Note: Number denotes IWP Project ID as presented in Table 3-5.
Figure 3-7
Santa Ana River Watershed:
Proposed Wetland and Habitat Projects
SAWPA

ID#	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
888	City of Santa Ana, Public Works and Parks Recreation and Community Services Agency	Santa Ana Pilot Urban Runoff Improvement Project	Design and construct a series of dry weather diversions to divert dry weather urban runoff to the sanitary sewer system or to natural treatment systems to be developed in conjunction with available open space. Project includes removal of ornamental exotics and replacement with drought tolerant native plants and trail connections.	389,000									■	■	■	■	■	■	■	■
582	Irvine Ranch Water District	Natural Treatment System	Construct a series of treatment wetlands throughout San Diego Creek Watershed to receive flow from dry weather urban runoff, as well as small storm flows prior to reaching Newport Bay.	41,000,000									■	■			■	■		
883	County of Orange - Resources & Development Management Dept.	Serrano Creek Corridor Ecosystem Restoration Project	Restore stream habitat corridors within the El Toro Marine Corps Air Base, and connect upland and coastal habitat reserves in central Orange County to improve habitat value within the overall region, as well as improve the biological, chemical and physical function of the watershed's aquatic ecosystem. Project is designed to implement the watershed wide objectives of the larger Newport Bay-San Diego Creek Watershed Feasibility Study.	2,900,000		■	■						■			■	■	■		■
887	City of Huntington Beach	Natural Treatment System Talbert Lake Diversion Project	Divert approximately 3-5 million gallons per day of urban runoff from the Wintersburg Channel through pre-treatment devices and into a 15-acre area for treatment.	4,500,000		■	■						■	■	■	■	■	■		
758	County of Orange - Resources & Development Management Dept.	Orange Coast River Park	Construct treatment wetlands, bioremediation ponds and onsite storage within the 1,000 acre Orange Coast River Park along the mouth of the Santa Ana River. This multi-objective project includes land owned by the Cities of Costa Mesa and Newport Beach, the County of Orange, Orange County Sanitation District, Army Corps of Engineers, California State Parks, and private landowners.	1,500,000		■	■						■			■	■	■		

Table 3-5 (8 pages)

ID#	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
EMWD Member Agency Area Projects																				
483	San Jacinto River Watershed Council	Habitat restoration -Mystic Lake	Restore habitat for one linear mile of the flood control channel located near Mystic lake in the San Jacinto watershed.	60,000														X		
IEUA Member Agency Area Projects																				
571	Inland Empire Utilities Agency	Magnolia Channel	Detain the 25-year storm event and increase local storage capacity through the re-establishment of the natural drainage corridor, the creation of managed wetlands, and lowering the elevation of the park to increase capacity. Project will directly restore approximately 1,500 linear feet of stream bank and 12 acres of native riparian habitat.	1,515,000									X	X			X	X		
576	Inland Empire Utilities Agency	Chino Creek	Increase local storage capacity, through the re-establishment of the natural drainage corridor, the creation of managed wetlands, as well as, the eradication of invasive species.	10,000,000		X	X						X	X	X	X	X	X	X	
OCWD Member Agency Area Projects																				
359	County of Orange - Resources & Development Management Dept.	Constructed Wetlands - Bolsa Chica Channel	Construct treatment wetlands to improve water quality in the Bolsa Chica Channel and its downstream waters: Anaheim Bay, Huntington Harbour, and Seal Beach National Wildlife Refuge. Project includes a detention system to hold and pretreat flow and a vegetated area to polish water quality through plant uptake and ultraviolet exposure. The Project is included in the Anaheim Bay-Huntington Harbour-Bolsa Chica Watershed Management Initiative (WMI) chapter for SWRCB-Region 8.	2,000,000								X	X	X			X	X	X	X
752	Orange County Water District	Prado River Road Wetlands Expansion	Construct large-scale treatment wetlands in the flood plain of the Santa Ana River as it enters the Prado Basin upstream of the River Road crossing. Project develops 194 acres on property owned primary by OCWD and the U.S. Army Corps of Engineers.	6,000,000		X	X					X	X			X	X	X	X	X

ID#	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
857	City of Costa Mesa	Fairview Park Wetlands & Riparian Habitat Restoration	Design and construct wetland treatment system to remove pollutants from dry weather flows and provide water for development and maintenance of approximately 20 acres of riparian habitat in Fairview Park adjacent to the Santa Ana River and treat diverted dry weather flow from the Greenville-Banning Pump Station. Project includes water delivery system design from the discharge at Greenville-Banning Pump Station; delivery system design from Fairview Channel used during storms for diversion to the system; wetlands system designed to treat urban runoff and discharge along the Placentia Drain currently located in Fairview Park, and through Talbert Park.	5,900,000	X	X	X	X					X			X	X	X		
868	Orange County Water District	Subsurface Flow Constructed Wetlands for Improved SAR Water Quality	Two year project to compare Subsurface Flow Constructed Wetlands to the commonly used Free Water Surface constructed wetlands to determine the best operating conditions for different source waters. The parameters to be tested include nitrate, orthophosphate, BOD and Fecal/Total Coliform bacteria. Subsurface Flow Constructed Wetlands are gravel-based systems that have been studied for 25 years for treating a variety of surface and waste waters. Subsurface Flow Constructed Wetlands occupy a far smaller geographic footprint and provide far more efficient and reliable capacity for removing nitrates, phosphates, heavy metals and trace organic matter. Subsurface Flow Constructed Wetlands wetland cells have been constructed at the OCWD Field Research Laboratory in Anaheim to determine the best operating conditions to yield the maximum amount of water treated per day with the optimal removal of nutrients. Using storage tanks adjacent to the test cells, it is possible to simulate different types of surface water such as storm water or nutrient rich urban runoff. In the future, these pock	100,000									X						X	

ID#	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
904	Orange county Coastkeeper	Inland Empire Recreational Use and Urban Runoff Source Program	Project will identify recreational sites and determine the level of recreational use along with point and nonpoint sources of runoff to major creeks and the Santa Ana River in the Chino Basin, Middle, and Lower Santa Ana River Watershed Management Areas. At identified recreational sites water samples will be taken and analyzed for bacteria at regular intervals to determine if water quality standards are being met to support the identified recreational uses. At runoff sites water samples will be taken and analyzed for common contaminates such as bacteria, nutrients, sediment, and pesticides. The runoff sites will also be documented and mapped and if possible flow will be measured.	150,000									■			■		■	■	■
905	Orange county Coastkeeper	Temescal Creek Watershed Water Quality Monitoring Project	Project will monitor all aspects of the Temescal Creek watershed over a period of two years to determine the impact of on the creek of the rapid residential and commercial development taking place in the watershed. The project will focus on changes in flow, nutrient loads, pesticides and other components of urban runoff to track any changes in water quality due to development in the watershed.	150,000									■					■	■	■
885	County of Orange - Resources & Development Management Dept.	Coyote Creek Watershed Management Plan	Develop a multi-objective, integrated, highly collaborative Coyote Creek Watershed Management Plan to maintain, restore and enhance ecosystem functioning. In partnership with the Los Angeles District of the U.S. Army Corps of Engineers (Corps), the County of Orange will examine existing conditions, identify opportunities and constraints, evaluate alternative projects and management measures and recommend solutions.	3,400,000															■	■

ID#	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
SAWPA Regional Projects																				
547	Santa Ana Watershed Project Authority	Arundo Removal and Habitat Restoration	Project to remove Arundo donax, giant cane, from the Santa Ana Watershed and to restore riparian habitat. From the perspective of water supply, most observers estimate that if Arundo were removed from the watershed and replaced with native vegetation some 10,000 AF of water could be made available for other uses. Project requires continued maintenance of areas where Arundo has been removed, and area monitoring.	6,000,000					X				X	X	X	X		X	X	X
659	Santa Ana Watershed Project Authority	Native and Treatment Wetlands Program	Program to develop and fund wetland projects in Orange, Riverside and San Bernardino Counties in areas where improvements to water quality are most critical. Initial planning for these projects was completed in the WEH portion of the 2002 SAWPA IWRP.	30,000,000									X				X	X		
658	Santa Ana Watershed Project Authority	Watershed Project Planning- Environmental and Habitat	Multiyear feasibility study directed toward implementing projects which would 1) allow further invasive species removal, 2) provide habitat linkages, 3) improve the quality of surface water, 4)identify areas where sedimentation and erosion are problematic, and 5) complete the Santa Ana River Trail, a regionally important recreation/alternative transportation corridor. The Upper Santa Ana River Feasibility study would be a collaborative three year effort between the US ACOE and SAWPA planning staff.	2,500,000															X	X

ID#	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
SBVMWD Member Agency Area Projects																				
522	San Bernardino County Department of Public Works (Regional Parks)	Santa Ana River Wetlands (Mission Zanja Creek Channel)	Construct wetlands on the Santa Ana River at the confluence of the Mission Zanja Creek Channel in the City of San Bernardino. The project will entail the removal of non-native vegetation and the planting of native species. Interpretive signage, boardwalk and the bike path will provide access and educational opportunities for trail users.	800,000								■			■	■	■			
677	Foundation for California State University, San Bernardino	CSUSB Canyon Conservation Center and Watershed Management	Perform hydrologic assessment of the springs and watershed hydrology for the proposed 40-acre CSUSB Canyon Conservation Center in Devil Canyon. This Center will be an environmental education facility offering on-site watershed education programs to disadvantaged K-12 students, their teachers, and university students. The Center will be managed by the CSUSB Environmental Education Resource Center and its Network for Environmental Science Teaching (NEST), in association with the CSUSB Water Resources Institute and the San Bernardino National Forest.	263,292														■	■	
817	City of Redlands	San Timoteo Creek Aquatic Restoration	Establish a comprehensive planning framework within the 125 square mile watershed area of San Timoteo Creek and its tributaries. Implementation would include watershed identification, assessment, acquisition, maintenance and enhancement of wetlands and wildlife habitat.	5,000,000		■	■					■				■	■	■		

ID#	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
881	San Bernardino County Museum	San Bernardino County Museum Santa Ana River Biological Resource Study	Study to compile and evaluate biological resource data for the Santa Ana River drainage area in County of San Bernardino. Data would be presented in a geospatial format over the web and provided in a metadata context via the State Clearing House node. Project will enhance the integration of biological resources into project and planning activities occurring in the project area. Data would be accessible by all entities with present or future activities in the project area.	8,960,000															X	X
WMWD Member Agency Area Projects																				
477	Regional Conservation Authority of Western Riverside County	San Jacinto River Fish and Wildlife Conservation and Enhancement Project	Acquire lands (approx. 1200 acres) within the San Jacinto river floodplain for the purposes of enhancing fish and wildlife habitat through conservation of wetlands and other habitats and improving access to open space and recreational opportunities within the riparian corridor. The Regional Conservation Authority (RCA) is working with multiple partners, including the CA Dept. of Fish and Game and US Fish & Wildlife Service. The project supports the RCAs efforts to implement a comprehensive multiple species habitat conservation plan for western Riverside County. The San Jacinto River corridor is an important link in the MSHCP because it supports key populations of threatened and endangered species and lends itself to recreational opportunities as well.	13,400,000									X			X	X	X		

ID#	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
898	Riverside Land Conservancy	Upper Springbrook Wash Acquisition and Restoration Program Phase I	Restore riparian habitat and water reclamation pools to water quality of stream flow as it heads into Fairmount Park and the Santa Ana River. Project would include the purchase of approximately 5 acres of land along the middle reaches of the Springbrook Wash. Project incorporates habitat restoration, recreation, stormwater capture, and education that can be replicated at varying scales along other reaches of the creek. It is a first phase effort to kick-off current planning to restore and provide trail recreation along the length of Springbrook Wash.	5,000,000		■						■	■	■	■	■	■			■
438	Lake Elsinore & San Jacinto Watersheds Project Authority	Lake Elsinore Back Basin Wetlands Rehabilitation Project	Construct treatment wetlands increasing the existing wetland area by 70% and provide recycling of lake water by circulating existing lake water through the wetlands. Project will include a system of nature trails and a visitors center to provide information about the ecological importance of the wetlands system.	4,627,000								■	■		■	■	■			■
878	Lake Elsinore & San Jacinto Watersheds Project Authority	Lake Elsinore Fishery Enhancement Project	Lake Elsinore Fishery Enhancement Project includes improvements to the fish community by developing a more diverse forage base, the addition of predator species to increase the predation on young carp, establishing emergent and aquatic vegetation in shallow waters along the shorelines of the lake to provide gamefish spawning and rearing habitat, managing terrestrial vegetation along the lake margin to provide for cover for gamefish spawning and rearing habitat when water levels rise and provide structural habitat diversity and improved recreational fishing habitat through the addition of physical structures in the lake, placement of gravel substrate for spawning beds and shoreline relief diversity.	400,000							■				■		■	■	■	■

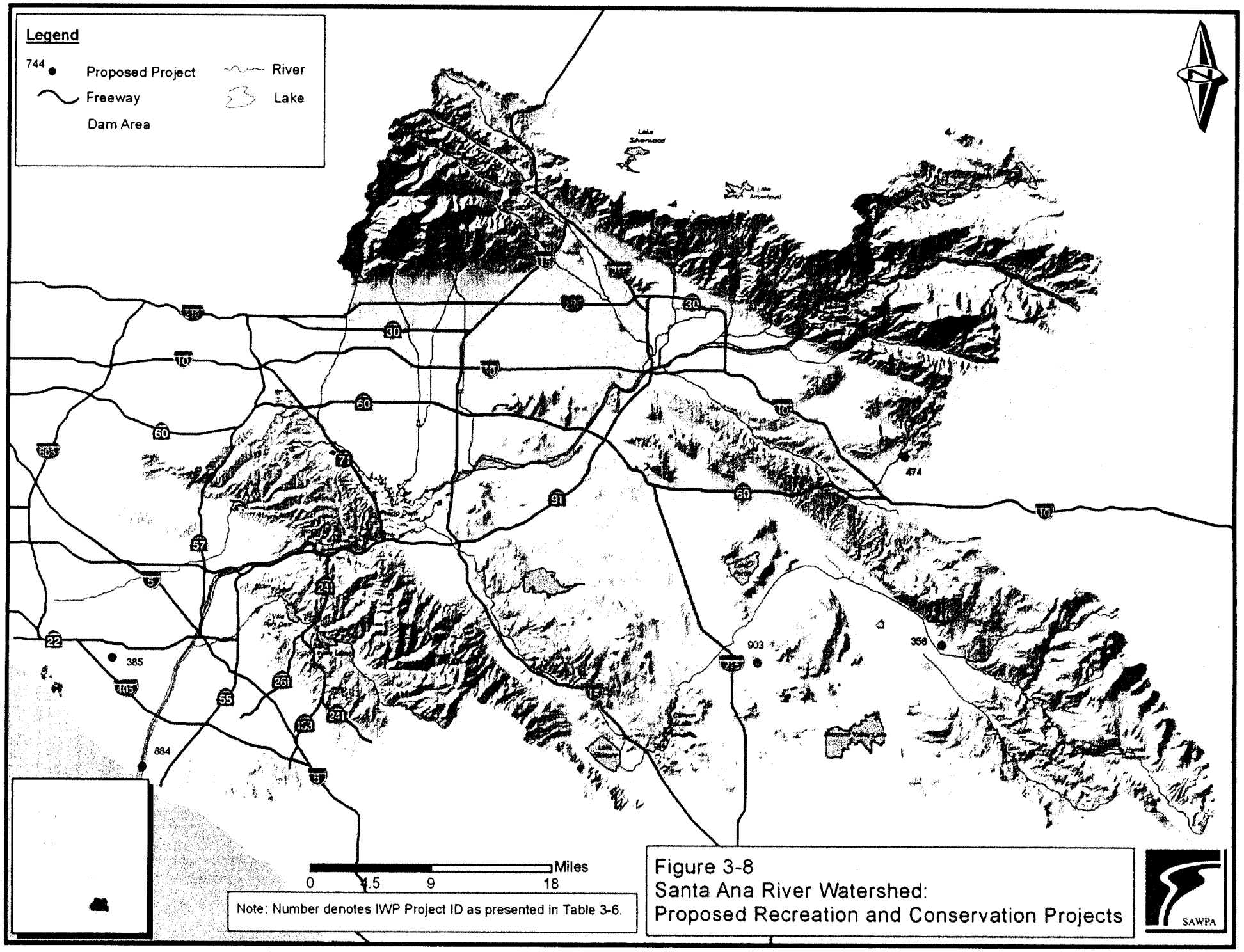

Legend
744
Proposed Project
River
Freeway
Lake
Dam Area
Miles
0
4.5
9
18
Note: Number denotes IWP Project ID as presented in Table 3-6.
Figure 3-8
Santa Ana River Watershed:
Proposed Recreation and Conservation Projects
SAWPA

Table 3-6 (2 pages)

ID#	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
EMWD Member Agency Area Projects																				
903	Eastern Municipal Water District	California Friendly Residential Irrigation System Rebates		207,328	X				X										X	X
356	San Jacinto River Watershed Council	Watershed management and planning	Develop a Management Plan for the San Jacinto watershed to promote stewardship and preserve watershed health. Study involves the collection of data, research, monitoring and outreach performed through a coordinated effort of stakeholder partners	160,000															X	X
OCWD Member Agency Area Projects																				
884	Friends of Harbors, Beaches and Parks (see Project 758)	Orange Coast River Park General Development Plan	Develop a detailed action plan for 1000 acre river park located at the mouth of the Santa Ana River including lands owned and individually managed by Costa Mesa, Huntington Beach and Newport Beach; Orange County; several regional, state and federal agencies; and a few private entities. The project includes plans for the restoration of riparian corridor with native plants, and restoration of coastal salt marshes and dunes. The project will complete master planning for those Orange Coast River Park lands which do not have approved master plans in place and develop a detailed implementation plan for the Orange Coast River Park. Plan will include a series of integrated tasks forming an action plan of next steps for each of the multiple land areas that form the Orange Coast River Park.	720,000									X	X	X	X	X	X	X	X

ID#	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
385	County of Orange - Resources & Development Management Dept.	Westminster Watershed Management Plan	Develop watershed management plan to protect 2000+ acres of some of Southern California's most valuable wetlands as well as a significant portion of the groundwater basin for northern Orange County. Plan will create a collaborative, multidisciplinary process for the system-wide evaluation of the watershed and the development of strategies for: ecosystem restoration including nonnative species removal, riparian revegetation, terrestrial and aquatic habitat, wetlands protection, and development of functional wildlife corridors; flood damage reduction; sediment management, stream bank and stream grade stabilization, and erosion protection; surface and ground water quality, including TMDL compliance; water supply and re-use; and improved quality of life through education, recreation, and aesthetic opportunities.	5,600,000															■	■
SBVMWD Member Agency Area Projects																				
474	Beaumont Cherry Valley Water District	Development of Two Community Park Areas Related to Overall Program, WRDP Phase 5	Phase 5 includes development of two community park areas along Noble Creek. One park will be located on the Phase 2 recharge facilities; the second will be adjacent to the Phase 3 constructed wetlands with educational signage. Both parks will include trials and other amenities.	8,100,000	■	■	■	■					■	■	■	■	■	■	■	■

Part 4: Recommended Regional Implementation Plan

A. Introduction

Previous sections of this report presented the elements of SAWPA's Integrated Regional Water Management Planning process, as well as an overview of regional issues and the suite of regional project proposals supporting the Plan. This section describes the decision making phase of the IRWMP process, and summarizes the recommended regional resource strategy. As stated earlier, SAWPA's Mission is to lay out an adaptive approach to make the region entirely self sufficient during drought cycles, thereby firming up the regions ability to assure a stable economy, while improving water quality, and also allowing more of the State's scarce water resources to be allocated to wildlife and agriculture during those times.

The suite of water management strategies and projects proposals included in the Plan consist of a complementary mix of investments in water resource infrastructure. This includes the construction of facilities and infrastructure to capture, move and treat the watershed's precious water resources. Within the watershed agencies have traditionally focused their efforts toward the development and expansion of storage capacity. In recent years there has been a greater emphasis toward the development of water recycling opportunities through the development desalination facilities and infrastructure within the region. In addition, there are efforts within the watershed to develop infrastructure to connect water agencies to enable the transfer of water throughout the watershed.

This Plan also considers project proposals relating to habitat protection, restoration, and enhancement. These efforts are intended to reflect the economic benefits relative to natural systems, recreational opportunities and reduction of conflict caused by species extinction, among other concerns. In particular, the protection, enhancement, and restoration of riparian stream zones, and wetlands will reduce the need for costly new water treatment plants, provide high quality drinking water at reduced cost, reduce costs of flood damage, and improve water quality for aquatic ecosystems and human recreation.

When considering the need for a comprehensive watershed plan for the Santa Ana River Watershed, one need not look further than attempting to coordinate the implementation of these various objectives without such a plan.

B. Regional Priorities

The broad mix of proposed projects presented in this plan represent today's priorities for member and sub-member agencies, as well as other various resource agencies operating within the watershed. In essence, these projects reflect the current needs, as well as, the critical milestones of many regional planning efforts and not the overall comprehensive long term objectives of regional agencies. The process for identifying preferred project alternatives, from the suite of project proposals is as follows:

Project Coordination:

The process to coordinate the needs of regional agencies/organizations into to a single comprehensive regional strategy was initiated by SAWPA through a watershed wide "Call for Projects", a process first instituted by SAWPA in 2000 in preparation of Proposition 13 Grant Program. Through this process, agencies and other organizations throughout the watershed are solicited to submit proposals for watershed projects to be considered for inclusion in SAWPA's 2005 IWP update, as well as, for consideration for funding through Chapter 8 of Proposition 50, the Integrated Regional Water Management Grant Program. A complete list of the agencies and organizations within the watershed solicited by SAWPA is included as Appendix J.

Participation in SAWPA's "Call for Projects" required applicants to complete an on-line application. The application was initially made available to the public in March 2003 following the authorization of Proposition 50 by the California

Legislature. In August 2004, following the release of the draft grant program guidelines a second request was made for additional projects and project updates. Regardless of submittal deadlines, applicants were able to submit additional projects and project updates through February 2005. A copy of the On-Line application form available to the public is included as Appendix K.

The 2005 IWP Update includes 185 updated or new projects from 50 agencies and organizations throughout the watershed supporting SAWPA's vision for a sustainable Santa Ana River Watershed. The process to assemble these projects into to a single comprehensive regional database required a great deal of coordination, as well as, communication between agency staffs. This was accomplished through multiple approaches with coordination conducted loosely upon SAWPA's five member agency service areas. Smaller watershed agencies located within a member agency service area were contacted to conduct meetings to coordinate their efforts with other member agencies within a SAWPA agency. Agencies or organizations supporting a project not affiliated with a member agency or lying outside of any member agency service area were contacted by SAWPA and meetings were held to discuss and coordinate the project goals with one of the five SAWPA member agencies. SAWPA staff worked closely with member agency staffs to compile each of the individual projects into a comprehensive database. Figure 4-1 presents a basic overview of the watershed divisions and the participating agencies.

Project Prioritization:

The prioritization of projects within the plan is a complex and constantly evolving task. This lends itself in part to the complex nature of the Santa Ana River Watershed itself, which is prone to significant shifts in annual rainfall and frequent drought, in addition to issues related to the rapid growth within the watershed, especially in the Inland Empire area as the region transitions from an agricultural to an urban residential landscape. The challenge for SAWPA was to develop a process to evaluate a broad base of project proposals, while considering numerous regional and State priorities, as well as, a host of technical criteria.

SAWPA initiated this process by reviewing the various regional plans and communicating with numerous water agencies, environmental organizations, as well as, RWQCB staff to gain a firm understanding of regional needs. Therefore, the approach employed by SAWPA to prioritize the 185 project proposals was performed as follows:

Step 1: Identify Dominant Project Goal:

Identify the dominant project goal, to reflect the issues of greatest concern to those agencies and organizations ready to move forward with projects. A review of the 185 proposals revealed the following mix of projects:

- 24% infrastructure supporting water resources;
- 16% infrastructure supporting groundwater resources;
- 13% facilities supporting the treatment or desalination of water resources;
- 12% facilities supporting the treatment of groundwater resources;
- 6% infrastructure supporting the capture of stormwater or flood control;
- 6% treatment wetlands;
- 4% restoration of natural habitat and the removal of invasive species;
- 1% water conservation;
- 1% recreational opportunities, as well as,
- 17% numerous studies to support the development and protection of water resources.

Step 2: Identify Key Watershed Management Elements:

Identify key watershed management elements presented with the mix of projects to reflect our ability to present an integrated regional project mix. A review of the 185 project proposals revealed the following breakdown of watershed elements to be addressed, presented in Table 4-1.

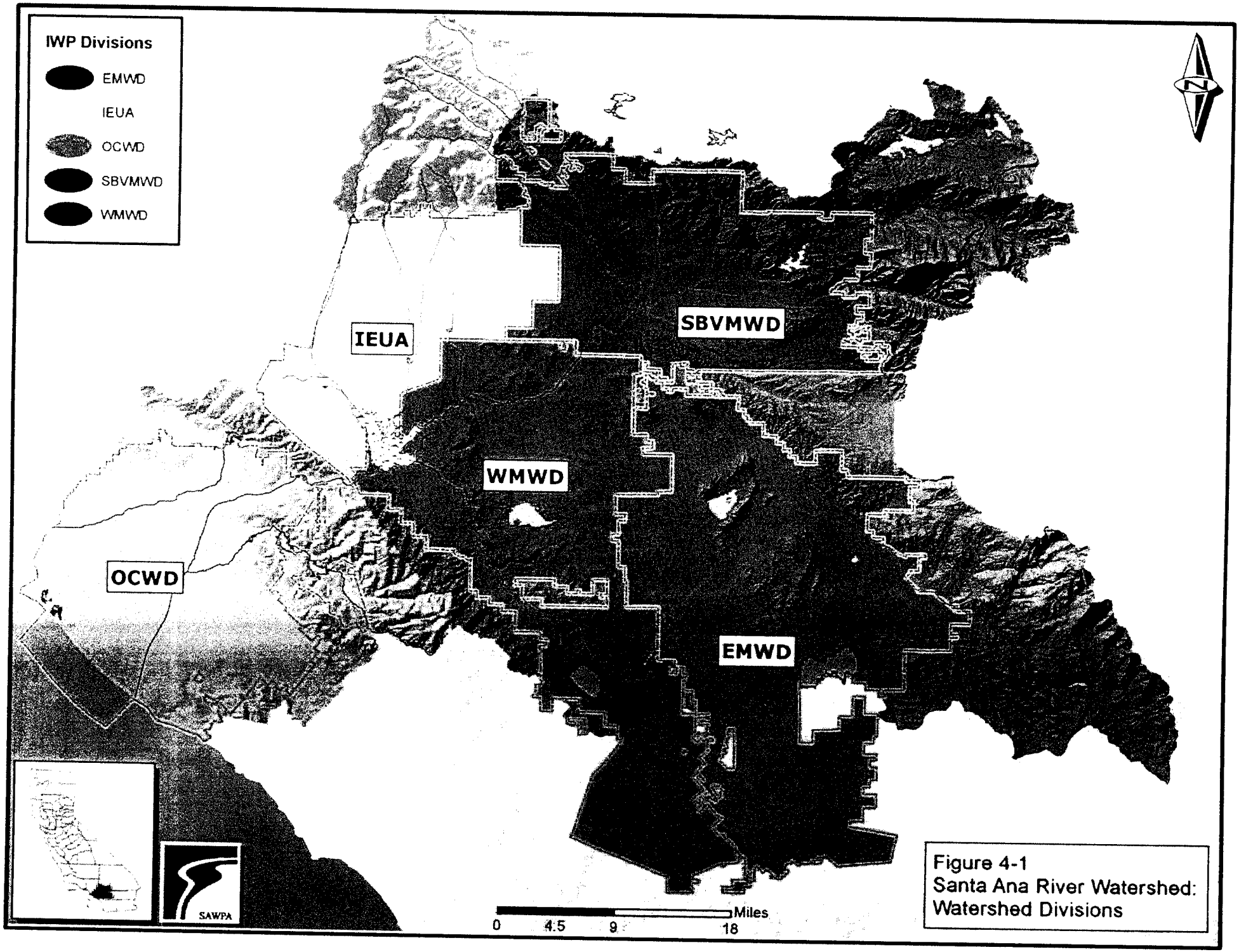


Figure 4-1
Santa Ana River Watershed:
Watershed Divisions

Table 4-1 Watershed Management Elements Present

Watershed Management Element	# of Associated Projects
Import Water	66
Groundwater Management	110
Conjunctive Use	58
Water Recycling	61
Water Conservation	3
Water Transfer	6
Surface Storage	8
Water and Wastewater Treatment	62
Non-Point Source Pollution Control	42
Storm Water Capture and Management	49
Flood Management	31
Recreation and Access	30
Wetlands Enhancement and Creation	30
Environmental and Habitat Protection and Improvement	37
Watershed Planning	70
Disadvantaged Community	183

Step 3: Score Project Attributes:

In addition to identifying a dominant goal and key watershed management elements, SAWPA also developed a set of physical or technical parameters to evaluate each and rank project. These parameters were developed using information extracted from the project proposal applications requested by SAWPA during its "Call for Projects". Parameters were designed to represent or act as surrogates for the various ranking criteria included in the Chapter 8 of Proposition 50, Integrated Regional Watershed Management Grant Program guidelines. Key parameters included:

- **Cost/Benefit** – represents the relative dollar cost of developing water resources within the Santa Ana Watershed;
- **Matching Fund** – represents the agencies ability to support the cost of the proposed project;
- **Project Readiness** – represents the relative ability of the proposed project to construct and complete the necessary work within the proposed grant period;
- **Multiple Objectives** – represents the ability of the proposed project to address multiple watershed management elements; and
- **Disadvantaged Communities** – represents the ability of the proposed project to support disadvantaged communities.

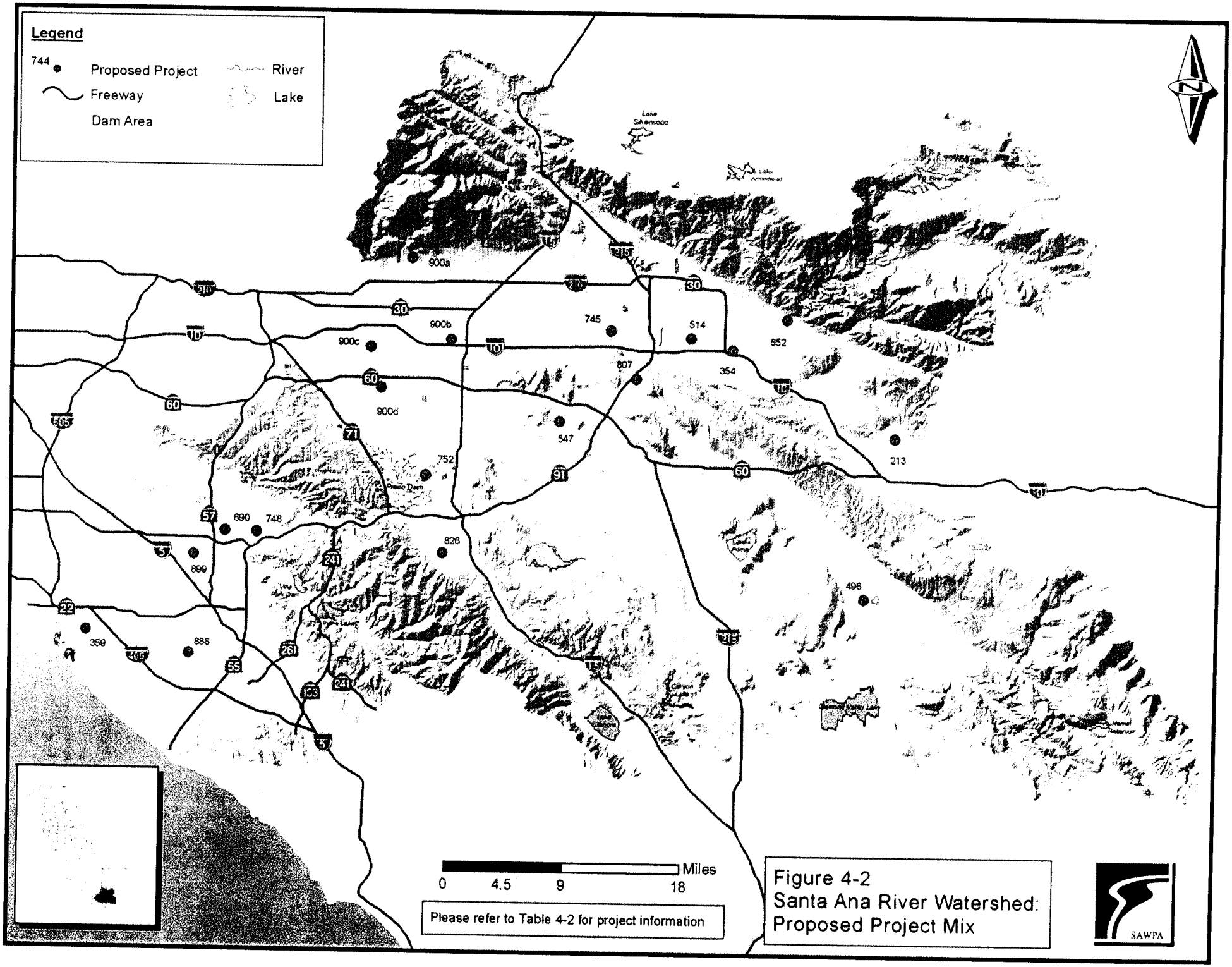
Step 4: Perform Project Ranking:

Project proposals were scored and ranked using the previously described project parameters. The resulting project mix was designed to represent the overriding regional priorities and needs within the watershed as expressed through the various regional and State plans. Due to the great number of projects to be included in the plan, as well as, the broad range water related issues to be addressed, SAWPA has considered a tiered approach to project prioritization. Figure 4-2 presents a regional overview of the Tier I regional priority programs and projects proposed to further SAWPA's regional management objectives within the Santa Ana River watershed. This is followed by Table 4-2, which lists each of the Tier I regional priority projects and programs. The projects and programs of the lower Tier II are the remaining projects and programs listed in Part 3.

Step 5: Additional Stakeholder Outreach and Review:

Multiple public meetings and hearings were held among the SAWPA member agencies and their constituents, as well as, SAWPA staff and project proponents to determine the best suite of priority projects to benefit the watershed and State. Meetings were also held with the Santa Ana Regional Water Quality Control Board staff to review the preliminary list and obtain input and suggestions on meeting water quality needs in balance with other resource goals as proposed in the Prop 50 Chapter 8 IRWMP guidelines. This feedback was used to modify and refine the final Tier I priority list of projects proposed for funding.

Feedback from the stakeholder meetings indicated that the funding need here in the Santa Ana


Legend
744 Proposed Project
Freeway
Dam Area
River
Lake
900a
900b
900c
900d
745
514
652
807
354
547
213
752
890
748
826
899
496
359
888
Miles
0 4.5 9 18
Please refer to Table 4-2 for project information
Figure 4-2
Santa Ana River Watershed:
Proposed Project Mix
SAWPA

Watershed far exceeds available funds from the Proposition 50 grant program. Recommendations were made that if there are any projects under the Tier I priority project list that are deemed by State review staff to be inadequate for any reason to qualify for the Proposition 50 funding, ample backup projects exist in the watershed that can be quickly moved up from the Tier II set of projects to replace the deficient project to assure that as much of the State funding under this program is directed to the Santa Ana Watershed as possible.

Step 6: Finalize Tier I Priority Project List:

Upon incorporation of all feedback, the final list of projects was presented to stakeholders at the SAWPA Board meeting held on March 8, 2005 and accepted for finalization. The priority list was then incorporated into the SAWPA Plan Update as a final chapter with detailed descriptions of each of the projects.

The California Water Plan is updated every five years and provides information on water supply and uses. The plan correctly identifies a "roll up" approach for water resource planning. Local agencies work together to provide regional information that is then pooled with data provided by other regions to provide a state-wide picture. Data collected in this manner is more robust than data collected using a "top down" approach and therefore more useful to planners. The Water Plan has been crucial in helping to understand and identify water issues in the Santa Ana Watershed. A similar approach has been employed in regional planning efforts by SAWPA. The SAWPA watershed planning effort enhances local efforts by working with local agencies in identifying linkages and opportunities to developing projects with regional benefit based on data and ideas generated at the local level.

Other Prop 50 Chapter 8 Submittals:

SAWPA is aware of and has coordinated with four other planned Prop 50 Chapter 8 submittals – three of which are for the Planning Grant Program and one is for the Implementation Grant Program. SAWPA has provided public information and has attended coordinated meetings for each of these efforts. Project data and information included in their submittals have been incorporated into the SAWPA IRWMP Update. Descriptions of these submittals are shown below:

1. Project Lead: San Bernardino Valley Municipal Water District and Upper Santa Ana Water Resources Association (USAWRA) – Planning Grant

SBVMWD, a SAWPA member agency, and a member agency of the Upper Santa Ana Water Resources Association, was asked to act as the Regional Agency for the purposes of preparing an IWRMP and as the lead agency responsible for applying for Proposition 50 Chapter 8 Planning and Implementation Grant funding. SBVMWD is a participating agency in the Upper Santa Ana Water Resources Association (Association), a group of water agencies, city and county representatives, and stakeholders located in the Upper Santa Ana River watershed. The Association meets regularly to discuss regional water and resource management issues. SBVMWD and other members of the Association that are interested in participating in the development of the IRWM Plan have formed a Regional Water Management Group to prepare an IRWM Plan. Interest in developing the IRWM Plan was expressed not to compete with the SAWPA IRWM Plan but rather as a supplement to the existing SAWPA IRWM Plan with further in-depth planning for the Upper Santa Ana Watershed. It is their hope that through further plan development for the area, additional funding resources from Prop 50 Chapter 8 future funding cycles may become available.

The Regional Management Group will be responsible for the development of the IRWM Plan including public outreach, oversight and review of the draft plan, briefing their governing boards about IRWM Plan development, obtaining its adoption, and coordinating with the California Department of Water Resources and the State Water Resources Control Board. While others may elect to join later, the Regional Management

Group is currently made up of representatives from following agencies:

- San Bernardino Valley Municipal Water District
- City of Redlands
- West Valley Water District
- East Valley Water District
- City of San Bernardino
- Water Resources Institute of California State University San Bernardino
- Yucaipa Valley Water District
- Bear Valley Water District
- City of Riverside
- Western Municipal Water District of Riverside County

2. Project Lead: WMWD – Planning Grant Submittal

WMWD, a SAWPA member agency is also submitting a planning grant application with the goal to develop a more in-depth planning guide for the WMWD service area.

Again, interest in developing the WMWD IRWM Plan was expressed not to compete with the SAWPA IRWM Plan but rather as a supplement to the existing SAWPA IRWM Plan. It is their hope that through further plan development for the area, additional funding resources from Prop 50 Chapter 8 future funding cycles may become available.

3. Project Lead: San Jacinto River Watershed Council – Planning Grant Submittal

The San Jacinto River Watershed Council, is a multi-agency non-profit group of watershed stakeholders within the San Jacinto River Watershed previously described under Collaboration Section of Chapter I of this report. SAWPA, as a board member of the Council, has coordinated with the staff of the Council in the plan development. It is the desire of this Council to submit a separate planning grant application for Prop 50 Chapter 8 under the Planning Grant program for the development of an IRWM Plan to further supplement the SAWPA IRWMP. This plan, The San Jacinto Watershed Component of the Santa Ana Integrated Watershed Plan will seek to provide more in depth planning for the San Jacinto River Watershed to supplement the SAWPA planning efforts. Further, the plan is being developed to seek future funding implementation grant funds under Prop 50 Chapter 8 future funding cycles. Several proposed projects which were intended to assist stakeholders with TMDL compliance for the San Jacinto River Watershed, a subwatershed to the Santa Ana Watershed, have been included in the SAWPA IRWM Plan.

4. Project Lead: Rancho California Water District – Planning Grant Submittal

Rancho California Water District, located within the Santa Ana River Watershed has submitted a planning grant application to prepare the South West Riverside Integrated Watershed Resource Plan. This plan continues the efforts of the Santa Margarita Watershed Study, prepared by Rancho California Water District in conjunction with the USBR and EMWD. The goal of this plan is to prepare a more in-depth planning guide for the implementation of projects to expand conjunctive use and develop the infrastructure to export brine from the region. Again, interest in developing the IRWM Plan was expressed not to compete with the SAWPA IRWM Plan but rather as a supplement to the existing SAWPA IRWM Plan. It is their hope that through further plan development for the area, additional funding resources from Prop 50 Chapter 8 future funding cycles may become available.

5. Project Lead: City of Riverside Parks & Recreation Department – Planning Grant Submittal

The City of Riverside Parks & Recreation Department has submitted a planning grant application to prepare the Middle Santa Ana Watershed Management Plan. The objective of this plan is to develop and implement projects to create and expand riparian habitat along the

Table 4-2 (6 pages)

ID#	SAWPA Member Agency Area	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
652	SBVMWD	San Bernardino Valley Water Conservation District	Seven Oaks Dam Borrow Pit Groundwater Recharge and Habitat Restoration Project	Construct approximately 7 groundwater recharge basins using approximately 200 acres of land in the Seven Oaks Dam pervious borrow pit to expand groundwater recharge and develop supporting native habitat. Project includes construction of canals, pipes, roads, and storage facilities, and re-vegetate the intervening land as native habitat.	7,000,000	X	X	X		X			X	X	X	X		X	X	X	X
911	IEUA	Inland Empire Utilities Agency	Recycled Water Line; Etiwanda Pipeline South Expansion	Project is a 24 and 36 inch pipeline extending on Etiwanda Avenue in the Eastern portion of the City of Ontario. The pipeline will deliver recycled water to direct reuse customers, primarily industry, which currently use water imported through the state water project. The deliveries from this project will be 1,000 acre-feet annually.	1,950,000	X	X	X	X	X					X						X
913	IEUA	Inland Empire Utilities Agency	Recycled Water Line; Chino and Chino Hills Pressure Zone 800 Improvements	Project will provided recycled water distribution pipelines and 10 million gallons of storage to supply 4,500 acre-feet of recycled water in the cities of Chino and Chino Hills. The 3.5 miles of pipelines will be 30 and 36-inch diameter.	8,900,000	X	X	X	X	X					X						X
912	IEUA	Inland Empire Utilities Agency	Recycled Water Line; Euclid Avenue Interconnection and Reservoir	Project consists of a 7 mile, 20-inch diameter pipeline on Euclid Avenue, a 5 million gallon storage reservoir, and a 2 mile, 20-inch diameter pipeline connecting the reservoir to the distribution system. This project is located in the Northwest portion of the City of Ontario with the reservoir located in the City of Montclair. The project will deliver 6,000 acre-feet of recycled water annually to direct reuse customers in the Cities of Ontario, Montclair and Chino.	11,700,000	X	X	X	X	X					X						X

ID#	SAWPA Member Agency Area	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
359	OCWD	County of Orange - Resources & Development Management Dept.	Constructed Wetlands - Bolsa Chica Channel	Construct treatment wetlands to improve water quality in the Bolsa Chica Channel and its downstream waters: Anaheim Bay, Huntington Harbour, and Seal Beach National Wildlife Refuge. Project includes a detention system to hold and pretreat flow and a vegetated area to polish water quality through plant uptake and ultraviolet exposure. The Project is included in the Anaheim Bay-Huntington Harbour-Bolsa Chica Watershed Management Initiative (WMI) chapter for SWRCB-Region 8.	2,000,000								X	X	X			X	X	X	X
752	OCWD	Orange County Water District	Prado River Road Wetlands Expansion	Construct large-scale treatment wetlands in the flood plain of the Santa Ana River as it enters the Prado Basin upstream of the River Road crossing. Project develops 194 acres on property owned primary by OCWD and the U.S. Army Corps of Engineers.	6,000,000		X	X					X	X			X	X	X	X	X
910	IEUA	Inland Empire Utilities Agency	Recycled Water Line, San Sevine and Etiwanda Recharge Basins	Project consists of approximately 14 miles of recycled water pipelines ranging from 16 to 36 inches in diameter. The project also includes 10 million gallons of recycled water storage to meet daily operational flow needs. The project is located in the northwest portion of the City of Rancho Cucamonga in a alluvial area prime for groundwater recharge. Recycled water deliveries or yield from this project will be 7,500 acre-feet annually.	19,500,000	X	X	X	X	X					X						X
690	OCWD	Orange County Water District	La Jolla Street Recharge Basin	Create an additional 9,000 AFY of groundwater recharge along the Santa Ana River through the development of the La Jolla Street property, an area approximately 10 acres in size in the City of Anaheim.	13,000,000	X	X	X				X	X		X					X	X

ID#	SAWPA Member Agency Area	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
213	SBVMWD	Beaumont Cherry Valley Water District	Little San Gorgonio Creek and Noble Creek Naturalization, WRDP Phase 1	The District's Water Resource Development Program (WRDP) is split into five phases. Phase 1 includes development of facilities along Little San Gorgonio Creek to capture stormwater flows, desilt the flows, and transfer flows to the Phase 2 Recharge Facilities/Community Park (RF/CP). Phase 1 also includes naturalization of Noble Creek on the RF/CP in order to maximize groundwater recharge potential.	6,220,000	■	■	■	■	■	■		■	■	■	■	■	■	■	■	■
496	EMWD	Eastern Municipal Water District	Hemet/San Jacinto RWRF Tertiary Expansion	Upgrade the Hemet/San Jacinto Regional Water Reclamation Facility to full tertiary treatment. Project creates recycled water for the Hemet/San Jacinto area, as well as, integrating recycled water use into the Groundwater Management Plan currently being developed by water users in the Hemet/San Jacinto Valley.	35,000,000	■	■	■	■		■		■				■	■	■		■
745	SBVMWD	San Bernardino County Flood Control District	Randall Basin Improvements	Upgrade hydraulic facilities to reduce downstream 100-year peak flows and intercept and/or recharge stormwater flows	1,400,000										■	■					■
807	WMWD	Western Municipal Water District	Riverside Corona Feeder Phase 2	Phase 2 of Project constructs infrastructure for the Northern and Southern ends of the Riverside/Corona Feeder including parts of the Ricethorn/Reche Canyon/Waterman Pipeline Replacement and Connection to Baseline Feeder; Arlington Desalter to Mockingbird Intertie; and Arlington Desalter to EVMWD intertie.	50,939,000	■	■	■		■	■	■	■							■	■

ID#	SAWPA Member Agency Area	Acting Agency	Project Name	Project Description	Total Project Cost
888	OCWD	City of Santa Ana, Public Works and Parks Recreation and Community Services Agency	Santa Ana Pilot Urban Runoff Improvement	Design and construct a series of dry weather diversions to divert dry weather urban runoff to the sanitary sewer system or to natural treatment systems to be developed in conjunction with available open space. Project includes removal of ornamental exotics and replacement with drought tolerant native plants and trail connections.	389,000
514	SBVMWD	San Bernardino Valley Municipal Water District	Central Feeder, Phase 1	Construct 18,000 feet of 48 to 60 inch diameter pipeline with 100 CFS capacity, as well as, 100 cfs pump station and 5 million gallon storage tank. Project will enable SBVMWD to treat and convey contaminated San Bernardino Basin groundwater to the City of Redlands and the City of Loma Linda. The project improves reliability by providing a large capacity intertie between the City of Loma Linda and the City of Redlands. When all phases of the Central Feeder are complete, SBVMWD will also be able to convey "nuisance" high groundwater from the area of historic high groundwater to the far eastern portion of its service area; to the Metro	53,000,000
547	SAWPA	Santa Ana Watershed Project Authority	Arundo Removal and Habitat Restoration	Project to remove Arundo donax, giant cane, from the Santa Ana Watershed and to restore riparian habitat. From the perspective of water supply, most observers estimate that if Arundo were removed from the watershed and replaced with native vegetation some 10,000 AF of water could be made available for other uses. Project requires continued maintenance of areas where Arundo has been removed, and area monitoring.	6,000,000

ID#	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
888									X	X	X	X	X	X	X	X
514		X	X					X							X	X
547					X				X	X	X	X		X	X	X

ID#	SAWPA Member Agency Area	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
899	OCWD	Orange County Water District	Burris Recharge Pit Recontouring	Increase both percolation and storage capacity in Burris Pit by excavated the shelf area; with the clay lenses removed and disposed of off-site. The remaining sand would be spread to create a uniform basin with a smooth sandy bottom. The Burris Pit is located adjacent to the Santa Ana River between Lincoln Avenue and Ball Road in the City of Anaheim. Its dimensions are approximately 5,800 feet long and an average of 1,300 feet wide. The average area and water storage capacity is approximately 134 acres and 2,600 acre-feet respectively. Of this area about 70 percent consists of a shallow shelf area to the west of the center levee. The center levee is an engineered earthen levee constructed by the ACOE, which separates the Santa Ana River and the Burris Pit Basin on its westside. Clayey soils present within the shallow shelf area slow infiltration rates of ponded water, while the deeper pond area appears to more readily allow the water to infiltrate into the groundwater basin.	3,500,000	X	X	X				X	X		X		X			X	X
354	SBVMWD	City of Redlands	Redlands Non-Potable Water Reclamation	Slip line 40,000 feet of gravity irrigation lines to utilize available water supplies of the Santa Ana River Watershed. The water produced by the slip lining project replaces potable surface water currently used for landscaping and citrus irrigation.	6,500,000	X	X	X		X										X	X
826	WMWD	City of Corona Department of Water and Power	Temescal Groundwater Basin Recharge Phase 2	Construct pipeline from Recycled Water Project A, currently under construction to the Oak and Main Street Basins. Project includes construction of control and treatment facilities, as well as, the construction of the recharge basins. Project will utilize two existing Riverside County Flood Control debris basins for surface spreading of recycled water as a means of recharging the underlying groundwater basin with 5000 - 6500 AFY of recycled water.	3,000,000	X	X	X	X	X					X					X	X

ID#	SAWPA Member Agency Area	Acting Agency	Project Name	Project Description	Total Project Cost	Import Water	Groundwater Management	Conjunctive Use	Water Recycling	Water Conservation	Water Transfer	Surface Storage	Water and Wastewater Treatment	Non Point Source Pollution Control	Storm Water Capture and Management	Flood Management	Recreation and Access	Wetlands Enhancement and Creation	Environmental and Habitat Protection and Improvement	Watershed Planning	Disadvantaged Community
748	OCWD	Orange County Water District	Lakeview Recycled Water Pipeline	Construct Pipeline to transport recharge water from the Warner System to Anaheim Lake and other nearby basins.	4,500,000	X	X	X				X	X		X					X	X
906	SAWPA	Santa Ana Watershed Project Authority	Non-Profit Organization Block Grant	Block grant projects will be selected from a pool of diverse watershed non-profit organizations who wish to develop projects to support SAWPA IWP and do not have either the organizational staff or resources to administer projects. These include various non-profit, volunteer groups and diverse stakeholder groups. Projects selected for the block grant will include opportunities to develop or restore of riparian habitat, wetlands and endangered species habitat, as well as, watershed monitoring, water conservation and public education programs. Projects selected for the block grant will be thoroughly reviewed by SAWPA to assure and compliance with the guidelines established for Proposition 50.	-na-					X				X			X	X	X	X	X

middle reaches of the Santa Ana River. Again, interest in developing the IRWM Plan was expressed not to compete with the SAWPA IRWM Plan but rather as a supplement to the existing SAWPA IRWM Plan. It is their hope that through further plan development for the area, additional funding resources from Prop 50 Chapter 8 future funding cycles may become available.

6. Project Lead: Running Springs Water District – Planning Grant Submittal

Running Springs Water District, located in the San Bernardino Mountains within the watershed has submitted a planning grant application to prepare the Hilltop Water Management Project Plan. The objective of this plan is to develop and implement conjunctive use projects using local wastewater discharge to develop an additional source of recycled water, thereby providing the opportunity to reduce water imports. Again, interest in developing the IRWM Plan was expressed not to compete with the SAWPA IRWM Plan but rather as a supplement to the existing SAWPA IRWM Plan. It is their hope that through further plan development for the area, additional funding resources from Prop 50 Chapter 8 future funding cycles may become available.

7. Project Lead: San Bernardino County Flood Control District – Implementation Grant

In accordance with subsequent legislation to Prop 50, AB 1747 requires that DWR allocate $20 million of the Prop 50 funding for groundwater management and recharge projects. No more than 50% of the funding was to be allocated for Northern California and the remainder was to be set aside for Southern California needs. For projects in Southern California, preference would be given to projects outside of the Metropolitan Water District that are infill projects within one mile of established residential and commercial development. The San Bernardino County Flood Control District (SBCFCD) has taken the position that a separate implementation grant should be prepared by SBCFCD to meet the legislative language requirements while remaining in support of the SAWPA IRWM Plan and using the SAWPA IRWM Plan as their Integrated Plan as basis of their implementation grant submittal. SAWPA has coordinated the development of their implementation grant submittal with SBCFCD and has provided the SAWPA IRMP Update to their agency for their grant submittal application. The proposed project that SBCFCD is seeking funding support with their application is entitled "Cucamonga Basin #6 & Spreading Grounds". This project is described in detail in the SAWPA IRWMP.

SAWPA supports the SBCFCD submittal as a non-competitive application for implementation grant funding from Prop 50 separate from the potential Chapter 8 implementation grant funding support for the watershed.

C. Impacts and Benefits of Tier I Priority Projects

The implementation of Tier I of SAWPA priority list of projects will not only provide a broad range of benefits to the Santa Ana River Watershed but to the State as well. This includes the development of infrastructure to create new water, expand water recycling, and restore recharge capacity, as well as, develop or restore acres of wetlands and riparian habitat. The numerous impacts and benefits derived from the mix of water resource project proposals include, but are not limited to the following:

- Thirteen projects which include components to support SAWPA's goal of reducing water imports and bring the watershed closer to achieving its goal of self sufficiency. This includes efforts to create opportunities for additional water banking through the construction of groundwater retention and stormwater detention basins, and projects which reduce the overdraft of groundwater resources through the development of alternative water supplies including water recycling.
- Fifteen projects which include components to support SAWPA's goal for improving groundwater management within the watershed. This includes projects to construct

recharge facilities for restoring and expanding groundwater storage within the watershed, and efforts to restore or improve groundwater quality through the implementation of remediation technologies or management programs.

- Fifteen projects which include components to expand opportunities for conjunctive use within the watershed. This includes projects to construct infrastructure to link water treatment facilities and water agencies throughout the watershed. Thus providing for greater opportunities to move water within the watershed, expand groundwater recharge, as well as, opportunities for recycled water.
- Seven projects which include components to support opportunities for recycled water within the watershed. This includes projects to develop and expand the production of recycled water, as well as, the construction of the necessary infrastructure to link recycled water to potential customers. Thus providing water agencies the opportunity to reduce their demand for potable water and furthering SAWPA's goals toward sustainability.
- Eleven projects which include components to support the conservation of water within the watershed. This includes the development of programs to improve and develop non-potable sources to reduce the consumption of higher quality potable water.
- Two projects which provide opportunities for water transfers within the watershed. This includes the creation by EMWD of a mechanism by which local farmers can switch from groundwater to recycled water while fully protecting their water rights. In turn, the in-lieu use of recycled water will reduce the demand for groundwater in the basin for municipal uses, as well as, reducing the demand for imported water required for groundwater replenishment.
- Five projects which include components for developing additional storage within the watershed. This includes projects to construct additional watershed infrastructure to directly expand available local storage capacity. Thus providing agencies the means to increase local water resources and reserves, furthering the region's goals toward sustainability.
- Ten projects which include components to improve water and wastewater treatment facilities within the watershed. This includes projects to upgrade treatment or expand the production capacity of facilities producing secondary or tertiary treated water supplies. Thus providing water agencies the opportunity to expand supplies of potable water or water available for groundwater recharge, and potentially reducing the demand for potable water.
- Seven projects which include components to support opportunities for controlling non point source (NPS) pollution within the watershed. This includes the development of treatment wetlands systems which have been proven to be effective in removing pollutants such as nutrients and various metals. Other projects include the construction of detention basins which have been proven to be effective at collecting debris and sediments from large high volume storm events.
- Fourteen projects which include components to support opportunities for capturing stormwater flows within the watershed. This includes efforts directed toward the development projects which detain storm flows for the purpose of providing flood control, opportunities for recharge to groundwater, as well as, to capture debris and sediment from high volume storm events. Additionally, projects which capture stormwater may also provide opportunities for improving riparian habitat, or in conjunction with wetlands treatment systems, the opportunity to reduce NPS pollution.
- Five projects which include components to support opportunities for flood control within the watershed. This includes efforts directed toward the development projects which manage storm flows, providing protection to life and property during large high volume storm events. Additionally, these may also provide opportunities for groundwater recharge, as well as, opportunities to restore or improve riparian habitat.

- Seven projects which include components to support the development of recreational opportunities within the watershed. This includes the development of parks, trails or access to riparian areas.
- Seven projects which include components to support opportunities for the creation or enhancement of natural wetland areas within the watershed. This typically includes various projects all which are focused toward the development of riparian habitat or in conjunction with projects which seek to polish water quality while providing opportunities for groundwater recharge.
- Eight projects which include components to support opportunities for the protection or enhancement or riparian habitat within the watershed. This includes efforts directed toward the conversion or restoration of land to create or enhance riparian habitat in support of sensitive or endangered native species. Restoration efforts are often coordinated with the removal of invasive non native plant species and include opportunities for public education or public access.

Together SAWPA's Tier I project proposals form a comprehensive mix of watershed strategies that not only support regional objectives, but also support the base of Statewide goals by providing:

- Water Supply Benefits
- Reduced Groundwater Overdraft
- Improved Drought Preparedness
- Improved Water Quality
- Reduced Flood Impacts
- Environmental Benefits
- Recreational Opportunities
- Supports Watershed Management Planning
- Develops Watershed Partnerships

All Tier I project proposals are supported by a broad mix of local or regional planning efforts. These include:

- SAWPA's 2002 Integrated Watershed Plan;
- Santa Ana River Watershed Water Quality Control Plan;
- Urban Water Management Plans;
- Groundwater Management Plans;
- County Flood Control Plans; and
- Various Countywide Plans
  all which are available from SAWPA.

Within the Santa Ana River Watershed, attention to disadvantaged communities is a major concern. SAWPA, in considering proposals to be included in its Tier I list of priority projects, has made it a priority to include disadvantaged communities. As a result, all Tier I project proposals have been identified to support, to some extent, disadvantaged communities within their areas of influence.

A detailed description of each of the 20 Tier I Priority projects including a proposed innovative Block Grant to support water resource needs from small scale organizations in the watershed follows.

SAWPA IWP – Tier I Priority Project: # 213

- **Title:** Little San Gorgonio Creek and Noble Creek Naturalization, WRDP Phase 1
- **Agency:** Beaumont Cherry Valley Water District
- **Partners:** San Timoteo Watershed Management Authority, City of Beaumont, San Gorgonio Pass Water Agency, City of Banning, Beaumont Basin Water Master
- **Total Cost:** $2,700,000
- **Funding Request:** $750,000

Project:

The objective of the Proposed Project is to capture high quality storm flows from two natural creeks, Little San Gorgonio Creek (watershed area = 7 sq.mi) and Noble Creek (watershed area = 5 sq.mi) to facilitate recharge of the Beaumont Basin. Surface water captured in the two creeks would be piped via gravity downstream to the proposed recharge facilities/community park site where ponds would be constructed to facilitate percolation into the Beaumont Basin. Based on pilot testing, it appears the recharge site could percolate 3,000 acre-feet per year or more.

Import Water: This project will limit dependence on imported water and contribute to a more reliable water supply by banking surplus water in wet years making it readily available for extraction in dry years.

Groundwater Management: This project provides additional groundwater recharge supporting the long term goals to manage the basin.

Conjunctive Use: This project will capture stormwater and excess runoff for groundwater storage.

Water Recycling: Stormwater runoff and imported water will be used to "blend" recycled water available in winter when irrigation of landscaping, parks and golf courses is reduced.

Water Conservation: This project will allow BCVWD to capture additional stormwater and wet weather period runoff from Little San Gorgonio Creek and Noble Creek watersheds.

Water Storage: This project will increase BCVWD ability to recharge the Beaumont Basin which currently has more than 200,000 AF of available storage capacity.

Water and Wastewater Treatment: Wetlands constructed along a reach of Noble Creek will take recycled water from the City of Beaumont's Wastewater Reclamation Plant to provide additional nitrogen removal.

Non-Point Source Pollution Control: Existing spreading basins in Little San Gorgonio Creek will be modified to capture a peak flow rate of 100cfs. These basins will act as debris basins for the transfer pipe and recharge ponds downstream.

Stormwater Capture and Management: Excess stormwater from Little San Gorgonio Creek and Noble Creek will be captured and desilted and conveyed to spreading basins for recharge.

Flood Management: This project constructs facilities to manage stormwater flows within Little San Gorgonio and Noble Creeks.

Environmental and Habitat Protection and Improvement: This project will provide opportunities for wildlife and other aquatic species through wetlands creation and the presence of water in the desilting basins and spreading grounds.

Watershed Planning: This WRDP is an integral part of the BCVWD's Urban Water Management Plan.

Disadvantaged Community: This project will limit dependence on imported water and contribute to a more reliable water supply for disadvantaged communities in the Region.

SAWPA IWP – Tier I Priority Project: # 354

- **Title:** Redlands Non-Potable Water Reclamation
- **Agency:** City of Redlands
- **Partners:** San Bernardino Valley Municipal Water District
- **Total Cost:** $6,500,000
- **Funding Request:** $750,000

Project:
This project will install 17,700 feet of slip lined pressurized piping within a network of existing gravity fed pipelines, resulting in improved transfer efficiency and flexibility in meeting water production and water quality requirements. This will allow for the blending of poor quality groundwater with surface water to provide an additional source of water suitable for potable use and reestablishes the aquifer as a resource for recharge and pumping. The water made available by this project replaces potable surface water currently used for landscaping and citrus irrigation.

The Groundwater Reclamation Interagency Project will directly benefit the City of Redlands, San Bernardino Valley Municipal Water District, Bear Valley Mutual Water Company, and the overall San Bernardino Groundwater Basin by creating additional dry year supplies of up to 5,000 acre-feet of potable water.

Import Water: This project directly reduces the demand currently being met using imported potable water by reclaiming a contaminated groundwater source.

Groundwater Management: This project improves the management of existing groundwater resources through reclamation of existing non-potable sources and improved distribution methods.

Conjunctive Use: This project facilitates conjunctive use of the San Bernardino Basin by developing water storage capacity in the basin and facilities to deliver stored water in dry years.

Water Conservation: This project directly and immediately accomplishes conservation of potable water and increases overall water efficiency by reclaiming a contaminated groundwater source to satisfy a demand currently being met using potable water.

Watershed Planning: This project provides an overall benefit to the Santa Ana Watershed through use and improvement within existing facilities and infrastructure, minimizing fiscal and environmental affects from implementation.

Disadvantaged Community: This project is expected to benefit disadvantaged communities within the service area of the San Bernardino Valley Municipal Water District (SBVMWD), or other agencies which receive water from SBVMWD facilities. As a regional agency, the San Bernardino Valley Municipal Water District may acquire potable water delivered through the project for use in the 78-inch Central Feeder Pipeline, or for use in the 144-inch Inland Feeder Pipeline. Both of these facilities serve portions of disadvantaged communities in Southern California.

SAWPA IWP – Tier I Priority Project: # 359

- **Title:** Constructed Wetlands – Bolsa Chica Channel
- **Agency:** County of Orange – Resources & Development Management Dept.
- **Partners:** Bolsa Chica Conservancy, City of Huntington Beach, City of Seal Beach, Orange County Coastkeeper, U.S. Navy (Naval Weapons Station-Seal Beach)
- **Total Cost:** $2,000,000
- **Funding Request:** $750,000

Project:
This project is seeking to improve water quality in Anaheim Bay-Huntington Harbor (ABHH) complex. The project will build a freshwater wetlands treatment system to divert and treat low flows in the Bolsa Chica Channel. Components of the system include an in-channel diversion structure situated upstream of the tidal prism, an intake screening system to keep trash and debris from entering the wetlands, a pumping station to raise water from the channel invert to the elevation of the adjacent land, a force main/pipeline to convey flows to the wetlands, a detention zone prior to the vegetated section of the wetlands to pretreat the water and settle solids that could otherwise decrease the effectiveness of the wetlands, and a vegetated, free-water surface treatment wetlands of approximately 14 acres on the Seal Beach Naval Weapons Station.

Water and Wastewater Treatment: The channel currently drains into the Anaheim Bay-Huntington Harbor (ABHH) complex. The system will treat 0.840 million gallons per day (1.3 cfs), the average dry weather flow in the channel, and bypass higher wet weather flows. Treated flows will be returned to the Bolsa Chica Channel downstream of the treatment system.

Non-Point Source Pollution Control: This project will reduce and manage urban runoff and nonpoint source pollutants, including the metals, pesticides, and pathogens listed as impairments for the receiving waters of this channel. Post-construction influent and effluent monitoring will be used to assess project effectiveness.

Storm Water Capture and Management: The proposed wetlands treatment system will be capable of treating dry weather flow, as wellas flows, from small storm events.

Wetlands Enhancement and Creation: This project will create approximately 14 acres of freshwater wetlands on the Naval Weapons Station, upstream of ABHH, and the Seal Beach National Wildlife Refuge.

Environmental and Habitat Protection and Improvement: This project will create approximately 14 acres of fresh water wetlands that can serve as habitat for many native plant and animal species. In addition, it will improve water quality entering the National Wildlife Refuge, Bolsa Chica Ecological Reserve, Huntington Harbor, Anaheim Bay, and the Pacific Ocean.

Watershed Planning: This project was developed in conjunction with other structural and non-structural BMPs developed by stakeholders in the watershed.

Other information relevant to the project: Programs to improve and increase maintenance in the harbor, increase enforcement of water quality ordinances, and educate boat owners and marina operators have been implemented. Two structural BMPs (including this project) are in development.

Disadvantaged Community: This project will treat runoff from all or part of 36 Census Tracts, 20 of which meet the criteria for disadvantaged communities as of the 2000 Census. This project is located in and will treat all the runoff from Census Tract 995.02, which also meets the criteria of annual Median Household Income that is less than 80% of the median, i.e., $37,994 based on 2000 Census. The tracts meeting the criteria are located in the cities of Stanton, Seal Beach, and Garden Grove and the unincorporated community of Midway City.

SAWPA IWP – Tier I Priority Project: # 496

- **Title:** Hemet/San Jacinto RWRF Tertiary Expansion
- **Agency:** Eastern Municipal Water District
- **Partners:** -na-
- **Total Cost:** $35,000,000
- **Funding Request:** $9,600,000

Project:
This project will upgrade the Hemet/San Jacinto Regional Water Reclamation Facility to full tertiary treatment. Project includes the construction of 14 MGD of tertiary treatment capacity and is a part of a larger expansion of the whole plant to provide 14 MGD of advanced wastewater treatment capacity through biological nutrient removal. This will allow EMWD to maintain and expand its current water recycling program as land use changes (residential development) significantly reduce opportunities to reuse secondary effluent. Immediate short term benefits of 6,000 AF/Year of additional recycled water use are expected as a result of this project.

Import Water: This project significantly reduces dependence on imported water by expanding recycling opportunities in the Hemet/San Jacinto area, and allowing the use of recycled water in-lieu of critically overdrafted groundwater supplies.

Groundwater Management: The Tertiary Expansion Project will provide recycled water of quality suitable for the full range of permitted uses, including irrigation of landscaping and food crops as well as supply augmentation for unrestricted recreational impoundments.

Conjunctive Use: Plant expansion supports and protects the use of local groundwater by augmenting local water supplies with treated imported water, replenishing local basins through groundwater recharge using seasonal surplus imported water available form MWD, and using recycled water in-lieu of imported water or groundwater.

Water Recycling: Tertiary treatment of wastewater at the SJV RWRF will allow for increased use of recycled water for municipal and agricultural irrigation in the San Jacinto Valley, reducing demands on local overdrafted groundwater basins and imported water supplies (State Water Project).

Water Transfer: The Groundwater Management Plan adopted for the SJV RWRF service area specifically creates a mechanism by which local farmers can switch from groundwater to recycled water while fully protecting their water rights.

Water and Wastewater Treatment: This project will ensure EMWD's ability to maximize water recycling while assuring the fail-safe disposal of seasonal surplus recycled water.

Recreation and Access: This project will allow for the delivery of 4500 AF/Year of recycled water from the SJV RWRF to be sold to the San Jacinto Wildlife Area (SJWA), a significant recreational asset providing the local communities with high-quality opportunities for hunting and wildlife viewing, and serves as a habitat reserve for multiple endangered species.

Wetlands Enhancement and Creation: This project will maintain seasonal wetlands as well as irrigation upland habitat areas, within the SJWA.

Environmental and Habitat Protection and Improvement: This project will provide habitat for migratory waterfowl within the wetlands habitat area of the SJWA.

Disadvantaged Community: This service area of the SJV RWRF includes the communities (census "places") of Hemet, San Jacinto, East Hemet and Valle Vista. This project will benefit these disadvantaged communities by providing up to 4,000 AF/Year of tertiary treated recycled water for municipal use and over 2,000 AF/Year of recycled water for agricultural use in-lieu of pumping overdrafted groundwater. Use of tertiary recycled water will lower overall water supply costs in the San Jacinto Valley and reduce the amount of imported water purchased to recharge local groundwater basins as required by the local Groundwater Management Plan. Additional economic benefits will derive through the provision of a reliable, cost-effective source of water supply for agriculture.

SAWPA IWP – Tier I Priority Project: # 514

- **Title:** Central Feeder, Phase 1
- **Agency:** San Bernardino Valley Municipal Water District
- **Partners:** City of Redlands, Metropolitan Water District of Southern California
- **Total Cost:** $53,000,000
- **Funding Request:** $6,400,000

Project:

This project entails construction of approximately 18,000 feet of 60- to 78-inch diameter pipeline with up to 300 cfs capacity. This project improves water supply reliability by interconnecting the City of Redlands, the SBVMWD and the MWD water systems. Additionally, the Central Feeder project supports SBVMWD's High-Groundwater Pump-Out project, enabling the SBVMWD to convey "nuisance" high groundwater from the area of historic high groundwater to other locations within its service area that are in need of recharge water.

Groundwater Management: The San Bernardino Basin is a tremendous resource, estimated to have a usable groundwater storage capacity of 5.5 million acre-feet. This project supports SBVMWD's High-Groundwater Pump-Out project to control water levels in the area of historic high groundwater, enabling the SBVMWD to better manage the basin through additional recharge and extraction.

Conjunctive Use: This phase of the project will allow conjunctive use opportunities for the Metropolitan Water District of Southern California. The completed Central Feeder will facilitate conjunctive use with the Department of Water Resources (Santa Ana Valley Pipeline/California Aqueduct) and the Metropolitan Water District of Southern California (Inland Feeder Pipeline).

Water and Wastewater Treatment: Water in the City of Redland's service area is plagued by contamination including TCE, PCE, and Perchlorate. This project will help reduce salt and contaminants concentration within the Basin through further dilution.

Watershed Planning: This project will facilitate a more effective use of this resource within the SBVMWD service area. By managing local resources more effectively, SBVMWD may reduce its demand on the State Water Project which will help others in the watershed and the State of California. Pumping additional water from the basin will also help relieve the high groundwater condition in the area of historic high groundwater.

Disadvantaged Community: Approximately 50% of the SBVMWD service area is classified as a disadvantaged community. The benefits to disadvantaged communities from this project include economic benefits through the provision of a reliable, cost-effective source of water supply for local communities, as well as, an additional long term source groundwater recharge of groundwater in the upper basin.

SAWPA IWP – Tier I Priority Project: # 547

- **Title:** *Arundo* Removal and Habitat Restoration
- **Agency:** Santa Ana Watershed Project Authority
- **Partners:** Orange County PFRD, Riverside County Parks and Open Space District, Santa Ana Watershed Association of RCDs
- **Total Cost:** $6,000,000
- **Funding Request:** $4,000,000

Project:

The goal of this project is to complete the second phase of *Arundo* removal/habitat restoration on the Santa Ana River and associated tributaries. In the first phase, over 3,000 acres of *Arundo* was removed and riparian habitat restored, providing approximately 10,000 AF of new water to the region. In this phase, up to 750 acres will be removed from the middle reaches of the Santa Ana River and in the tributaries where *Arundo* remains. This phase will provide up to an additional 2500 AF of water for other uses and will restore habitat along an important biological corridor within the watershed. This project will require continued vegetation management to maintain the restored habitat and monitoring to prevent the establishment of invasive weed species and to comply with Endangered Species Act requirements. Areas where removal has been successful provide essential habitat for several Federally and State listed species, including the least Bell's vireo.

Water Conservation: Phase one of this project provided approximately 10,000 AF of water for other uses within the watershed. This phase will add up to 2500 additional AF. *Arundo* consumes three times more water than native vegetation and replacing *Arundo* with less water-hungry native vegetation will increase water availability to downstream users.

Storm Water Capture and Management: *Arundo donax* is not native to the western United States where stream flows can be characterized by long periods of low or no flow punctuated with extremely high flow periods of shorter duration. During these high flow events, native vegetation is inundated with water and recharge to groundwater basins may occur. *Arundo* breaks during high flow events and stands of *Arundo* redirect storm flows, limiting recharge opportunities.

Flood Management: *Arundo* breakage during storm events also forms debris dams that threaten transportation and flood control infrastructure. The formation of these debris dams is much less common in restored riparian corridors. Replacing *Arundo* with native vegetation will protect bridges and other important infrastructure within the watershed during storm events.

Recreation and Access: Stands of *Arundo* provide little habitat value for native species and often encourage the establishment of other nonnative plants and animals. *Arundo* removal makes open space more open, accessible and conducive to recreation. Native riparian plant communities are also less susceptible to wildfire events that threaten both lives and property.

Environmental and Habitat Protection and Improvement: Removal of nonnative plants, especially *Arundo*, will reduce the risk of flooding and fire within the watershed, improve the quality of habitat available, including essential habitat for endangered species, as well as provide surface water available for other uses.

Disadvantaged Community: This project area includes a number of disadvantaged communities and the removal of *Arundo* results in increased accessibility to some of the only natural areas available to residents.

SAWPA IWP – Tier I Priority Project: # 652

- **Title:** Seven Oaks Dam Borrow Pit Groundwater Recharge and Habitat Restoration Project
- **Agency:** San Bernardino Valley Water Conservation District
- **Partners:** U.S. Army Corps of Engineers
- **Total Cost:** $7,000,000
- **Funding Request:** $750,000

Project:
The intent of this project is to construct approximately 7 groundwater recharge basins using approximately 200 acres of land in the Seven Oaks Dam pervious borrow pit to expand groundwater recharge and develop supporting native habitat. This project includes the construction of canals, pipes, roads, and storage facilities, and the re-vegetation of the intervening land as native habitat.

This project will provide additional operational flexibility for the SBVWCD, support increased conjunctive use of the basin, improve water quality by reducing turbidity of the water impounded behind Seven Oaks Dam, and establish wetlands habitat.

Import Water: This project will create greater groundwater supply for local producers, and allow imported water to be allocated to where it is more urgently needed, contributing to water conservation and decreased dependency on imported water.

Groundwater Management: This project will divert stormwater and other releases of water detained behind Seven Oaks Dam to constructed percolation basins for groundwater recharge.

Conjunctive Use: The Bunker Hill Groundwater Basin-II is one of only three groundwater basins in the Santa Ana River watershed that has improved in quality for nitrate-nitrogen and total dissolved solids. The marked improvement in water quality is attributable to the continued recharge of the Basin.

Water Conservation: This project will divert storm water and other releases of water detained behind Seven Oaks Dam to constructed percolation basins for groundwater recharge.

Water and Wastewater Treatment: This project would act as a filtration system prior to percolation or municipal use.

Non Point Source Pollution Control: The construction of recharge basins for this project will improve non point source pollution control by providing a settling area for the removal of sediment and organic debris from surface runoff.

Stormwater Capture and Management: The construction of recharge basins for this project will aid stormwater capture and management operations by providing a facility to capture floodwater released from the Seven Oaks Dam. This released water can then be diverted for groundwater recharge or additional surface storage.

Flood Management: This project will assist flood control operations by providing the capability to release floodwater from the Seven Oaks Dam.

Wetlands Enhancement and Creation: This project would include the creation of artificial wetlands used to treat and percolate water.

Environmental and Habitat Protection and Improvement: This project includes the construction of water percolation basins and artificial wetlands to improve migratory bird flyway habitat and restore native wetlands plant communities.

Watershed Planning: This project is fundamental to the Santa Ana River Water Quality Control Plan (Basin Plan) in that it helps to put the highest quality water to beneficial use at the upper part of the watershed.

Disadvantaged Community: While this project is not targeted to disadvantaged communities, this project includes economic benefits derived through the provision of a reliable, cost-effective source of water supply for local communities within the Bunker Hill Basin.

SAWPA IWP – Tier I Priority Project: # 690

- **Title:** La Jolla Street Recharge Basin
- **Agency:** Orange County Water District
- **Partners:** -na-
- **Total Cost:** $13,000,000
- **Funding Request:** $2,600,000

Project:

This project will create an additional 9,000 AFY of groundwater recharge along the Santa Ana River through the development of the La Jolla Street property, an area approximately 10 acres in size in the City of Anaheim. The primary benefit of this project is increased recharge capacity for the Orange County Groundwater Basin, thus providing the OCWD an increased sustainable amount of water that can be extracted from the basin.

Import Water: The construction of this recharge basin will provide an additional 9,000 AFY of groundwater recharge along the Santa Ana River, and thereby reduce OCWD's need for imported water. The recharge basin will capture and recharge water that currently flows to the Pacific Ocean, thereby increasing the yield of the groundwater basin and increasing local water reliability by decreasing dependence on imported water.

Groundwater Management: This project will increase water supply reliability by increasing the amount of water that can be recharged and stored underground in the Orange County Groundwater Basin. This project will recharge water that would otherwise flow to the ocean, increasing the yield of the groundwater basin.

Conjunctive Use: This project increases OCWD's capacity to bank and store water by increasing the OCWD's recharge capacity. Increased recharge capacity increases the OCWD's flexibility to conjunctively use water, such as buying excess imported water when it is available in wet years and recharging and storing this water underground for subsequent extraction.

Water Storage: This project increases OCWD's recharge capacity, which increases the OCWD's ability to store water in the underground groundwater basin.

Water and Wastewater Treatment: As documented in OCWD's Santa Ana River Water Quality and Health Study, infiltration and subsurface flow of recharge water provides significant water treatment benefits. This natural treatment process is very effective at removing bacteria, organic carbon, and other constituents.

Stormwater Capture and Management: This constructed recharge basin will provide increased stormwater capture and storage capacity.

Watershed Planning: This project is consistent with SAWPA's Integrated Watershed Plan and is also consistent with the goal of reducing the flow of contaminants and debris to the Pacific Ocean.

Disadvantaged Community: Portions of Anaheim and Fullerton north of State Highway 91 will directly benefit from this project. Increased recharge capacity will increase the amount of water that can be extracted from the groundwater basin, resulting in increased water reliability for these disadvantaged communities. Additionally, by increasing the sustainable amount of groundwater extraction, the disadvantaged communities will be able to produce more groundwater, which saves money compared to the alternative water supply.

SAWPA IWP – Tier I Priority Project: # 745

- **Title:** Randall Basin Improvements
- **Agency:** San Bernardino County Flood Control District
- **Partners:** San Bernardino Valley Municipal Water District, City of Colton
- **Total Cost:** $1,400,000
- **Funding Request:** $600,000

Project:

This project will upgrade the existing undersized hydraulic facilities to reduce downstream flows and intercept and recharge stormwater flows. Increased capacity will provide for the containment of 100-year storm flows. Additionally, the outlet works will be fitted with a gate to regulate the flow of water discharged form the facility.

Groundwater Management: This project improves the ability of the flood control basin to capture storm flow, thus providing the increased opportunity for groundwater recharge.

Stormwater Capture and Management: This project will increase the capture and improve the management of storm flows, including the flows from a 100-year storm event.

Flood Management: An integral element of the SBCFCD's flood control program is to protect lives and property from the flood waters produced by high intensity storms. The modification of the existing basin will reduce the impacts of storm runoff peak flows, including the flows from a 100-year storm event.

Disadvantaged Community: This project most greatly impacts two disadvantaged community census tract blocks within the City of Colton, which are located immediately at and south of the Randall Basin project.

SAWPA IWP – Tier I Priority Project: # 748

- **Title:** Lakeview Recycled Water Pipeline
- **Agency:** Orange County Water District
- **Partners:** -na-
- **Total Cost:** $5,010,000
- **Funding Request:** $2,500,000

Project:

This project involves the construction of a pipeline to transport recharge water from the Warner System to Anaheim Lake and other nearby basins. This project will increase OCWD's recharge capacity in the Orange County Groundwater Basin, thus providing the OCWD an increased sustainable amount of water that can be extracted from the basin. The objective of this project is to increase OCWD's recharge capacity by 4,000 acre-feet per year.

Import Water: This project will help capture and recharge water that currently flows to the Pacific Ocean, increasing the yield of the groundwater basin and increasing local water reliability by decreasing dependence on imported water.

Groundwater Management: This project will recharge water that would otherwise flow to the ocean, increasing the yield of the groundwater basin.

Conjunctive Use: This project increases OCWD's capacity to bank and store water by increasing recharge capacity. Increased recharge capacity increases the OCWD's flexibility to conjunctively use water, such as buying excess imported water when it is available in wet years and recharging and storing this water underground for subsequent extraction.

Water Storage: This project increases OCWD's recharge capacity, which increases the ability to store water in the underground groundwater basin.

Water and Wastewater Treatment: As documented in OCWD's Santa Ana River Water Quality and Health Study, infiltration and subsurface flow of recharge water provides significant water treatment benefits.

Stormwater Capture and Management: This project will provide increased stormwater capture by increasing OCWD's ability to convey Santa Ana River flows to the recharge basins.

Watershed Planning: This project is consistent with SAWPA's Integrated Watershed Plan and is also consistent with the goal of reducing flows to the Pacific Ocean.

Disadvantaged Community: Portions of Anaheim and Fullerton north of State Highway 91 will directly benefit from this project. Increased recharge capacity will increase the amount of water that can be extracted from the groundwater basin, resulting in increased water reliability for these disadvantaged communities. Additionally, by increasing the sustainable amount of groundwater extraction, the disadvantaged communities will be able to produce more groundwater, which saves money compared to the alternative water supply. Based on 15 percent of the area within the Orange County Groundwater Basin being disadvantaged communities, these disadvantaged communities would receive a benefit of 600 acre-feet per year of additional groundwater.

SAWPA IWP – Tier I Priority Project: # 752

- **Title:** Prado River Road Wetlands Expansion
- **Agency:** Orange County Water District
- **Partners:** -na-
- **Total Cost:** $6,000,000
- **Funding Request:** $1,300,000

Project:
This project develops 194 acres on property owned primarily by OCWD and the U.S. Army Corps of Engineers. This entails the construction of large-scale treatment wetlands in the flood plain of the Santa Ana River as it enters the Prado Basin upstream of the River Road crossing. The goal of this project is to improve the quality of the Santa Ana River flows that are recharged into the Orange County Groundwater Basin, through the reduction of nitrate concentrations in the river flows.

Groundwater Management: This project increases natural treatment capacity of the Santa Ana River and enhances the OCWD's ability to improve water quality of the water recharged.

Conjunctive Use: Natural treatment wetlands are effective at removing nitrate. This project will remove nitrate from the Santa Ana River flow and improve the quality of water recharged in the Orange County Groundwater Basin. Wetlands are also effective at removing phosphorus, which helps reduce the amount of clogging in the OCWD's recharge facilities.

Water and Wastewater Treatment: The objective of the proposed project is to provide water quality benefits associated with nitrate removal. When the wetlands vegetation is mature and dense, the nitrate removal (as nitrogen) efficiency is expected to average 1,200 milligrams/square meter/day. This removal rate is favorable compared to the removal rate from a conventional water treatment plant.

Non-Point Source Pollution Control: This project increases natural treatment of the Santa Ana River. The wetlands will work to effectively remove nitrate, and will treat 50% of the baseflow and some stormwater, reducing the impacts of non-point source pollution on the river.

Recreation and Access: The created wetlands will expand public access and recreation and create an aesthetically pleasing natural setting.

Wetlands Enhancement and Creation: This project will provide 194 acres of new wetlands.

Environmental and Habitat Protection and Improvement: This project will restore and enhance 194 acres of wetlands habitat, aiding in the recovery of endangered species, and removing non-native *Arundo donax* from the project site. The design of the project will include over ten miles of waters edge riparian and woodland habitat, which is particularly important for an endangered bird, the southwestern willow flycatcher. Removal of non-native *Arundo* benefits the environment because *Arundo* (Giant Reed) provides limited to no habitat for species of concern in the area. In addition to providing habitat for the southwestern willow flycatcher, this project will also provide enhanced habitat for the least Bell's vireo, an endangered songbird.

Watershed Planning: This project will restore and enhance habitat, expand public access and recreation, and create an aesthetically pleasing natural setting, as well as increase the natural treatment capacity of the Santa Ana River, all improving the overall quality and future of the watershed.

Disadvantaged Community: Disadvantaged communities within the groundwater basin benefit from improved water quality in the groundwater basin that results from the proposed project.

SAWPA IWP – Tier I Priority Project: # 807

- **Title:** Riverside Corona Feeder – Phase 2
- **Agency:** Western Municipal Water District
- **Partners:** San Bernardino Valley Municipal Water District, City of Riverside, Elsinore Valley Municipal Water District, City of Corona, Jurupa Community Services District, Riverside Highlands Water Company, Orange County PFRD, Metropolitan Water District (MWD)
- **Total Cost:** $50,939,000
- **Funding Request:** $8,500,000

Project:
This project phase involves constructing infrastructure for the Northern and Southern ends of the Riverside/Corona Feeder (RC Feeder).

This project will provide for the better utilization of local water resources and enhanced basin management through increased banking of State Water Project water during periods of excess. Scenarios have been performed to verify that the system will be able to transfer up to 40,000 AFY of previously stored water during periods of drought. Additionally, the RC Feeder project supports SBVMWD's High-Groundwater Pump-Out project, by providing additional recharge of low TDS State project water in the upper basin.

Import Water: This project will allow for the banking of additional water from outside the Basin available in wet years, for use during extended dry periods.

Groundwater Management: This project will allow groundwater banking for the benefit of about 1 million people. When complete, a new groundwater storage capability for more than 100,000 AF of water will be available for drought.

Conjunctive Use: This project will efficiently be able to convey SWP water purchased from MWD during wet years and stored in the Bunker Hill Basin, for extraction by WMWD during periods of drought.

Water Conservation: Excess water imported and stored in wet years (water that otherwise would be lost to the ocean) is banked for use in dry years.

Water Transfer: Unused pipeline capacity of the RC Feeder, could be used to transfer water throughout the network of the feeder system.

Water Storage: This project involves the storage of State Water Project water purchased from MWD during wet years supply exceeds demands and storage capabilities in the Bunker Hill Basin.

Water and Wastewater Treatment: Groundwater modeling has demonstrated that increased recharge and extractions in the basin will accelerate ongoing cleanup of contaminate plumes. The RC Feeder will provide the conveyance mechanism to provide higher extractions.

Watershed Planning: Both contaminant issues and liquefaction threats in the watershed will be better managed through this project and a significant area of the watershed now dependent on imported water will be drought-proofed.

Disadvantaged Community:
This project will provide up to 40,000 acre-feet per year of potable water in drought events to various communities within WMWD's service boundary. There are 46 census tracts that are considered disadvantaged communities within WMWD's service boundary and will share this benefit.

SAWPA IWP – Tier I Priority Project: # 826

- **Title:** Temescal Groundwater Basin Recharge – Phase 2
- **Agency:** City of Corona Department of Water and Power
- **Partners:** Riverside County Flood Control & Water Conservation District, Department of Health Services, Santa Ana Regional Water Quality Control Board
- **Total Cost:** $3,000,000
- **Funding Request:** $550,000

Project:

This project entails the construction of an outfall from the adjacent Recycled Water Project "A" lines to the Oak and Main Street Basins. This is a continuation of the City's plans to stabilize local groundwater and increase groundwater recharge through the development of recharge sites. This project includes the construction of the control and treatment facilities, as well as the recharge basins. This project will utilize two existing Riverside County Flood Control debris basins for the surface spreading of 5000 - 6500 AFY of recycled water as a means of recharging the underlying groundwater basin.

Import Water: This project will reduce demand on regional water supplies used by Corona and surrounding agencies within the Santa Ana River Watershed.

Groundwater Management: The results of the City's recently completed Surface Disposal Pilot Project indicate that between 5,000 and 6,500 AFY of recycled water can be used to recharge the Temescal Groundwater Basin. The City's current capital improvement program includes the development of the Temescal Basin Management Plan to best manage these water resources including the spreading and recharge of recycled water.

Conjunctive Use: Utilization of the Main Street and Oak Avenue debris basins for surface spreading of recycled water can result in an estimated 5,000 to 6,500 acre-feet per year (AFY) of recharge within the Temescal Groundwater Basin. This project will recharge groundwater supply making it more drought resistant. This source will serve to enhance the City's groundwater supply reliability.

Water Recycling: Recharge ponds will expand the City's groundwater supply by recapturing storm flows, recycled water, untreated imported water, and other sources leading to a readily available source of water.

Water Conservation: Recharge of the Temescal Groundwater Basin, will enable the City to reclaim between 5,000 and 6,500 AFY of water for future use, thereby maximizing the use of recycled water and reducing the need for imported water.

Stormwater Capture and Management: The establishment of the recharge sites will provide the opportunity to capture additional stormwater for groundwater recharge.

Watershed Planning: Recharge of the Temescal Groundwater Basin implements elements of the City's Operational Plan, as well as, SAWPA's Integrated Watershed Plan.

Disadvantaged Community: This project does not have a direct impact on the disadvantaged communities in Corona; however, the water saved by this project will allow Corona to manage water resources more efficiently, thereby having a benefit to all communities served by the City.

SAWPA IWP – Tier I Priority Project: # 888

- **Title:** Santa Ana Pilot Urban Runoff Improvement
- **Agency:** City of Santa Ana, Public Works and Parks Recreation and Community Services Agency
- **Partners:** City of Santa Ana Public Works, City of Santa Ana Parks and Recreation
- **Total Cost:** $389,000
- **Funding Request:** $350,000

Project:

This pilot project will restore native habitat; trail aesthetics; and provide educational signage about water treatment, habitat, and water quality for a segment of the Greenville-Banning Channel adjacent to Centennial Park. This includes the replacement of ornamental exotic plant species with native plant species.

This project provides an integrated, multiple benefit approach to treating and managing stormwater runoff as well as enhancing the environment, recreational (trail), and educational opportunities associated with this segment of the Greenville-Banning Channel. Additional benefits include flood control improvements and upgrades to storm drain systems.

Non-Point Source Pollution Control: This project will reduce trash discharge and enhance channel function as a vegetated swale/wetlands BMP through installation of a trash interceptor device upstream of Centennial Park and vegetation improvements to the Channel at Centennial Park.

Stormwater Capture and Management: This project will increase stormwater (urban runoff) capture and provide treatment and management opportunities in the Greenville-Banning Channel with multiple benefits of water quality improvement, and enhanced habitat and educational/recreational opportunities.

Flood Management: This project will also upgrade deficient storm drain systems within the project area to improve flood capacity and treatment of urban runoff, where feasible.

Recreation and Access: Habitat improvements through the use of native plantings will strengthen public use of the trails and adjacent park (Centennial Park) and greenbelt opportunities. Educational signage explaining native plants, habitat, and water quality improvements will be included at the site.

Wetlands Enhancement and Creation: The Greenville-Banning Channel along Centennial Park is considered a wetland enhancement because of the removal of exotics and replacement with natives.

Environmental and Habitat Protection and Improvement: Removal of ornamental exotics and replacement with native plants will enhance habitat.

Watershed Planning: This project integrates flood control improvements, City adopted land use planning (General Plan and EIR), infrastructure planning documents (master plan of drainage), environmental enhancement along the Greenville-Banning Channel, and cultural/social benefits to neighboring disadvantaged communities by improving the environment aesthetically and practically.

Disadvantaged Community: This project is located within a Disadvantaged Community (northwestern portion of the City of Santa Ana). This project will provide 2-3 acres of channel and park enhancement (restored habitat and improved treatment capacity) and up to 10 acres of flooding reduction.

SAWPA IWP – Tier I Priority Project: # 899

- **Title:** Burris Recharge Pit Recontouring
- **Agency:** Orange County Water District
- **Partners:** -na-
- **Total Cost:** $3,500,000
- **Funding Request:** $1,800,000

Project:

This project will increase OCWD's recharge capacity in the Orange County Groundwater Basin, thus providing the OCWD an increased sustainable amount of water that can be extracted from the Basin. The objective of this project is to increase OCWD's recharge capacity by 9,000 acre-feet per year.

Import water: This project will reconfigure Burris Pit, an existing recharge basin, and provide an additional 9,000 AFY of groundwater recharge along the Santa Ana River, and thereby diminish OCWD's dependence on imported water. Reconfiguration work includes removing low-permeability sediments that restrict recharge and removing a low shelf in the existing basin.

Groundwater Management: This project will increase water supply reliability by increasing the amount of water that can be recharged and stored underground in the Orange County Groundwater Basin.

Conjunctive Use: This project increases OCWD's capacity to bank and store water by increasing recharge capacity. Increased recharge capacity increases OCWD's flexibility to conjunctively use water, such as buying excess imported water when it is available in wet years and recharging and storing this water underground for subsequent extraction.

Water Storage: This project increases OCWD's recharge capacity, which increases the ability to store water in the underground groundwater basin.

Water and Wastewater Treatment: As documented in OCWD's Santa Ana River Water Quality and Health Study, infiltration and subsurface flow of recharge water provides significant water treatment benefits.

Stormwater Capture and Management: The constructed recharge basin will provide increased stormwater capture and storage capacity.

Recreation and Access: The basin reconfiguration is being developed in conjunction with recreational enhancements that are being proposed by the City of Anaheim. These recreational enhancements would allow passive recreation such as hiking and bird watching around the perimeter of the recharge basin. Recreational improvements such as these are important to the city because of the relative shortage of hiking trails and open space in the urban environment.

Watershed Planning: This project is consistent with SAWPA's Integrated Watershed Plan and is also consistent with the goal of reducing flows to the Pacific Ocean.

Disadvantaged Community: Increased recharge capacity will increase the amount of water that can be extracted from the groundwater basin, resulting in increased water reliability. Additionally, by increasing the sustainable amount of groundwater extraction, water supply agencies such as the cities in the basin will be able to produce more groundwater, which saves money compared to the alternative water supply. Based on 15 percent of the area within the Orange County Groundwater Basin being disadvantaged communities, these disadvantaged communities would receive a benefit of 1,350 acre-feet per year of additional groundwater.

SAWPA IWP – Tier I Priority Project: # 910

- **Title:** Recycled Water Line, San Sevine and Etiwanda Recharge Basins
- **Agency:** Inland Empire Utilities Agency*
- **Partners:** Chino Basin Watermaster, Cucamonga Valley Water District
- **Total Cost:** $19,500,000
- **Funding Request:** $4,100,000

Project:

This project consists of the construction of recycled water distribution facilities capable of delivering 7,500 acre-feet of recycled water annually. This includes approximately 14 miles of recycled water pipelines ranging from 16- to 36-inches in diameter and 10 million gallons of recycled water storage to meet daily operational flow needs. This project is located in the northeast portion of the City of Rancho Cucamonga in an alluvial area prime for groundwater recharge.

Benefits of the project include the reduction of imported water demand, and sustainability of the water supply needs to support the economic growth of the region.

Import Water: The regional recycled water program deliveries of 7,500 AFY will directly offset water deliveries (both direct deliveries and groundwater replenishment) imported from the State Water Project. This project will enhance the region's water supply reliability by providing a drought-proof local water supply in-lieu of additional supplies from the State Water Project.

Groundwater Management: This project will provide a supply of recycled water to additional recharge basins which will directly offset replenishment deliveries from the State Water Project. Recycled water recharge is a specific element of the Chino Basin Optimum Basin Management Plan.

Conjunctive Use: Use of recycled water from this project will enhance groundwater storage through in-lieu and direct replenishment. This will enhance the utilization of the Chino Basin's 1,000,000 acre-feet of storage capacity for conjunctive use.

Water Recycling: This project consists of approximately 14 miles of recycled water pipelines ranging from 16- to 36-inches in diameter. This project also includes 10 million gallons of recycled water storage to meet daily operational flow needs. This project is located in the northeast portion of the City of Rancho Cucamonga in an alluvial area prime for groundwater recharge. Recycled water deliveries or yield from this project will be 7,500 acre-feet annually.

Water Conservation: Use of recycled water from this project will conserve 7,500 acre-feet of potable water supplies annually.

Stormwater Capture and Management: Recharge of recycled water in addition to stormwater and imported water will improve water quality in areas of the basin by recharging water with higher quality than existing groundwater.

Disadvantaged Community: The population of the IEUA service area exceeds 750,000 people. According to the U.S. Census Bureau's 2002 data, about 37% of households in IEUA's service area are considered as "Disadvantaged". Although these households are not localized within one particular city or an unincorporated area, the benefits of the IEUA Regional Recycled Water Distribution System will accrue to them all. IEUA Regional Recycled Water Distribution System provides a mechanism to extend the benefits of recycled water infrastructure to everyone within the service area, including the Disadvantaged households by providing an increased volume of valuable water resources for re-filling (or recharging) the Chino Groundwater Basin which underlies the entire area.

**This IEUA's Recycled Water Project is part of an overall IEUA's Recycled Water Program and may be modified or combined with other proposed IEUA Tier I Priority Projects as defined in the Prop 50 Chapter 8 FAAST Application from SAWPA.*

SAWPA IWP – Tier I Priority Project: # 911

- **Title:** Recycled Water Line, Etiwanda Pipeline South Expansion
- **Agency:** Inland Empire Utilities Agency*
- **Partners:** City of Ontario
- **Total Cost:** $1,950,000
- **Funding Request:** $400,000

Project:

This project consists of the construction of recycled water distribution facilities capable of delivering 1,100 acre-feet of recycled water annually. This includes a 24- and 36-inch pipeline extending on Etiwanda Avenue in the Eastern portion of the City of Ontario. The pipeline will deliver recycled water to direct reuse customers, primarily industry, who currently use water imported through the State Water Project.

Benefits of this project include the reduction of imported water demand, and sustainability of the water supply needs to support the economic growth of the region.

Import Water: The regional recycled water program deliveries of 1,100 AFY will directly offset water deliveries, (both direct deliveries and groundwater replenishment) imported from the State Water Project. This project will enhance the region's water supply reliability by providing a drought-proof local water supply in-lieu of additional supplies from the State Water Project.

Groundwater Management: This project supplies 1,100 acre-feet of recycled water Chino Basin Management Zone III. Recycled water use is a specific element of the Chino Basin Optimum Basin Management Plan.

Conjunctive Use: Use of recycled water from this project will enhance groundwater storage through in-lieu replenishment from wells that would otherwise be pumped to supply demand. This will enhance the utilization of the Chino Basin's 1,000,000 acre-feet of storage capacity for conjunctive use.

Water Recycling: This project is a 24- and 36-inch pipeline extending south on Etiwanda Avenue in the Eastern portion of the City of Ontario. The pipeline will deliver recycled water to direct reuse customers, primarily industry, who currently use water imported through the State Water Project. The deliveries from this project will be 1,100 acre-feet annually.

Water Conservation: Use of recycled water from this project will conserve 1,100 acre-feet of potable water supplies annually.

Stormwater Capture and Management: Recharge of recycled water in addition to stormwater and imported water will improve water quality in areas of the basin by recharging water with higher quality than existing groundwater.

Disadvantaged Community: According to the U.S. Census Bureau's 2002 data, about 37% of households in IEUA's service area are considered as "Disadvantaged" (with an annual income below the $37,994 threshold). Although these households are not localized within one particular city or an unincorporated area, the benefits of the IEUA Regional Recycled Water Distribution System will accrue to them all. IEUA's Regional Recycled Water Distribution System provides a mechanism to extend the benefits of recycled water infrastructure to everyone within the service area, including the Disadvantaged households by providing an increased volume of valuable water resources for re-filling (or recharging) the Chino Groundwater Basin which underlies the entire area. This project will provide Disadvantaged households with access to approximately 1,100 acre-feet per year of additional water resources.

**This IEUA's Recycled Water Project is part of an overall IEUA's Recycled Water Program and may be modified or combined with other proposed IEUA Tier I Priority Projects as defined in the Prop 50 Chapter 8 FAAST Application from SAWPA.*

SAWPA IWP – Tier I Priority Project: # 912

- **Title:** Recycled Water Line, Euclid Avenue Interconnection and Reservoir
- **Agency:** Inland Empire Utilities Agency*
- **Partners:** City of Ontario, City of Chino
- **Total Cost:** $11,700,000
- **Funding Request:** $2,400,000

Project:

This project consists of the construction of recycled water distribution facilities capable of delivering 6,000 acre-feet of recycled water annually. This includes approximately 7 miles of 20-inch diameter pipeline on Euclid Avenue, a 5 million gallon storage reservoir, and 2 miles of 20-inch diameter pipeline connecting the reservoir to the distribution system. This project is located in the Northwest portion of the City of Ontario with the reservoir located in the City of Montclair. This project will deliver recycled water to direct reuse customers in the Cities of Ontario, Montclair, and Chino.

Benefits of this project include the reduction of imported water demand and sustainability of the water supply needs to support the economic growth of the region.

Import Water: The regional recycled water program deliveries will directly offset water deliveries imported from the State Water Project. This project will enhance the region's water supply reliability by providing a drought-proof local water supply in-lieu of additional supplies from the State Water Project.

Groundwater Management: This project will deliver 6,000 acre-feet of recycled water annually to direct reuse customers in the Cities of Ontario, Montclair, and Chino, for groundwater recharge.

Conjunctive Use: In addition, recharge will enable utilization of the Chino Basin's 1,000,000 acre-feet of storage capacity.

Water Recycling: This project will deliver 6,000 acre-feet of recycled water annually to direct reuse customers in the Cities of Ontario, Montclair and Chino.

Water Conservation: Use of recycled water from this project will conserve 6,000 acre-feet of potable water supplies annually.

Stormwater Capture and Management: Recharge of recycled water in addition to stormwater and imported water will improve water quality in areas of the basin by recharging water with higher quality than existing groundwater.

Disadvantaged Community: According to the U.S. Census Bureau's 2002 data, about 37% of households in IEUA's service area are considered as "Disadvantaged" (with an annual income below the $37,994 threshold). Although these households are not localized within one particular city or an unincorporated area, the benefits of the IEUA Regional Recycled Water Distribution System will accrue to them all. IEUA's Regional Recycled Water Distribution System provides a mechanism to extend the benefits of recycled water infrastructure to everyone within the service area, including the Disadvantaged households by providing an increased volume of valuable water resources for re-filling (or recharging) the Chino Groundwater Basin which underlies the entire area. This project will provide Disadvantaged households with access to approximately 6,000 acre-feet per year of additional water resources.

**This IEUA's Recycled Water Project is part of an overall IEUA's Recycled Water Program and may be modified or combined with other proposed IEUA Tier I Priority Projects as defined in the Prop 50 Chapter 8 FAAST Application from SAWPA.*

SAWPA IWP – Tier I Priority Project: # 913

- **Title:** Recycled Water Line, Chino and Chino Hills Pressure Zone 800 Improvements
- **Agency:** Inland Empire Utilities Agency*
- Partners: City of Chino, City of Chino Hills
- Total Cost: $8,900,000
- Funding Request: $1,800,000

Project:

This project consists of the construction of recycled water distribution facilities capable of delivering 4,500 acre-feet of recycled water annually. This includes approximately 3.5 miles of 30- and 36-inch diameter pipelines and 10 million gallons of storage to meet daily operational flow needs. This project will deliver recycled water to direct reuse customers in the Cities of Chino and Chino Hills.

Benefits of this project include the reduction of imported water demand and sustainability of the water supply needs to support the economic growth of the region.

Import Water: The regional recycled water program deliveries of 4,500 AFY will directly offset water deliveries, (both direct deliveries and groundwater replenishment) imported from the State Water Project. This project will enhance the region's water supply reliability by providing a drought-proof local water supply in-lieu of additional supplies from the State Water Project.

Groundwater Management: This project supplies 4,500 acre-feet of recycled water in the cities of Chino and Chino Hills will reduce pumping in Chino Basin Management Zone I. Recycled water use is a specific element of the Chino Basin Optimum Basin Management Plan.

Conjunctive Use: Use of recycled water from this project will enhance groundwater storage through in-lieu replenishment from wells that would otherwise be pumped to supply demand. This will enhance the utilization of the Chino Basin's 1,000,000 acre-feet of storage capacity for conjunctive use.

Water Recycling: This project will provide recycled water distribution pipelines and 10 million gallons of storage to supply 4,500 acre-feet of recycled water in the cities of Chino and Chino Hills.

Water Conservation: Use of recycled water from this project will conserve 4,500 acre-feet of potable water supplies annually.

Stormwater Capture and Management: Recharge of recycled water in addition to stormwater and imported water will improve water quality in areas of the basin by recharging water with higher quality than existing groundwater.

Disadvantaged Community: According to the U.S. Census Bureau's 2002 data, about 37% of households in IEUA's service area are considered as "Disadvantaged" (with an annual income below the $37,994 threshold). Although these households are not localized within one particular city or an unincorporated area, the benefits of the IEUA Regional Recycled Water Distribution System will accrue to them all. IEUA's Regional Recycled Water Distribution System provides a mechanism to extend the benefits of recycled water infrastructure to everyone within the service area, including the Disadvantaged households by providing an increased volume of valuable water resources for re-filling (or recharging) the Chino Groundwater Basin which underlies the entire area. This project will provide Disadvantaged households with access to approximately 4,500 acre-feet per year of additional water resources.

**This IEUA's Recycled Water Project is part of an overall IEUA's Recycled Water Program and may be modified or combined with other proposed IEUA Tier I Priority Projects as defined in the Prop 50 Chapter 8 FAAST Application from SAWPA.*

SAWPA IWP – Tier I Priority Project: # 906

- **Title:** Non-Profit Organization Block Grant
- **Agency:** Various
- **Partners:** -na-
- **Total Cost:** not yet determined
- **Funding Request:** $250,000

Project:

Based on discussions with the Santa Ana Regional Water Quality Control Board staff of potential water resource needs in the Santa Ana Watershed, a process to support water resource needs from small scale organizations often lacking the administrative resources to implement large scale projects was proposed. A block grant program utilizing grant funds was proposed.

Block grant projects will be selected from a pool of diverse watershed non-profit organizations who wish to develop projects to support SAWPA's IWP and do not have either the organizational staff or resources to administer projects. These include various non-profit, volunteer groups and diverse stakeholder groups. Projects selected for the block grant will include opportunities to develop or restore riparian habitat, wetlands, and endangered species habitat, as well as, watershed monitoring, water conservation, and public education programs. Projects selected for the block grant will be thoroughly reviewed by SAWPA to assure compliance with the guidelines established for Proposition 50.

Water Conservation: Emphasis will be on funding programs which encourage water conservation. These include programs which provide incentives, such as rebates for converting high flow toilets to low flow toilets, converting high water use landscapes to xeriscapes, changing out high water use washing machines to low water use washers, installation of hot water recirculation units and sprinkler timers, as well as, educational programs and home water use audits.

Non-Point Source Pollution Control: Emphasis will be on funding projects or programs which control or reduce sources of non-point pollution, such as, nutrients, sediment, and litter which impact water resources. These include projects or programs to implement BMP's, remove trash from riparian waterways, as well as, public awareness and educational programs.

Recreation and Access: Emphasis will be on funding programs which develop access to open space corridors to promote the dual establishment of passive and active recreational open spaces.

Wetlands Enhancement and Creation: Emphasis will be on funding programs which develop natural treatment wetlands to promote the duel objectives of restoring natural habitat and providing for improved water quality.

Environmental and Habitat Protection and Improvement: Emphasis will be on funding programs which develop or restore riparian habitat. This includes projects to remove ornamental exotics to be replaced with drought tolerant native plants to improve water supply reliability, conservation, and efficiency.

Watershed Planning: Emphasis will be on funding programs consistent with SAWPA's integrated watershed planning goals.

D. Institutional Structure

SAWPA and its water agencies have worked together for over 30 years along with smaller water and water resource related agencies in developing an integrated approach to watershed management. Through this process SAWPA has coordinated watershed task forces to address various watershed management issues and worked with agencies throughout the region to develop multifunctional projects and programs to address these issues.

In 2000, SAWPA received funding under the Costa-Machado Water Act (Proposition 13) to implement the first of the integrated projects for the region. These state funds were leveraged with local funding to build nearly $900 million in water projects to rehabilitate and improve the Santa Ana River Watershed. To date the accomplishments of this effort have produced approximately 292,000 AF of new water for the region. This includes new water through the development of the following project types:

- Basin water banking;
- Contaminant and salt removal through reclamation and desalting;
- Removal of non-native plants and the creation of new open space and wetlands;
- Programs for water conservation, efficiency, storm water capture, and management; and
- Planning and implementation of a flood control program to protect agricultural operations and adjacent property and to assist in abating the effects of waste discharges into waters of the State.

SAWPA has worked successfully to complete these projects following the guidelines as prescribed by the State through Prop 13. Through this process SAWPA has coordinated closely with agencies constructing the projects and SWRCB staff administrating the grant opportunity. To date a number of these vital projects have been completed with the remainder scheduled for completion within the year.

SAWPA proposes a similar process, as was used for Proposition 13, to administer projects funded through Proposition 50. Through this process SAWPA expects to achieve the same if not greater level of success in implementing projects to further the goals of the IWP. As with Proposition 13, this process consists of measures to ensure consistency in the review, preparation, and submission of all documentation pertaining to Proposition 50 funded projects, and to meet the objectives of the California Department of Water Resources (DWR) and State Water Resources Control Board (SWRCB), as well as, the goals of SAWPA's IWP. The direct benefits to the region of funding these Tier I projects are outlined in Table 4-3.

Table 4-3 SAWPA Tier I Project Benefits

Regional Benefit:
Additional Potable Conservation Water: 52,620 acre-feet/year
Additional Recycled Water: 19,000 acre-feet/year
Additional Recharge Capacity: 329,400 acre-feet/year
Additional Wetland, Habitat and Park Land: 1171 acres

The measures that SAWPA will use to review all project-related documents (e.g. engineering, environmental, financial) where SAWPA's role is to serve as the program manager for funds expended for related activities under Proposition 50 are outlined as follows:

Program Management and Administration

SAWPA serves as administrator for agreements between State Agencies and SAWPA, as well as program manager for the various programmatic requirements and related activities required through these agreements. SAWPA's authority and administrative policy to serve as program manager for such agreements was granted by the SAWPA Commission in April 2001. This authority provides SAWPA the means to implement the specific terms and conditions of the sub-agreements which the implementing parties must follow. The duties for which SAWPA is responsible as administrator include the following:

- Coordinate and administer the watershed stakeholder process;
- Coordinate activities to ensure maximum value for the funds expended;
- Ensure projects meet the requirements of California Environmental Quality Act (CEQA) and SCIWP;
- Develop fundable projects and contracts for the administration of the funds;
- Provide project/program status reports to communicate program efforts to the SWRCB and the public;
- Expedite the collection and processing of documentation and payment for agencies; and
- Collect and provide project information, water quality and quantity information and maintain other programmatic information for analysis and future planning.

E. Schedule

The SAWPA's IWP has established an adaptive approach to make the region entirely self sufficient during drought cycles, thereby firming up the region's ability to assure a stable economy, while improving water quality and achieving a salt balance, and also allowing more of the State's scarce water resources to be allocated to wildlife and agriculture during those times. This process is based upon a 25 year planning horizon, under which SAWPA has projected water supplies and demands needed for the region augmented by the infusion of the important new projects and technologies to meet those demands and water quality needs.

This process began in 1998 with SAWPA's WRP. The WRP described the measures that must be taken in order to more efficiently utilize both local and imported water resources. This plan was updated and expanded in 2002 as SAWPA's three volume 2002 SAIWP, which resulted in the acquisition of funding through California's 2000 Proposition 13 Water Bond and initiated the first major phase of project implementation.

Continued implementation of regional projects and programs through SAWPA's IWP process is largely dependent on the availability of funding. Agencies requesting funding support for projects and programs through SAWPA's IWP typically are limited in their ability to implement regional projects without outside funding support. As part of SAWPA's regional strategy to continue and expand the implementation of water resource improvements in the Santa Ana River basin, SAWPA is actively supporting funding opportunities as they arise.

It is anticipated that the acquisition of funding for the implementation of future IWP programs and projects will follow an approach similar to Proposition 13 Water Bond. This consists of selecting the best available projects within its IWP program and matching them to suitable grant programs. This does not necessarily assure that the most urgent of watershed priorities are being pursued due to the diversity of the grant program objectives, however this does provide for the opportunity to advance the overall goals of the IWP. A representation of the schedule for this process is presented in Figure 4-3.

F. Performance Measures

As part of SAWPA's process to implement projects through IWP process SAWPA has instituted a series of measures to assure technical and economic feasibility, as well as, environmental compliance. These measures include:

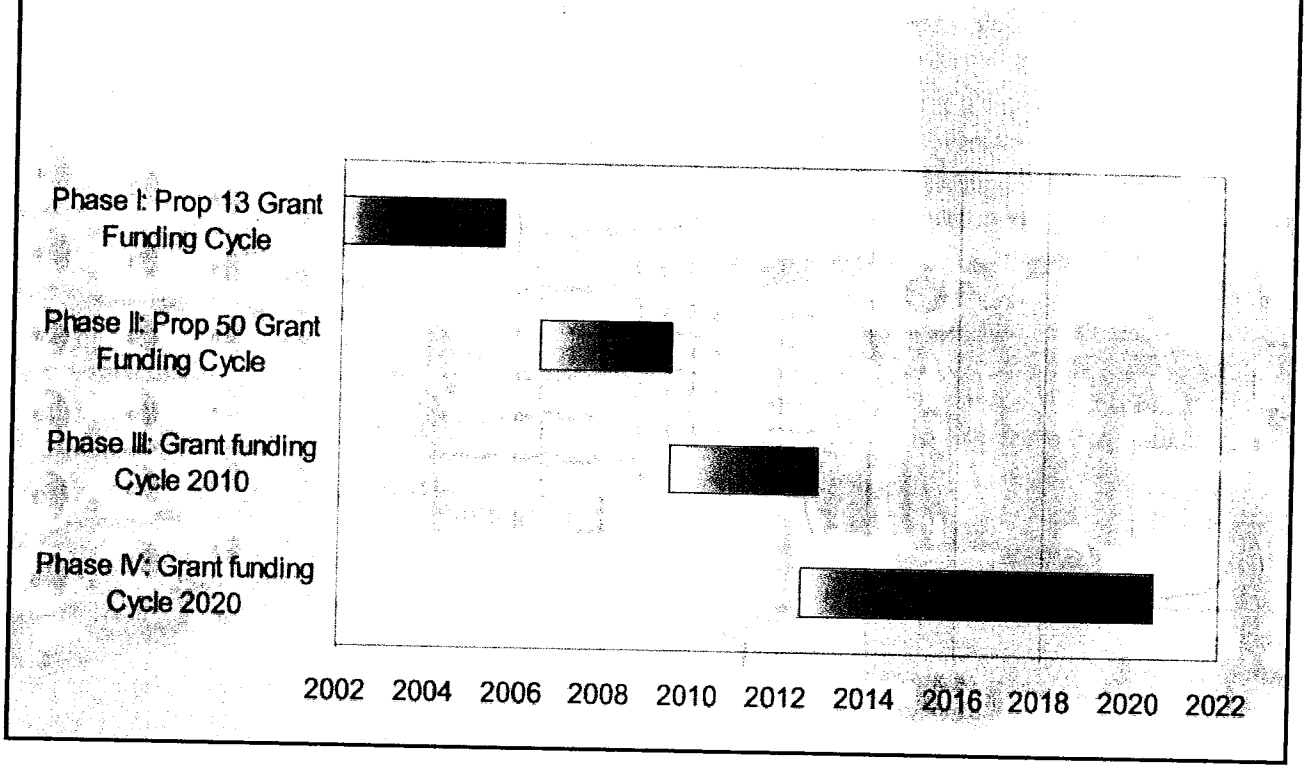
CEQA Review

SAWPA will obtain all documentation needed from the CEQA lead agency to understand the project, as well as, the requirements for environmental compliance or mitigation. SAWPA will review available information for compliance with CEQA and confirm that the necessary measures for compliance or mitigation have been addressed.

Schedule and Budget Tracking

SAWPA is required to periodically compile, summarize, and update schedule and budget information for all contracted projects. The purpose of maintaining and tracking project schedule and budget is to have readily available program and project information.

Figure 4-3: Integrated Watershed Plan Implementation Schedule



SAWPA maintains an automated Program Information Management System (System) to maintain and track data on the program, its projects, and their phase tasks and status. The following steps summarize the documentation required for schedule and budget tracking and maintenance:

- The Construction Agencies will prepare and submit cash flow projections, budget forecasts, and schedule information for each contracted project.
- Cash flow projections will be submitted for the remainder of the project period.
- Project schedule information including schedule of each phase and task of work completed will be submitted in accordance with the work breakdown structure for the project.
- Compile and summarize schedule and budget information into the System.
- Update schedule and cash flow projection information to the System at least once per quarter.

Site Visits

SAWPA staff performs site visits to better understand project progress, issues, and schedule. The Constructing Agency must ensure that the Grant Funding Agency or any authorized representatives thereof has suitable and reasonable access to the project site at reasonable times during project construction and thereafter for the useful life of the project.

Documentation Requirement

Each Construction Agency is required to submit project documentation to assure compliance with the less specific terms of the agreement entered into between SAWPA and the individual Constructing Agency.

Periodic Review and Evaluation

SAWPA will perform a project review or otherwise evaluate any project to determine compliance with the project funding criteria and requirements at any time, or if questions about the proper use or management of the funds arise as indicated in the agreement.

Agreement Deliverables

Agreement Deliverables required per the Program Management and Administration Agreement include project status reports for the Grant Funding Agency (submit monthly), quarterly reports (submit 30 days after the end of each quarter ending January, April, July, and October, for the duration of the contract), public outreach documents, program newsletter and other documents.

Invoice Procedure

SAWPA uses an internal invoice review checklist to insure that all invoice and progress documentation submitted by the Constructing Agencies meet SAWPA's, as well as, the Grant Funding Agency's requirements. The purpose of the invoice review checklist is to ensure that invoice documents provided by the Constructing Agencies are complete and accurate.

SAWPA, through its contract with each Construction Agency, requires the Constructing Agency to:

- Maintain books, records, and other material relative to the Project in accordance with generally accepted government accounting standards;
- Retain books, records, and other material for a minimum of three years after Project completion; and
- Make available books, records, and other material at all reasonable times for inspection, copying, and audit by the Grant Funding Agency or state auditors, or any authorized representatives thereof.

Audits

The Grant Funding Agency is authorized to review and obtain copies of all SAWPA's records pertaining to the Memorandum of Understanding and subsequent contracts. To manage SAWPA finance department workflow and minimize program cost, the Grant Funding Agency will give SAWPA 30 days notice, if possible, for any detailed audit or time-consuming review of financial information.

Closeout

SAWPA has developed a Project Closeout Procedure to ensure that each project is closed in a manner that provides an auditable file. This procedure includes verifying completion of all required closeout activities and receipt of all needed documents and certifications upon completion of the project.

Each project will utilize the project closeout procedure provided for in the agreement. SAWPA will review and approve the completeness of the closeout process and transmit a completed project notice for approval from the Grant Funding Agency.

Additionally, SAWPA maintains Project accounts in accordance with generally accepted government accounting standards. The following activities have been implemented:

- Establish an official Project file;
- Maintain separate accounts that depict all amounts received and expended on the Project, including all grant funds received;
- Maintain separate accounts that depict all income received which is attributable to the Project, specifically including any income attributable to grant funds disbursed under this contract;
- Maintain an accounting system which accurately depicts final total costs of the Project, including both direct and indirect costs; and
- Establish accounts and maintain records as necessary for the State to fulfill reporting requirements, including any and all reporting requirements under federal tax statutes or regulations.

G. Next Steps

In as much as this Plan presents a snapshot of the innovative projects and summarizes the plans and projects of many agencies, it will quickly age. SAWPA has received excellent feedback from agencies, groups, and individuals in this process.

The dynamic nature of projects and plans in the Watershed necessitates their update and renewal on a relatively frequent basis. This Plan will be used by agencies in the Watershed to help integrate plans and to focus funding on projects that are most effective and ready to proceed. This information must remain current to be effective.

Additionally, revisions to this Plan's strategies aimed at sustainability of the Watershed will develop over time forming a culture for the Watershed community. Future revisions of this document will capture these developments, new projects that are created, and projects currently listed that develop and evolve.

The SAWPA Commission will adopt this plan as part of the Integrated Watershed Planning process for the Santa Ana River Watershed and will use it to guide funding and development priorities.

In recognition of the ever changing aspects of the planning process, SAWPA will update and refine this Plan periodically. As new funding opportunities arise to support the implementation of the remaining water resource projects, SAWPA will continue to pursue these opportunities. With the support of local and State agencies further progress can be made in meeting long term goals of water sustainability for the region and the State.

References

Brattstrom, B. H. 1988. Habitat destruction in California with special reference to Clemmys Marmorata: A perspective [sic], pp.13.24. In: H.F. DeLisle, P.R. Brown, B. Kaufman, and B.M. Mcgurty (editors), Proceedings of the Conference on California Herpetology. Southwestern Herpetologists Society, Special Publication (4).

California Department of Transportation (Caltrans), Division of Transportation Planning. Retrieved: November 2004. Long-Term Socio-Economic Forecasts by County. Site: http://www.dot.ca.gov/hq/tpp/offices/ote/socio-economic.htm.

City of San Bernardino Economic Development Agency (CSBEDA). Regional Demographic Information. Retrieved: November 2004. Site: http://www.sanbernardino-eda.org/pdf/section9.pdf

California Department of Water Resources. April 2005. California Water Plan Update 2005. Bulletin 160-05.

Dill, William A. and Almo J. Cordone. 1997. History and status of introduced fishes in California, 1871.1996. California Department of Fish and Game, Fish Bulletin 178:414. Sacramento, CA.

Husing, John. April 2005. Santa Ana Watershed Coalition. Presentation: Water and Santa Ana River Watershed Economy. Annual Watershed Conference. Riverside, CA.

Lawrence Livermore National Laboratory (LLNL). October 21-24 1996. Evaluation of MTBE Analytical Field Results and Analysis of MTBE Plumes in California LUFT Sites. Annual Conference on Contaminated Soils, 11th, Amherst, MA, Report No. UCRL-JC-125178-ABS.

Metropolitan Water District of Southern California, Water Surplus and Drought Management Plan, August 1999

Moyle, Peter B. 2002. Inland fishes of California. 502 p. Berkeley, CA: University of California Press.

Oak Ridge National Laboratory. 1989. The Installation Restoration Program Toxicology Guide. Prepared for Harry G Armstrong Aerospace Medical Research Laboratory, Wright-Patterson Air Force Base. Under DOE Interagency Agreement No. 1891-A076-A1.

Santa Ana Watershed Project Authority. 2002. Santa Ana Integrated Water Resources Program, Volume 1, Water Resources Component.

Santa Ana Watershed Project Authority. 2002. Santa Ana Integrated Water Resources Program. Volume 2, Environmental and Wetlands Component.

Santa Ana Watershed Project Authority. 2002. Santa Ana Integrated Water Resources Program. Volume 3, Upper Santa Ana Regional Interceptor (SARI) Planning Study.

Santa Ana Watershed Project Authority. October 2003. Old, Grand Prix and Padua Fires Burn Impacts to Water Systems and Resources Report.

Santa Ana Watershed Project Authority. January – March 2004 Quarterly Report. Southern California Integrated Watershed Program.

Santa Ana Watershed Project Authority. March 2004. Santa Ana River Projected Flow Impacts Report.

Santa Ana Watershed Project Authority. November 2004. Santa Ana River Watershed Regional Perchlorate Investigative Report.

Schreiber Kenneth, Gary Binger, Dennis Church. May 2003. Making Growth Work for California's Communities. Mineta Transportation Institute, College of Business Publication.

Swift, Camm C., Thomas R. Haglund, Mario Ruiz, and Robert N. Fisher. 1993. The status and distribution of the freshwater fishes of southern California. Bulletin of the Southern California Academy of Sciences, 92(3):101. 172.

United States Census Bureau (USCB). 2002. Income in the United States. Retrieved: November 2004. Site: http:// www.census.gov/hhes/income/income02.sa.pdf.

United States Geological Survey (USGS). June 2002 Pharmaceuticals, Hormones, and Other Organic Wastewater Contaminants in U.S. Streams. Fact Sheet FS-027-02.

APPENDIX A:
Volume I Water Resources Component

SAWPA 2002 Santa Ana Integrated Watershed Plan

Included on the enclosed CD

APPENDIX B:

Volume II Environmental and Wetlands Component

SAWPA 2002 Santa Ana Integrated Watershed Plan

Included on the enclosed CD

APPENDIX C:

Volume III Upper Santa Ana Regional Interceptor (SARI) Planning Component

SAWPA 2002 Santa Ana Integrated Watershed Plan

Included on the enclosed CD

APPENDIX D:

Old, Grand Prix and Padua Fires Burn Impacts to Water Systems and Resources Report

SAWPA Commission Report, October 2003

Included on the enclosed CD

APPENDIX E:
Santa Ana River Projected Flow Impacts Report

SAWPA Commission Report, March 2004

Included on the enclosed CD

APPENDIX F:
Santa Ana River Watershed Regional Perchlorate Investigative Report

SAWPA Commission Report, November 2004

Included on the enclosed CD

APPENDIX G:
Water and Santa Ana River Watershed Economy

Santa Ana Watershed Coalition. Presentation: April 2005

Included on the enclosed CD

APPENDIX H:
Santa Ana River Watershed Regional Groundwater Management Plan

SAWPA 2005

Included on the enclosed CD

APPENDIX I:
Urban Water Management Plan

SAWPA 2005

Included on the enclosed CD

APPENDIX J:
List of Organizations Solicited by SAWPA to Participate in IWP

Water and Wastewater Agencies

Big Bear City Community Services District
Big Bear Municipal Water District
Box Springs Mutual Water Company
Cherry Valley Water District
Chino Basin Water Conservation District
Chino Basin Watermaster
Coachella Valley Water District
Cucamonga Valley Water District
Desert Water Agency
East Valley Water District
Eastern Municipal Water District
Edgemont Community Services District
El Toro Water District
Elsinore Valley Municipal Water District
Fern Valley Water District
Fontana Union Water Company
Fontana Water Company
High Valleys Water District
Home Gardens County Water District
Idyllwild Water District
Inland Empire Utilities Agency
Irvine Ranch Water District
Jurupa Community Service District
La Habra Heights County Water District
Laguna Beach County Water District
Lake Hemet Municipal Water District
Lee Lake Water District
Los Alisos Water District
Marygold Mutual Water
Mesa Consolidated Water District
Metropolitan Water District of Southern California
Mission Springs Water District
Monte Vista Water District
Moulton Niguel Water District
Municipal Water District of Orange County
Nuevo Water Company
Orange County Sanitation District
Orange County Water District
Pine Cove Water District
Rancho California Water District
Riverside - Highland Water Company
Rubidoux Community Service District
Running Springs Water District
San Antonio Water
San Bernardino Valley Municipal Water District
San Bernardino Valley Water Conservation District
San Gorgonio Pass Water Agency
Santa Ana River Water Company
Santiago County Water District
Serrano Water District
Southern California Water Company
Three Valley Municipal Water District
Trabuco Canyon Water District
Victor Valley Water District
West Valley Water District
Western Heights Mutual Water Company
Western Municipal Water District
Yorba Linda Water District
Yucaipa Valley Water District

Cities

City of Anaheim
City of Banning
City of Beaumont
City of Big Bear Lake
City of Brea
City of Buena Park
City of Canyon Lake
City of Cerritos
City of Chino
City of Chino Hills
City of Claremont
City of Colton
City of Corona
City of Costa Mesa
City of Cypress
City of Diamond Bar
City of Fontana
City of Fountain Valley
City of Fullerton
City of Garden Grove
City of Grand Terrace
City of Hawaiian Gardens
City of Hemet
City of Highland
City of Huntington Beach
City of Irvine
City of La Habra
City of La Habra Heights
City of La Mirada
City of La Palma

City of Lake Elsinore
City of Lakewood
City of Loma Linda
City of Long Beach
City of Los Alamitos
City of Los Angeles
City of Mission Viejo
City of Montclair
City of Moreno Valley
City of Newport Beach
City of Norco
City of Ontario
City of Orange
City of Perris
City of Perris Public Works
City of Placentia
City of Pomona
City of Rancho Cucamonga
City of Redlands
City of Rialto
City of Riverside
City of San Bernardino
City of San Jacinto
City of Santa Ana
City of Santa Fe Springs
City of Seal Beach
City of Stanton
City of Tustin
City of Upland
City of Villa Park
City of Westminster
City of Whittier
City of Yorba Linda
City of Yucaipa

Counties

County of Riverside
Riverside County Flood Control & Water Conservation District
County of San Bernardino
County of San Bernardino Flood Control District
County of Orange

Environmental Organizations

Friends of The Los Angeles River
Keep Riverside Clean & Beautiful
National Audubon Center
Natural Resources Conservation Service
Orange County Coastkeeper
San Gabriel Mountains Regional Conservancy
Save Our Shores
Sierra Club Angeles Chapter (Orange Cnty.)
Sierra Club Regional Office
The Nature Conservancy

Universities and Colleges

California Baptist University
California Polytechnic Institute, Pomona
California State University Long Beach
California State University, San Bernardino
La Sierra University
Mt. San Jacinto College
Riverside Community College
University of California, Riverside
Urban Water Research Center, University of California, Irvine
Water Resource Institute

Federal Agencies

Angeles National Forest - Santa Clara/Mojave
Los Angeles National Forest
San Bernardino National Forest
U. S. Army Corps of Engineers
U. S. Bureau of Land Management
U. S. Bureau of Reclamation
U. S. Environmental Protection Agency
U. S. Fish & Wildlife Services
U. S. Forest Service
U. S. Forest Service - Lytle Creek
U. S. Geological Survey

Indian Tribes

Morongo Band of Mission Indians
Pechanga Band of Luiseno Indians
Ramona Band of Mission Indians
Santa Rosa Band of Mission Indians
Soboba Band of Luiseno Indians

State Agencies

California Citrus Co-Op
California Coastal Commission
California Department of Fish & Game
California Department of Food And Agriculture
California Department of Forestry & Fire Protection
California Department of Health Services
California Department of Health Services, Food & Drug
California Department of Parks & Recreation
California Department of Toxic Substances Control
California Department of Transportation
California Department of Water Resources

California Department of Water Resources
California Exotic Pest Plant Council
California Institute For Men
California Institute For Women
California Milk Producers Council
California Resource Agency
California Rural Water Association
California Wildlife Conservation Board
Santa Ana Regional Water Quality Control Board
State Water Resources Control Board

Other Organizations

American Water Works Association
Baldy View Public/Private Coalition
Big Bear Area Regional W W
Canyon Lake Property Owners Association
Coachella Valley Economic Partnership
Economic Development Agency of Riverside County
Economic Partnership Pass Area Community
Hemet/san Jacinto Action Group
Inland Empire Coalition
Inland Empire West Resource Conservation District
Inland Valley Economic Development Corp.
Jurupa Area Recreation & Park District
La Raza Coalition
Lake Elsinore & San Jacinto Watersheds Authority
League of California Cities
Los Angeles/San Gabriel Rivers Watershed Council
Lytle Creek Watershed Coalition
March Joint Powers Authority
Milk Producers Council
Mono Lake Committee
Palo Verde Irrigation District
Riverside - Corona Resource Conservation District
San Jacinto Basin Resource Conservation District
San Jacinto River Watershed Council
Santa Ana Watershed Association
Soil Conservation Service Resource Conservation District
South Coast Air Quality Management District
Southern California Association of Governments
Southern California Water Committee
Southern California Wetlands Recovery Project
Sun City Civic Association
United Dairymen of California
Valley Sanitary District
Western Riverside Council of Government
Western States Water Council

APPENDIX K:
SAWPA Proposition 50 On-Line Project Proposal Application

SAWPA SAWPA Project Information Form for Prop 50 Potential Funding

® Indicates Required Fields

Agency Information

Agency or Organization ®: _____

Contact Name ®: First: _____ Last: _____

Mailing Address ®: _____

City ®: _____State: CA Zip®: _____

Email ®: _____

Phone ®: (_____) _____-_____ Ext. _____ Fax: (_____) _____-_____

Cell Phone: (_____) _____-_____

General Information

Project Name ®: _____

Project Type

- O Construction
- O Planning

Project Cost ®: $_____

Project Description ®:

_____

_____

_____

_____

Project Location ®:

_____

_____

(Please be as specific as possible)

This project is an ®: Independent operable project _____

Operable segment of larger project _____

Larger Project: Start Date _____ Complete Date: _____

Annual Water Yield (AF) ®: _____ Annual yield = 3 X Storage

Are there any significant institutional barriers to project ®? (If Yes, describe)

O Yes

O No

_____

_____

_____

Has your agency constructed similar projects in the past ®?

O Yes

O No

Has CEQA been Completed ®? O Yes Actual or estimated date: _____

Completion preferred O No

Provide current estimated construction contract award date ®:_____

Project Funding Information

Approximately what portion of the project funding is expected from ®:

Prop 50	$_____	_____%
Other State funds	$_____	_____%
Local matching funds	$_____	_____%
Other matching funds	$_____	_____%
Total project	$_____	_____%

Is your agency/organization able to fund pre-construction work, design, CEQA, etc. ®?

O Yes

O No

Please describe any other funding opportunities available to this project:

_____

_____

_____

Proposition 50 Purposes

Which purposes of Proposition 50 Section 79561 are met by this project? (At least on required) ®

☐ Programs for water supply reliability, conservation, and efficiency:

☐ Storm water capture, storage, treatment, and management:

☐ Removal of non-native plants, creation and enhancements of wetlands:

☐ Non-point source pollution reduction, management and monitoring:

☐ Groundwater recharge and management:

☐ Contaminant and salt removal:

☐ Water banking, exchange, reclamation, and quality improvement.:

☐ Planning, implementation of multipurpose flood control programs:

☐ Watershed management and planning:

☐ Projects to develop new water treatment and distribution methods:

☐ Provide others benefits to the watershed:

Construction Criteria
(for Construction Projects Only)

The State will evaluate construction projects according to the criteria below. Please demonstrate how your project meets each of the criteria, or explain how the criterion is not applicable to your project®

Please describe how your project provides environmental, recreation and other multiple benefits.

Please describe the critical negative impacts of not implementing the project.

If your project is related to water quality describe how the project will contribute to the long-term attainment and maintenance of water quality standards and will eliminate or significantly reduce pollution into impaired waters and sensitive habitats.

The State will evaluate projects based on the extent to which the applicant demonstrates the project is technically feasible and able to be permitted. Please describe the permits you have, or will attain for the project.

Demonstrate there is sufficient baseline data and technical knowledge to manage the project

Please describe performance measures you will use to determine the effectiveness of the project. How will the monitoring component integrate into statewide monitoring efforts

Please describe how you will support the long term O&M of the project both operationally and financially.

Please describe your experience with implementation of similar projects of both size and type. Give examples of projects you have completed successfully

Does the project consider statewide and Santa Ana Region strategic planning goals (basin wide objectives, reduce water rights conflicts, TMDLs, RWQCB Watershed Intitiative Chapters, CALFED ROD Objectives, floodplain management task force, desalination task force, environmental justice or statewide needs)

Project Attachments and Miscellaneous

Is your project located within a Disadvantaged Community (census tracts with annual income < 80% California statewide annual median of $48,113). If so please indicate the city/town the disadvantaged community is in and the general area of the community (e.g. northwest Riverside). Leave blank if none. A map of Disadvantaged Communities in the Watershed is available at http://www.sawpa.net/maps/income_tracts

Please add any additional information about your project or any comments you have on this form:

Please attach a project map ®

Please attach a project schedule

SAWPA SAWPA Project Information Form for Prop 50 Potential Funding Cooperating Agencies

Agency or Organization®: _____

Contact Name®: First: _____ Last: _____

Phone: (_____) _____-_____ Ext. _____ Fax: (_____) _____-_____

Role or Contribution®:

_____

_____

_____

_____

_____

For Further Information

Santa Ana Watershed Project Authority
11615 Sterling Avenue
Riverside, CA 92503
(951) 354-4224
www.sawpa.org

MEMBER AGENCIES

Eastern Municipal Water District
www.emwd.org

Inland Empire Utilities Agency
www.ieua.org

Orange County Water District
www.ocwd.com

San Bernardino Valley Municipal Water District
www.sbvmwd.com

Western Municipal Water District
www.wmwd.com