

## 2.0 KEY REGIONAL ISSUES

The following sections describe some of the issues of wide significance in the Santa Ana River Basin. These include nitrogen/TDS management in the Santa Ana River (Section 2.1), water quality problems associated with dairies (Section 2.2), and coastal beaches (Section 2.3). A list of water quality projects and project needs that target these and other key water-quality issues along with information about potential sources of funding for these projects and needs, is also included (Section 2.4.)

### 2.1 SANTA ANA RIVER WATERSHED NITROGEN/TDS MANAGEMENT

Water quality degradation due to high concentrations of nitrogen and total dissolved substances (TDS) is among the most significant regional water quality problem in the Santa Ana River Watershed. Historically, the Santa Ana River and its major tributaries likely flowed during most of the year, recharging deep alluvial groundwater basins in the inland valleys and the coastal plain. However, irrigation projects eventually led to the diversion of most of the streams tributary to the river, and the quantity of groundwater recharge diminished greatly. Diverted stream flows were used to support extensive irrigated agriculture operations, principally citrus orchards that were also reliant on the use of nitrogen fertilizers to sustain crop yields. As a consequence of these historic practices, water quality issues in the Santa Ana River Watershed have often revolved around elevated concentrations of TDS and total inorganic nitrogen (TIN).

#### *Total Dissolved Solids*

Water from the Santa Ana River is used multiple times as it moves downstream through the watershed. Each cycle of use adds an increment of salt, whether through addition of soluble materials as a result of consumptive use, or through evaporation and evapotranspiration. Typically, each use adds 200-300 parts per million (ppm) or milligrams per liter (mg/L) of TDS.

Major efforts to address the salt balance problem include the Regional Board's program of regulating TDS levels in waste discharges, import and recharge of large volumes of low-TDS water from the State Water Project (SWP), construction of the Santa Ana River Interceptor (SARI) Line to export high TDS wastes from the upper Santa Ana River Basin, and operation of groundwater desalting facilities that extract high-TDS groundwater, remove excessive TDS, export the resulting brine via the SARI Line, and provide water supplies with lowered TDS levels. In 2000, the Santa Ana Watershed Project Authority (SAWPA) began operating a 9 million-gallon per day groundwater desalter in the Chino Basin. Another 8 million-gallon per day groundwater desalter will be operational by 2004. The goal is to have over 40 million gallons per day of groundwater desalting capacity in the Chino Basin by 2020. Other desalters include SAWPA's Arlington Desalter, operating since 1990, the City of Corona's Temescal Basin Desalter, operating since 2002, and Eastern Municipal Water District's Sun City Desalter, operating since 2003. Eastern MWD has plans for two more desalters in the Menifee area.

#### *Nitrogen*

Degradation of water quality at Prado Dam due to nitrogen (often expressed as Total Inorganic Nitrogen, or TIN) was first observed in the mid-1980s. The elevated TIN concentrations in groundwater are largely due to historical agricultural practices in the Santa Ana River Watershed. From 1986 onwards, the nitrogen water quality objective (WQO) for the Santa Ana River at Prado has been exceeded. A significant increasing trend in concentrations was observed and it was recognized that the nitrogen wasteload allocations specified in the 1983 Basin Plan were no longer adequate. The Regional Board derived a new nitrogen allocation, using computer modeling, and recommended that POTW discharges be limited to 10 mg/L TIN. However, POTW dischargers argued that additional studies were required to verify the Regional Board's analysis.

In early 1988, a Nitrogen Task Force was formed to finance and oversee these studies, and its scope of work was broadened to include TDS and groundwater. In the interim, the Regional Board adopted a WQO of 10 mg/L TIN for new discharges, while requiring existing discharges to conform to their 1987 July-September average TIN concentrations. The studies conducted by the nitrogen task force were used in developing the 1995 Basin Plan.

***Nitrogen/TDS Study***

A TIN /TDS Task Force was formed in 1995 to provide funding, oversight, supervision, and approval of a study to evaluate the impact of Nitrogen and TDS on water resources in the Santa Ana River Watershed. The study was coordinated by SAWPA, and investigated questions related to nitrogen and TDS management in the watershed, including groundwater subbasin water quality objectives, subbasin boundaries, and regulatory approaches to wastewater reclamation and recharge.

**Members of the TIN/TDS Task Force**

Chino Basin Water Conservation District	Jurupa Community Services District
Chino Basin Watermaster	Orange County Sanitation District
City of Colton	Orange County Water District
City of Corona	Santa Ana Regional Water Quality Control Board
City of Redlands	Riverside-Highland Water Company
City of Rialto	San Bernardino Valley Municipal Water District
City of Riverside	San Bernardino Valley Water Conservation District
City of San Bernardino	Santa Ana Watershed Project Authority
Eastern Municipal Water District	US Geological Survey – Advisory Member
Elsinore Valley Municipal Water District	West San Bernardino County Water District
Inland Empire Utilities Agency	Yucaipa Valley Water District

The study findings recommended changes in groundwater water quality objectives and subbasin boundaries that would substantially affect management of water quality throughout the entire Santa Ana River. Basin Plan amendments to incorporate these changes were considered by the region’s stakeholders and the Regional Board in a series of workshops and hearings. In January 2004, the Regional Board adopted Basin Plan amendments that revised TDS and TIN objectives and created groundwater management zones over large parts of the region.

## 2.2 DAIRIES

Dairy, calf and heifer ranches began concentrating in the Chino Basin in the late 1950's and 1960's, leaving rapidly urbanizing Orange County and southeastern Los Angeles County. To provide some protection against future urban encroachment for the growing industry, a dairy preserve was created in the San Bernardino County area of the Chino Basin. Currently, all of the dairies in the Chino Basin are located in and around the preserve, in the southern portion of the Chino Basin adjacent to the Santa Ana River, an area of approximately 25 square miles. Region-wide, about 340,000 dairy animals reside on fewer than 250 facilities, including a number of dairies that are located along the San Jacinto River Valley, in Riverside County. Many of the dairy facilities have a density of 30 to 40 cows per acre. Both the number of animals and the number of facilities is declining as land is converted from agriculture to more urban uses. However, the trend has been toward fewer, but larger, facilities.

Water quality problems associated with dairy wastes include TDS and TIN degradation of groundwater in the Chino Basin and Orange County, and adverse impacts to the Santa Ana and San Jacinto Rivers. The Chino Basin is the largest groundwater basin in the region and one of the largest basins in southern California. Groundwater in the basin has been impacted by high levels of nitrates and other salts present in discharges from dairies and other existing and historic intensive agricultural operations throughout the basin. The discharge of millions of gallons of dairy wash water per day to unlined ponds continues to contribute to this impact. Dairy facilities use as much as 50 gallons of water to wash down each cow prior to each milking, generating over 14 million gallons per day of wash water in the Chino Basin. Management practices for dairy wash water currently involve long-term storage in ponds, where wash water and runoff with manure is left to evaporate, percolate into groundwater, or sprayed onto fodder crops and/or disposal lands. In addition, nitrate-laden rising groundwater entering the Santa Ana River impacts the quality of the river water used to recharge groundwater basins in Orange County.

The lack of adequate local composting capacity, high hauling costs and tipping fees, and inadequate market demand for composted dairy manure has created obstacles to efficient removal manure from the Chino Basin and elsewhere in the region. As a consequence, illegal manure disposal has occurred, necessitating enforcement actions that led to prosecution, fines and penalties. Despite high transportation costs, manure is trucked out of the basin and into the agricultural counties of the southern San Joaquin Valley, hundreds of miles away.

The Regional Board began regulating dairies in 1972 by adopting individual waste discharge requirements (WDRs) for all dairies in the region. The WDRs limited the rate of on-site manure disposal and prohibited off-site wastewater discharges except in the event of a 24-hour, 25-year storm. However, when the Board reviewed its dairy regulatory policy for Chino Basin in 1990, it became evident that the WDRs were not effective in protecting the water quality of the Santa Ana River and the Chino Groundwater Basin. Significant amounts of manure were still being applied to land, and many dairies were still not able to contain waste runoff from large storms. As a result, in 1994, the Board adopted general waste discharge requirements (WDR) and National Pollutant Discharge Elimination System (NPDES) permit for all dairies in the region. The permit required implementation of a manure tracking system and a groundwater monitoring program, and Engineered Waste Management Plans (EWMPs) were required for new operations and problem facilities.

The 1994 general WDR / NPDES dairy permit expired in 1999, and the Board adopted a new, even more restrictive general WDR / NPDES permit for dairies. The new requirements prohibited the disposal of manure in the region, prohibited the application of manure for fertilizer in the Chino Basin (and other basins lacking assimilative capacity for TDS, as shown in the Basin Plan), limited the application of manure for fertilizer in other basins to agronomic rates, and required all dairies to develop and implement an EWMP. In accordance with a time schedule included in a concurrently adopted cease and desist order, all EWMPs were to be submitted by June 2003. Currently, the Board's limited dairy regulatory program resources are focused primarily on reviewing, commenting on and approving EWMPs, and overseeing the

implementation of EWMPs that have already been approved. Staff continues to conduct routine compliance inspections and complaint investigations, initiate enforcement actions, and perform other duties associated with overseeing compliance with the dairy general WDR / NPDES permit.

The high concentration of dairies in the Chino Basin, and other factors, has resulted in a situation that goes beyond the compliance problems of individual dairies, and extends to the local dairy industry as a whole. Increased herd size, lack of sufficient land to dispose of dairy wastes and dairies being flooded by storm water runoff from urbanized communities in the upslope areas of the Chino Basin have resulted in the need to explore and develop regional solutions to the water quality problems associated with the Chino Basin dairies. In addition to its regulatory program for individual dairies, the Regional Board is working with other public agencies and dairy industry organizations to identify and implement regional solutions to these problems.

With the assistance of a watershed coordinator initially funded by the Orange County Sanitation Districts, the Santa Ana River Watershed Group (SARWG) was formed in the late 1990s. Within this organizational framework, the Orange County Sanitation Districts, the Orange County Water District, the Regional Water Quality Control Board, the San Bernardino County Transportation and Flood Control District, the dairy industry, and others, are working together in an attempt to address water quality problems associated with the local dairy industry. A pilot project to sewer as many as nine dairies has been operating since 2001. A state-of-the-art regional organics management center that would accept a significant amount of the manure generated in the Chino Basin has been proposed but not constructed.

In 1995, the Inland Empire Utilities Agency began operating a co-composting facility in the Chino Basin, where wastewater treatment biosolids and dairy manure were both composted. However, the maximum capacity of the facility has not been utilized due to difficulty in finding adequate markets for the finished product.

In 2001, Congress authorized an appropriation of approximately \$20 million to address the uncontrolled flooding from upslope urban development that flows through corrals and other manure-covered areas of the Chino Basin. This funding was to be spent over the next four to five years on initial projects, including several interim projects such as detention basins to help control peak flows. The total flood control project is estimated to cost approximately \$130 million. State and federal loans and grants, including from the state revolving fund administered by the SWRCB, are being used to help fund the facilities. It is projected that over the next twenty plus years, most of the dairy preserve areas will be urbanized.

In July 2000, Orange County Water District (OCWD) received a 319(h) grant for \$210,656 to develop a dairy washwater treatment demonstration project in the Chino Basin. (OCWD manages the SAR flows below Prado Dam to recharge the groundwater basin that supplies over 2 million residents with about 75% of their municipal supply.) The purpose of the demonstration project was to show how wetlands technology can treat dairy washwater to generate a product water suitable for reuse as "utility water" on a dairy. Reusing treated water would reduce the amount of groundwater pumped, reduce the amount of washwater stored in ponds and sprayed on disposal lands, and thereby reduce contaminants entering groundwater supplies as a result of percolation, create pond storage capacity for flooding or other emergencies, and reduce the risk of pond berm failures by operating ponds at lower levels. The demonstration project was completed and met its objectives, however, the local dairy community has not embraced the technologies it featured.

## 2.3 COASTAL BEACHES

There are approximately 74 miles of Orange County coastal and bay beaches that are within the Santa Ana Region. These beaches receive a large number of visitors and generate considerable revenue for local businesses and the municipalities.

Following the approval of Assemble Bill (AB) 411 in 1997, new requirements for protection of beach water quality, specifying higher testing frequencies and more stringent criteria for public health advisories and beach water closures, went into effect in 1999. Orange County Health Care Agency (OCHCA) and Orange County Sanitation District (OCSA) conduct the required testing program, collecting samples, ankle deep, at the same monitoring stations through the year. Beaches are posted with advisory or closure notices are required when testing indicates that water quality objectives for bacteria are exceeded. The required protocol for evaluating beach water quality test results includes a total coliform-to-fecal coliform ratio of 10 to 1, or fecal to total ratio of 0.1. These criteria are:

	<u>Maximum</u>	<u>Geometric Mean</u>
Total Coliform	10,000	1,000
Fecal Coliform	400	200
Enterococcus	104	35

Units = MPN (most probable number) or CFU  
(colony forming units)

In accordance with AB 411, all storm drain outlets into the ocean now have permanent warning signs, informing the public that the water may be contaminated.

Monitoring data collected since 1999 demonstrate that there have been occasional episodes when microbial levels monitored at public beaches in the Region exceed the allowable levels specified by state regulations. AB 411 requires beach water closures if there is any evidence of sewage. When sewage spills occur, Orange County Health Care Agency takes a conservative approach and closes beaches most likely to be affected by the spill. Portions of Seal Beach, Sunset Beach, Bolsa Chica State Beach, Huntington Harbour, Huntington City Beach, Huntington State Beach, Newport Beach, Newport Slough, and Newport Coast were closed to body contact recreation on 42 occasions during the period from January 2000 through December 2001.

### ***Causes of Beach Closings/Postings***

To date, studies have indicated that beach water postings cannot be linked to any single source, although there are a number of suspected or potential sources, and contributing factors, that have been investigated. These include unreported sewage spills and leaks, urban runoff, behavior of the waste plume discharged from Orange County Sanitation District's ocean outfall, the AES power plant discharge offshore from Huntington State Beach, discharges from vessel pump out stations or vessel holding tanks, failing septic systems, deteriorated sewage infrastructure, coastal wetlands, marshes and wildlife. However, all 42 closures indicated above were due to sewage spills or leaks that reached, or threatened to reach, ocean waters.

### ***Source Investigations***

During the summer of 1999, from July 1<sup>st</sup> to early September, portions of Huntington State Beach and Huntington City Beach ranging from 1 to 5 miles long were closed to body contact recreation due to extremely elevated and tracking levels of total coliforms, fecal coliforms and enterococci bacteria (pre-AB411 regulations). In response, the Regional Board's Executive Officer issued a Cleanup and Abatement Order requiring the City of Huntington Beach to conduct an investigation of its sanitary sewers and to determine the impact of leaking sewers on the microbial levels being observed at the

beaches. The Cleanup and Abatement Order also required the City to develop and implement a plan for repairing leaking sewers throughout the City.

The City of Huntington Beach completed the investigation of the sewer system and concluded that leaking sewers had not contributed to the beach water pollution problems at Huntington Beach, or adversely impacted ground water quality. However, these investigations and other similar studies indicated that sewage leaks and spills from deteriorated or improperly maintained sewer lines could be a significant source of near-shore microbial contamination in ocean waters. The Orange County Sanitation District (OCSD) also conducted an intensive survey of its sewer lines in the area, and found no indications that leaks from its facilities caused the microbial levels observed at the beaches.

The 1999 Huntington Beach closures resulted in intense efforts to identify the sources of microbial contamination. Under authority of California Water Code Section 13267, the Board's Executive Officer directed the County of Orange and the coastal cities to conduct an investigation to identify and remediate the sources of microbial contamination. The County in cooperation with the cities, OCSD, and the National Water Research Institute (NWRI) commissioned a study of the causes of bacterial contamination in the waters off Huntington Beach. The study was led by researchers on the faculty of the University of California at Irvine (UCI), and included experts from local, state and federal agencies, and from other universities. The OCSD, UCI (Phase 2 Report), and City of Huntington Beach studies failed to identify the source(s) of the microbial contamination.

The UCI study indicated that the Talbert Marsh might be contributing to the microbial problem in the near-shore zone. OCSD, the UCI researchers, and their technical committee also conducted a study of the dynamics of the OCSD offshore discharge plume, and its possible relationship to the beach pollution. No linkage between the OCSD ocean discharge and the elevated microbial levels in Huntington Beach was found.

The AES power plant discharge has periodic elevated bacterial levels. However, studies of this discharge preliminarily indicate that the discharge is not likely impacting the nearshore zone of Huntington Beach.

Board staff requested and received \$200,000 from the State Water Resources Control Board's Cleanup and Abatement Account to help support a study of the Lower Santa Ana River and Newport Slough to determine the amount of bacterial pollution from these two sources. The County, OCSD, the coastal cities, and NWRI also contributed to this study. This Phase 2 study looked at contributions to the microbial problem in Huntington Beach from nuisance and urban runoff, the natural environmental sources (wildlife, wetlands, etc.), leaking sewer lines, ocean outfalls and tidal input. All of these studies indicate that a number of sources are causing or contributing to the elevated microbial counts occasionally encountered at Orange County beaches.

#### ***Regional Board Activities to Minimize Beach Closures***

The Regional Board is taking a variety of steps to address the cause of beach postings and closures in Orange County. The Board's permit for the Orange County municipal separate storm sewer system (MS4) was revised in 2003, and includes new requirements to address bacterial contamination problems resulting from urban runoff, such as:

- diversion of dry weather flows (being implemented);
- best management practices to eliminate sources of bacterial contamination; and
- investigation and remediation of infiltration into MS4 systems from leaking sanitary sewer lines.

Bacterial contamination in urban runoff is an extremely difficult problem to control due to the diverse, and sometimes unknown, sources of the contamination. Significant resources (both money and personnel) are being dedicated to address this problem. Source identification studies and methods are needed to

determine where origins of the bacterial loadings (both host organism and geographic distribution) and how to control their release into the flood control channels and marine and estuarine waters.

***Orange County Sanitary Sewer Overflow (SSO) Waste Discharge Requirements (WDRs)***

Based on the finding that a number of the beach water closures in Orange County are due to SSOs and the fact that most of these SSOs are preventable, the Regional Board adopted waste discharge requirements for sewage collection agencies in Orange County that are within the Santa Ana Region, requiring development and implementation of Sewer System Management Plans (SSMP). The SSMPs include programs and policies the agencies propose to address sanitary sewer capacity, management, operation, maintenance, funding, and spill response. Since grease blockage has been identified as one of the major causes of SSOs, the sewage collection agencies are required to implement a fats, oils and greases (FOG) source control program.

There are 27 sewage collection agencies within the Santa Ana portion of Orange County. With the exception of the IRWD, and the El Toro Water District, all the sewage collection systems are tributary to the OCSD system, which operates major trunk line sewers throughout each service area. The agencies collect approximately 240 million gallons per day of wastewater from over 2 million people spread over more than 460 square miles. The entire sewage collection system includes almost 5,000 miles of sewers, and over 100 pump stations.

Many of these collection systems have had sewage spills that resulted in beach water closures. The Basin Plan prohibits the discharge of untreated sewage to any surface water stream, natural or man-made, or to any drainage system intended to convey storm water runoff to surface water streams. The California Water Code (Section 13260) and the Clean Water Act (Section 402) prohibit the discharge of pollutants to surface waters without a NPDES permit. Since the order was adopted and SSMPs implemented, there has been a reduction in the number of sewage spills and beach closures triggered by sewage spills.

## 2.4 REGION 8 GRANT PROJECT PRIORITIES and PRIORITIZED PROJECTS AND PROJECT NEEDS LISTS

Table 2 at the end of this section describes regional priorities for grant projects in Region 8. Tables 2-1 and 2-2 list projects and project needs in Region 8 that can be used as a stakeholder guide to projects that could be funded through competitive grants, and show which of the listed projects and project needs align with a regional priority. The tables purposefully do not list suggested funding sources or attempt to match potential funding sources with projects. Potential funding from a variety of sources are discussed below and at the State Water Resources Control Board's "Grants and Loans" website link at [www.waterboards.ca.gov/funding/index.html](http://www.waterboards.ca.gov/funding/index.html). The California Watershed Funding Database, available at <http://calwatershedfunds.org/index.php>, also provides access to a wide range of resources that can be used to fund watershed projects.

Table 2, *Regional WMI Water Quality Priorities for Grant Projects*, was presented to the Regional Board on September 17, 2004 as a ranked priority list of eight project categories. By aligning proposed projects with regional priorities, grant applicants can use these priorities to develop ideas for projects that are more likely to receive grant funding, and to improve the quality of grant proposals through linkages to Board priorities and the WMI chapter. WMI-listed projects that also address a regional priority should receive more favorable consideration when competing for grants. Table 2 also lists three preference conditions that, if satisfied, will enhance a proposed project's standing in competitive selection processes. The priorities listed in Table 2 contain a reference to germane project areas in Tables 2-1 and 2-2, *Santa Ana Region (Reg. 8)WMI Targeted Projects, Needs, or Activities*.

Table 2-1 and Table 2-2, *Santa Ana Region (Reg. 8)WMI Targeted Projects, Needs, or Activities* ("projects"), presents the list of regional projects and project needs suggested and/or favored by Regional Board staff, in two separate ways. These potential projects and project needs are intended to restore, protect, or enhance water quality characteristics and beneficial uses in one or more watersheds, including coastal areas. Projects that address a regional priority are shaded. Table 2-1 displays, in tabular form, projects and project needs by Watershed Management Area, and by those benefiting multiple watersheds. Table 2-2 is a narrative list of the same projects, identified as general tasks/activities that could be applicable regionwide or pertinent to one of the Region's Watershed Management Areas. The shaded projects (i.e., projects that address a regional priority) in Tables 2-1 and 2-2 correlate to at least one of the eight regional priorities listed in Table 2. With input from Regional Board staff and interested watershed stakeholders, Tables 2-1 and 2-2 will be periodically updated and revised as projects receive funding or water quality problems are resolved.

### ***Potential Sources Of Funds***

In the past, interested watershed stakeholders have sought funding for implementation and planning projects by responding to requests for proposals for Nonpoint Source Program and Water Quality Management Programs grants offered by the State Water Resources Control Board (SWRCB) and funded through the USEPA's CWA Sections 319(h) and 205(j) programs, respectively. The SWRCB also administers the State Revolving Fund, a low-interest loan program that can help fund capital expenditure projects for water quality infrastructure. The following list identifies several other funding programs potentially available directly or indirectly support water quality goals. Stakeholders seeking grants for their projects are encouraged to use the Internet to obtain current information about these and other potential funding opportunities.

### ***Federal Programs***

Land and Water Conservation Fund (LWCF): The LWCF is revenue from outer continental shelf leases and royalties. Although the authorized level of funding annually is \$900 million, Congress appropriates much less for the acquisition of land for conservation by the U.S. Forest Service, Bureau of Land Management, National Park Service, and the U.S. Fish and Wildlife Service. Contact your Congressional Representative or regional office of any of the federal agencies for more specific information.

National Coastal Wetlands Conservation Grants: Funds generated from excise taxes on sport fishing equipment and boat gasoline taxes are set aside in the Sport Fish and Restoration Account of the Aquatic Resources Fund for grants to state agencies for the acquisition, restoration, and enhancement of coastal wetlands systems. Grants are available to all coastal states and require a 50/50 match.

North American Wetlands Conservation Act (NAWCA): NAWCA provides federal funds specifically to “conserve North American wetland ecosystems and waterfowl and the other migratory birds and fish and wildlife that depend on such habitats” (PL 101-233). Eligible projects include acquisition and restoration of wetlands among other activities. Proposals require a 50/50 nonfederal match and are accepted twice a year in March and August. A small grants program is also available with a December 1 deadline. These grants cannot be used to fund research or education.

Wetlands Reserve Program: Funds are available through the U.S. Department of Agriculture as part of the 1996 Farm Bill for the acquisition of conservation easements on agricultural lands. For more information, contact the local National Resource Conservation Service office.

CALFED Bay-Delta Program: The CALFED Bay-Delta Program is a joint state and federal program charged with managing water quality in the Sacramento River Delta. Ecosystem restoration, watershed management, and water quality improvement are major components of the program. Over \$100 million has been allocated to date. Grants range in size from \$10,000 - \$2 million.

Army Corps of Engineers/Sections 1135 & 206: Section 1135 funds are available for the restoration and acquisition of wetlands previously affected by an Army Corps project. Section 206 funds provide for the restoration of aquatic ecosystem structure and function. Projects usually include the manipulation of the hydrology in and along bodies of water, including wetlands and riparian areas. No relationship to an existing Corps project is required.

Environmental Protection Agency (EPA): Various grants in the range of 25k-350k are available through the EPA for watershed planning, restoration and stewardship studies for state, tribal and local governments. For more information, visit USEPA’s website at [www.epa.gov/epahome/grants.htm](http://www.epa.gov/epahome/grants.htm). Also refer to the Nonpoint Source information under state programs.

Partners for Fish & Wildlife Program: The U.S. Fish and Wildlife Service offers cost-share programs to restore and enhance fish and wildlife habitats on private land. For more information or visit <http://partners.fws.gov/index.htm>.

U.S. Dept. of Agriculture Natural Resource Conservation Service (NRCS): Wildlife Habitat Incentives Program (WHIP) is a voluntary program for private landowners who want to develop or improve fish and wildlife habitat on their property. The Natural Resource Conservation Service (NRCS) administers the program, providing technical assistance and up to 75% of the cost of the project. NRCS also offers watershed planning services that may lead to the commitment of financial resources for project implementation. Contact your local NRCS for more information or [www.nrcs.usda.gov/NRCSProg.html](http://www.nrcs.usda.gov/NRCSProg.html).

Watershed Assistance Grants (WAG): The River Network allocated funding to build capacity of existing or new watershed partnerships to protect and restore their watersheds. For more information, visit their website at [www.rivernetwork.org](http://www.rivernetwork.org).

### ***State Programs***

The State Water Resources Control Board administers a wide variety of grant and loan programs. The State Revolving Fund is a low interest loan program that can be used for wastewater collection and treatment systems, water recycling systems, and other water quality infrastructure needs. NonPoint Source (NPS) Program grants, funded by through Clean Water Act Section 319(h), are offered annually

for implementing NPS reduction projects that implement TMDLs. State and local agencies and non-profits may apply. Limited funding for planning grants may also be available through Clean Water Act Section 205(j). The SWRCB also plays a key role in administering grants authorized by voter-approved bonds, such as Propositions 13, 40 and 50.

**Coastal Conservancy:** The Conservancy has grant funding for the acquisition, restoration and enhancement of significant coastal and bay resource and habitat lands. Grants are also available for the preparation of plans for the enhancement and restoration of wetlands, dunes, rivers, streams, and watersheds. State and local agencies and non-profits may apply.

**Wildlife Conservation Board: Inland Wetlands Conservation Program and Riparian Habitat Conservation Program:** WCB acquires and restores wildlife habitat throughout California. WCB also manages the Inland Wetlands program for the acquisition and restoration of wetlands in the Central Valley and Riparian Habitat conservation program focuses on protecting and restoring riparian systems throughout the state.

**Environmental Enhancement and Mitigation Program (EEM):** The EEM program statute allows for \$10 million a year when approved by the legislature for the supplemental mitigation for highway work in three categories, one of which is resource lands. Grants are available for projects that mitigate, directly or indirectly, the environmental impacts of new or modified transportation facilities. Grants are available for land acquisition, restoration enhancement and pollution reduction. Eligible applicants include any local, state, or federal agency, or non-profits. Deadline is in November. Contact the EEMP Coordinator, California Resources Agency, at (916) 653-5656.

**Habitat Conservation Fund:** The California Department of Parks and Recreation administers this grant program for local public agencies for the acquisition and restoration of wildlife habitats and significant natural areas. Deadline is in October. Contact Odell King at (916) 653-7423 or check out website at [www.parks.ca.gov/grants/index/htm](http://www.parks.ca.gov/grants/index/htm).

**Transportation Enhancement Activities Program:** The Federal intermodal surface transportation efficiency act of 1991 (ISTEA) required that states spend a minimum of 10% of their surface transportation program funds on “transportation enhancements” such as the acquisition of scenic lands and mitigation of water pollution due to highway runoff. The program is now called transportation equity act for the 21<sup>st</sup> century (TEA-21). Contact the Caltrans’ transportation enhancement activities office at (916) 654-5275 or visit [www.dot.ca.gov/hq/transenhact](http://www.dot.ca.gov/hq/transenhact).

**Department of Fish and Game (DFG) Fines:** DFG collects fine monies for fish and game code violations. County fish and game committees typically administer these funds. Contact your local Fish and Game office for information.

**Caltrans Mitigation:** Caltrans frequently looks for wetlands projects that can be used to mitigate approved highway projects. Contact your local Caltrans office.

**Urban Streams Restoration Program:** This program is offered by the Department of Water Resources Division of Planning and Local Assistance. The objective is to assist communities in reducing damages from stream bank and watershed instability and floods while restoring the environmental and aesthetic values of streams, and to encourage stewardship and maintenance of streams by the community. For more information, check out [www.dpla.water.ca.gov/environment/habitat/stream/usrp.html](http://www.dpla.water.ca.gov/environment/habitat/stream/usrp.html).

### ***Local***

**General Obligation Bonds:** Cities, counties, and recreation and Park districts have authority to issue bonds for park and open space purposes. If approved, bonds and the interest they incur are re-paid through

property taxes. Current law requires passage by a 2/3 majority vote – bonds issued to fund specific, popular projects are more likely to be approved.

**Assessments:** An assessment may also be referred to as a “special” or “benefit” assessment and involves levying a charge on property owners to provide financing for public improvements. A *Landscaping and Lighting Act Assessment District* is specifically designed to fund landscaping, street lighting, and open space acquisition projects. Proposition A in Los Angeles County, which was approved by county voters in November 1992, created a countywide Landscaping and Lighting Assessment District.

**Local Park Districts:** Many local or regional park districts are actively involved in acquiring and restoring wetland and riparian habitat. For more information, contact your local park district office.

**Flood Control Districts:** The acquisition and restoration of wetlands is increasingly recognized as providing both environmental and flood control benefits. Contact your local district to determine if funds are available.

**Regional Water Quality Control Boards:** In accordance with the SWRCB’s Enforcement Policy, Regional boards may direct a portion of administrative civil liability it collects from violators to local projects. For more information, contact your local regional board, or visit [www.waterboards.ca.gov](http://www.waterboards.ca.gov).

#### ***Private Organizations***

**National Fish and Wildlife Foundation (NFWF):** NFWF has numerous grant programs for the acquisition and restoration of wetlands and watersheds. 2:1 matching funds are required. For more information, visit [www.nfwf.org](http://www.nfwf.org).

**Ducks Unlimited (DU):** DU provides technical assistance, matching funds and help in securing grants for the completion of wetland habitat restoration projects on both public and private land. Call the Western Regional Office of DU at (916) 852-2000 and ask about grants in California.

**Packard Foundation:** The foundation’s Conserving CA Landscapes Initiatives funds habitat protection and watershed projects in the Central Valley, Sierra, and Central Coast. For more information and grant guidelines, call (650) 948-7658 or [www.packard.org](http://www.packard.org).

#### ***Additional Resources***

**Options for Wetland Conservation: A Guide for California Landowners** - Published by the California State Coastal Conservancy, 1994. For a copy, call the Conservancy at (510) 286-1015.

**Funding for Habitat Restoration Projects – A Compendium of Current Federal Programs with Fiscal Year 1996-1998 Funding Levels.** Published by Restore American’s Estuaries. Download from the Internet at [www.estuaries.org/funding.html](http://www.estuaries.org/funding.html) or call (202) 289-2380.

#### **NOAA Funding Opportunities for Community-Based Restoration**

<http://www.nmfs.noaa.gov/habitat/restoration/funding.html>

#### **California Department of Fish and Game Fishery Restoration Grants Program (SB 271)**

<http://www.dfg.ca.gov/>

#### **Department of Water Resources**

<http://www.grantsloans.water.ca.gov/>

## TABLE 2

### Regional WMI Water Quality Priorities for Grant Projects

1. Projects that implement approved TMDLs, including studies called for in TMDL implementation plans (*see Tables 2-1 and 2-2, General Category 5*).
2. Projects that support development of scheduled TMDLs (*see Tables 2-1 and 2-2, General Category 4*).
3. Projects that address pollutant loadings in urban runoff discharges (*see Tables 2-1 and 2-2, General Categories 1, 4, 5, 9*).
4. Projects that protect and improve the quality of local groundwater resources (*see Tables 2-1 and 2-2, General Category 10*).
5. Removal and prevention of invasive, exotic aquatic and riparian vegetation to enhance and protect water quality standards, including habitat and recreation beneficial uses (*see Tables 2-1 and 2-2, General Categories 6, 7, 8*).
6. In support of WARM, COLD, RARE, WILD, SPWN, MAR, SHEL and EST beneficial uses, projects that protect, restore and/or enhance aquatic, wetland, and riparian habitat and habitat connectivity, particularly habitat of rare, threatened and endangered species (*see Tables 2-1 and 2-2, General Categories 3, 7, 8*).
7. Projects that support watershed management planning efforts, especially those that build local capacity in watershed management through citizen involvement and public education (*see Tables 2-1 and 2-2, General Categories 1, 6, 9*).
8. Projects that provide tools for managing and/or enhancing access to regional water resources data, water quality data and watershed data (*see Tables 2-1 and 2-2, General Categories 2, 3, 6*).

***Projects that include opportunities to build or expand organizational capacity to implement watershed management will be favored.***

***Projects that lead to water quality improvements within the Critical Coastal Areas of the Region will be favored.***

***Projects that utilize partnerships among diverse stakeholders, and that integrate Regional Board priorities with those established by other watershed stakeholders, will be favored.***









**TABLE 2-1**

**SANTA ANA REGION (REG. 8) WMI TARGETED PROJECTS, NEEDS, OR ACTIVITIES – Page 5**

PROJECT NEEDS, BY CATEGORY	Watershed Management Area									
	Anaheim Bay/ Huntington Harbour/ Bolsa Chica	Lower Santa Ana River	Coyote Creek/Carbon Ck	Newport Bay	Newport Coast	Upper Santa Ana River	Middle Santa River	Lake Elsinore/ San Jacinto River	Mountain	Big Bear Area

Conduct water quality monitoring and bioassessment of these referenced sites, to establish benchmarks for restoration efforts, setting/enforcing standards, etc.	X	X	X	X	X	X	X	X	X	X
Develop biocriteria for each aquatic life use for each water body class (see Module 11 of USEPA's Water Quality Standards Academy workbook).	X	X	X	X	X	X	X	X	X	X
Establish impacts of pollutants on beneficial uses.	X	X	X	X	X	X	X	X	X	X

4. TMDL Development										
Compile data (GIS, water quality, etc.) and separate by watershed management areas.	X	X	X	X	X	X	X	X	X	X
Evaluate impacts of 303(d) listed constituents on beneficial uses.	X	X	X	X	X	X	X	X	X	X
Evaluate data used in placing water body on 303(d) list (what water quality standards were violated?).	X	X	X	X	X	X	X	X	X	X
Evaluate where (temporally and spatially), in TMDL-candidate water body, beneficial uses are supported or impaired.	X	X	X	X	X	X	X	X	X	X
Develop and update a dynamic water quality model.	X	X	X	X	X	X	X	X	X	X
Develop TMDL with defensible calculations and load allocations, consistent with the California Toxics Rule (CCR) and State Implementation Plan (SIP).	X	X	X	X	X	X	X	X	X	X
Conduct water quality monitoring in water column and continue monitoring after TMDL adopted.	X	X	X	X	X	X	X	X	X	X

5. TMDL Implementation										
Set up water quality models and updates for watersheds and receiving waters.	X	X	X	X	X	X	X	X	X	X
Conduct water quality and watershed model simulations to validate and/or revise load allocations and evaluate compliance with TMDLs.	X	X	X	X	X	X	X	X	X	X
Create models to simulate groundwater/ surface water interactions that account for contaminant loadings to the watershed, and assess potential remediation strategies.	X	X	X	X	X	X	X	X	X	X
Identify BMPs to reduce/remove nutrients/sediment.	X	X	X	X	X	X	X	X	X	X
Review/revise water quality objectives, including nutrients (Ranked on Basin Plan 2002 Triennial Review priority list).	X	X	X	X	X	X	X	X	X	X
Evaluate in-lake water quality management strategies and management practices.		X				X	X	X	X	X





TABLE 2-1

SANTA ANA REGION (REG. 8) WMI TARGETED PROJECTS, NEEDS, OR ACTIVITIES – Page 8

PROJECT NEEDS, BY CATEGORY	Watershed Management Area									
	Anaheim Bay/ Huntington Harbour/ Bolsa Chica	Lower Santa Ana River	Coyote Creek/Carbon Ck	Newport Bay	Newport Coast	Upper Santa Ana River	Middle Santa River	Lake Elsinore/ San Jacinto River	Mountain	Big Bear Area

Establish/identify reference reaches of surface waters.		X	X	X	X	X	X	X	X	X
Develop regional hydrologic curves.	X	X	X	X	X	X	X	X	X	X
Collaborate in producing a stream restoration handbook.	X	X	X	X	X	X	X	X	X	X
Assess condition of mitigation banks and classify them.	X	X	X	X	X	X	X	X	X	X
Restore beneficial uses to streams through the application of fluvial geomorphology principles.	X	X	X	X	X	X	X	X	X	X
Preserve and protect remaining unimproved stream segments.	X	X	X	X	X	X	X	X	X	X
Remove concrete channel linings from streams and flood control channels, and restore beneficial uses, such as WILD, WARM, GWR, REC2 and/or REC1, of these channels.	X	X	X	X	X	X	X	X	X	X
“Daylight” fully enclosed drainage channels and similar surface waters and restore the above beneficial uses.	X	X	X	X	X	X	X	X	X	X
Implement program of removal for channel “armor”, dams, and weirs with budget and schedule from flood control agencies.	X	X	X	X	X	X	X	X	X	X
Encourage environmental easement acquisitions.	X	X	X	X	X	X	X	X	X	X
Discourage development on flood plains.	X	X	X	X	X	X	X	X	X	X
Where development in a flood plain is already occurring, encourage the use of bioengineering techniques to stabilize and restore water courses to minimize potential destabilization from the loss of the flood plain (i.e. erosion of stream banks, accelerated downcutting, and headward erosion), and to reduce impacts from increased dry weather flows from urban development and flooding.	X	X	X	X	X	X	X	X	X	X
Wetlands management projects that are consistent with the Southern California Wetlands Recovery Project goals/objectives.	X	X	X	X	X	X	X	X	X	X

8. Habitat Acquisition and Protection										
Preserve and protect endangered and threatened species (plant and animal), their habitat, and movement corridors.	X	X	X	X	X	X	X	X	X	X
Remove barriers to fish spawning (weirs, dams, etc.).	X	X	X	X	X	X	X	X	X	X
Create and improve fish habitat.	X	X	X	X	X	X	X	X	X	X
Preserve and protect designated Critical Coastal Areas (CCA), including State Water Quality Protection Areas (formerly Areas of Special Biological Significance) and certain Marine Managed Areas.	X	X		X	X					



TABLE 2-1

SANTA ANA REGION (REG. 8) WMI TARGETED PROJECTS, NEEDS, OR ACTIVITIES – Page 10

PROJECT NEEDS, BY CATEGORY	Watershed Management Area									
	Anaheim Bay/ Huntington Harbour/ Bolsa Chica	Lower Santa Ana River	Coyote Creek/Carbon Ck	Newport Bay	Newport Coast	Upper Santa Ana River	Middle Santa River	Lake Elsinore/ San Jacinto River	Mountain	Big Bear Area

Implement/teach Integrated Pest Management (IPM) practices.	X	X	X	X	X	X	X	X	X	X
Develop and/or implement pet waste / good housekeeping BMPs.	X	X	X	X	X	X	X	X	X	X
Develop and/or implement for fertilizer/ manure applications rates to cropland.	X	X	X	X	X	X	X	X	X	X
Deliver BMP and NPS MM education and outreach, focused on locally important NPS issues, to targeted audiences.	X	X	X	X	X	X	X	X	X	X

10.Groundwater Resource Protection										
Groundwater model for the entire Santa Ana Basin, as well as for each subbasin/ management zone.	X	X	X	X	X	X	X	X	X	X
Coordinate as many groundwater elevations /water quality data points as possible into one regional database.	X	X	X	X	X	X	X	X	X	X
Support Department of Water Resources update on Groundwater Basins of California, providing summary data on subbasins.	X	X	X	X	X	X	X	X	X	X
Plan effective uses of brownfields that protect groundwater quality.	X	X	X	X		X	X	X		
Develop groundwater management plans where none exist.	X	X	X	X	X	X	X	X	X	X
Develop and implement a regional groundwater monitoring program. Inventory of impacted drinking water supply wells throughout Region, with primary contaminants/ concentrations.	X	X	X	X	X	X	X	X	X	X
Support protection of groundwater recharge areas.		X	X	X		X	X	X	X	X
Support protection of groundwater sources including ephemeral streams, meadows, and vernal pools.	X	X	X	X	X	X	X	X	X	X
Plan and construct wellhead treatment facilities for removal of perchlorate from groundwater extracted by municipal supply wells.	X	X	X	X		X	X	X	X	X
Plan and construct desalters and related peripheral facilities.	X	X	X	X		X	X	X	X	X
Support for seawater intrusion barrier programs.	X	X		X	X					







TABLE 2-1

SANTA ANA REGION (REG. 8) WMI TARGETED PROJECTS, NEEDS, OR ACTIVITIES – Page 14

PROJECT NEEDS, BY CATEGORY	Watershed Management Area								
	Anaheim Bay/ Huntington Harbour/ Bolsa Chica	Lower Santa Ana River	Coyote Creek/Carbon Ck	Newport Bay	Newport Coast	Upper Santa Ana River	Middle Santa River	Lake Elsinore/ San Jacinto River	Mountain

Support efforts to make use of hull cleaning/ hull management techniques that reduce pollutant loadings to marina waters.				X						
Conduct studies of vessel waste pumpout stations and conduct repair/ upgrade/ installations of stations in Newport Bay.				X						
Anadromous fish restoration (steelhead trout). GIS maps of fish migration blockages and deficiencies.				X						
Monitor Newport Dunes water quality, biota (macroinvertebrates) and sediment as part of Baywide program.				X						
Focus a project on comparisons of traditional pathogen indicator assays and human virus/ coliphage analyses.				X						
Install dry weather flow diversion structures and connect to treatment systems, "offline natural treatment systems," or sewer.				X						
Develop and implement management plans that specify practices to reduce sediment and chemical pollutant loadings from row crops, nurseries and/or citrus/avocado orchards.				X						
Design a study to evaluate potential pollutant loadings from agriculture in the Newport Bay watershed. Study would screen surface soils to assess current concentrations of organochlorine compounds, soil texture, and soil TOC as predictors of future pollutant loadings.				X						
Investigate bioaccumulation of organochlorine compounds and selenium in San Diego Creek and Upper/Lower Newport Bay at multiple trophic levels, and develop site-specific biota-sediment accumulation factors, through rigorous studies.				X						
Assess and model long-term impacts of Sediment TMDL, MS4 Permit and BMPs, and USACOE dredging on aggradation/degradation of Newport Bay (Is a sediment-heavy system becoming a sediment-starved system?) and beaches – both up-coast and down-coast as well as intra-bay impacts.				X						
Evaluate biodiversity, and compliance with water quality standards, for Upper Newport Bay CCA.				X						
Stream restoration projects throughout the watershed that stabilize embankments, or remove "armor" and restore embankments.				X						
Support Serrano Creek preservation, restoration, and revegetation.				X						
Support Borrego Creek preservation, restoration, and revegetation.				X						

TABLE 2-1

SANTA ANA REGION (REG. 8) WMI TARGETED PROJECTS, NEEDS, OR ACTIVITIES – Page 15

PROJECT NEEDS, BY CATEGORY	Watershed Management Area								
	Anaheim Bay/ Huntington Harbour/ Bolsa Chica	Lower Santa Ana River	Coyote Creek/Carbon Ck	Newport Bay	Newport Coast	Upper Santa Ana River	Middle Santa River	Lake Elsinore/ San Jacinto River	Mountain

Use development of The Great Park, El Toro to leverage opportunities to “daylight” fully enclosed channels and to initiate restoration efforts on Agua Chinon and Bee Canyon channels.				X						
Create areas that support WILD and WARM beneficial use areas in The Great Park, El Toro.				X						
Implement NPS Management Measures for The Great Park, El Toro.				X						
Determine depth of pollution / contamination in the Rhine Channel. Assess remedial options for cleanup of the Rhine Channel to meet TMDLs.				X						
Assess ways to increase oxygen and circulation in the Rhine Channel.				X						
Biological and geochemical investigation of the UCI portion of the San Joaquin Marsh for selenium.				X						
Egg studies for presence of selenium and other bioaccumulative compounds in both the San Joaquin Marsh and Newport Bay areas. Target live eggs for non-threatened and endangered species. Target unhatched, nonviable eggs for threatened and endangered species such as the Brown Pelican, Least Tern, and Light-footed Clapper Rail.				X						
Identification and assessment of remedial options for selenium removal from groundwater and surface water in the Peters Canyon Wash area of San Diego Creek (original Swamp of the Frogs area).				X						
Natural Treatment System (NTS) Projects focused on urban runoff, legacy contamination, and groundwater influence from the entire watershed.				X						
Increase biomass of pickleweed ( <i>Salicornia</i> sp.) and cord grass ( <i>Spartina foliosa</i> ) in Upper Newport Bay and eelgrass ( <i>Zostera marina</i> ) in Lower Newport Bay.				X						

E. Newport Coast Watershed Management Area										
Build dry weather flow diversion structures that connect to treatment systems, “offline natural treatment systems,” or sewer. Build similar wet weather flow treatment systems.					X					
Studies determining effects of hydromodification outfalls to coast.					X					
Implement water quality management elements of California Department of Parks and Recreation’s Crystal Cove Historic District Preservation and Public Use Plan.					X					
Projects that focus on comparisons of traditional pathogen indicator assays and human virus/ coliphage analyses.					X					

TABLE 2-1

SANTA ANA REGION (REG. 8) WMI TARGETED PROJECTS, NEEDS, OR ACTIVITIES – Page 16

PROJECT NEEDS, BY CATEGORY	Watershed Management Area								
	Anaheim Bay/ Huntington Harbour/ Bolsa Chica	Lower Santa Ana River	Coyote Creek/Carbon Ck	Newport Bay	Newport Coast	Upper Santa Ana River	Middle Santa River	Lake Elsinore/ San Jacinto River	Mountain

Coordinate ocean monitoring of benthic and pelagic fauna for toxics, etc., adjacent to natural-drainage modification projects and other outfalls.					X					
Restoration program for Little Corona tide pools/biota.					X					
Restoration of drainages to improve attainment of water quality standards.					X					
Encourage/facilitate Orange County area urban dischargers to develop monitoring programs and evaluate sources of fecal coliform affecting REC1 beneficial use on beaches.	X	X	X	X						
Reduce total/fecal coliform to Buck Gully, Pelican Point Creek, Los Trancos (Crystal Cove Creek), and Muddy Creek (impaired REC1, REC2, and MUN due to pathogens).					X					
Implement projects to protect beneficial uses, i.e., (REC1, REC2, WILD, etc.) of "Little Corona," part of the Newport Coast CCA and State Water Quality Protection Area.					X					
Restore anadromous fish (steelhead trout) habitat.					X					
Conduct projects that protect the integrity of beneficial uses of San Joaquin Hills natural drainages.					X					
Evaluate biodiversity and compliance with water quality standards in Newport Beach Marine Life Refuge Critical Coastal Area.					X					
Evaluate biodiversity and compliance with water quality standards in Irvine Coast Critical Coastal Area (shared project with Region 9).					X					

F. Upper Santa Ana River Watershed Management Area										
Restore, rehabilitate, preserve and maintain riparian buffers along the Santa Ana River (SAR) and its tributaries.						X				
Maximize floodplain/ wildlife corridor swaths on both sides of SAR before pending urbanization claims all land, up to the active channel.						X				
Support San Timoteo Creek watershed management, riparian habitat, and channel restoration.						X				
Remove <i>Arundo donax</i> and tamarisk along the Santa Ana River and its reaches and tributaries. Support and participate in Team Arundo.						X				
Projects to address WQ standards compliance and WQ impacts as a result of the October 2003 and May 2004 fires and subsequent rainy season debris flows.						X				

TABLE 2-1

SANTA ANA REGION (REG. 8) WMI TARGETED PROJECTS, NEEDS, OR ACTIVITIES – Page 17

PROJECT NEEDS, BY CATEGORY	Watershed Management Area								
	Anaheim Bay/ Huntington Harbour/ Bolsa Chica	Lower Santa Ana River	Coyote Creek/Carbon Ck	Newport Bay	Newport Coast	Upper Santa Ana River	Middle Santa River	Lake Elsinore/ San Jacinto River	Mountain

Connect Reche Canyon Mobile Home Park, Colton, to local sewer system. Extend sewer to parts of Grand Terrace/Colton/ Rialto/Fontana/ Bloomington.						X				
Stabilize and restore "Spring Brook", Market Street at Fairmont Park, Riverside. This creek is not concrete-lined where it discharges into Lake Evans, a tributary of the Santa Ana River.						X				
Remove concrete linings from flood control channels, such as sections of Temescal Creek (upstream of Prado wetlands) and San Sevaine Creek (from the foothills of the San Gabriel Mtns downstream). Another lined drain, Sunnyslope Drain (upstream from the Louis Rubidoux nature center) has spawning habitat for the endangered Santa Ana Sucker ( <i>Catostomus santaanae</i> ).						X				
Programs focusing on Santa Ana Sucker restoration.						X				
Coordinate with USEPA on site-specific objectives for un-ionized ammonia.						X				
Provide desalters and related peripheral facilities, including pipelines, in groundwater subbasins impacted by excessive TDS concentrations resulting from historic land use practices.						X				
Provide wellhead treatment for removal of perchlorate in water produced by municipal supply wells.						X				
Support projects that protect/restore alluvial fan scrub						X				
Consolidate monitoring/ ag well data for nitrates, TDS, and pesticides in Riverside area GW subbasins. Coordinate recycled water recharge projects.						X				
Study pathogen pathways from urbanization, aiding development of a pathogen TMDL.						X				
Projects that support WARM, WILD, RARE, REC2, etc. water quality beneficial uses within areas subject to Multiple Species Habitat Conservation Plans.						X				
Projects that implement the Chino Basin Optimum Basin Management Plan.						X				

G. Middle Santa Ana River Watershed Management Area										
Support Basin Studies developing multiple TMDLs for pathogens, nitrogen, etc.							X			
Identify and evaluate bacterial indicator and pathogen off-site transport mechanisms (and BMPs for their reduction) associated with agricultural operations.							X			
Perform field surveys to determine the sources of dry-weather urban nuisance runoff from Chino Basin sites							X			

TABLE 2-1

SANTA ANA REGION (REG. 8) WMI TARGETED PROJECTS, NEEDS, OR ACTIVITIES – Page 18

PROJECT NEEDS, BY CATEGORY	Watershed Management Area								
	Anaheim Bay/ Huntington Harbour/ Bolsa Chica	Lower Santa Ana River	Coyote Creek/Carbon Ck	Newport Bay	Newport Coast	Upper Santa Ana River	Middle Santa River	Lake Elsinore/ San Jacinto River	Mountain

Projects supporting Chino Basin Dairy Runoff Management Plan, Chino Basin Optimum Basin Management Plan, and Organics Management Strategy Implementation.							X			
Projects supporting Chino Basin Integrated Ground and Surface Water Model (CIGSM), part of Chino Basin Water Resources Management Study.							X			
Nitrogen removal activities from consolidated basin drainage at Prado Lake Park and wetlands.							X			
Support measures to protect riparian habitats at Prado Wetlands.							X			
Provide wellhead treatment for removal of perchlorate in water produced by municipal supply wells.							X			

H. Lake Elsinore/ San Jacinto Watershed Management Area										
Revise nutrient water quality objectives for Lake Elsinore, Canyon Lake, and San Jacinto River (SJR).								X		
Update model simulations for nutrients, sediments, and pathogens in the San Jacinto River Watershed.								X		
Conduct monitoring studies to identify sources of toxicity, sediment, and nutrients entering Lake Elsinore, Canyon Lake, and San Jacinto River, leading to the development of multiple TMDLs.								X		
Monitor and track pesticide/ fertilizer/ manure application to cropland in SJR watershed. Implement BMPs to prevent over-application.								X		
Support efforts of Reclaimed Water Task Force to evaluate use of reclaimed water to stabilize level of Lake Elsinore and reduce impairments of beneficial uses from excessive nutrients.								X		
Restore SJR near Mystic Lake and enhance the riparian habitats on CDFG properties.								X		
Restoration programs for Mystic Lake and vernal pools in this WMA.								X		
Extend regional sewers to Quail Valley and the south shore of Lake Elsinore, and abandon existing septic tank discharges in these areas.								X		
Implement recommended lake management practices.								X		
Provide phosphorus removal treatment for all tertiary effluent proposed to be discharged into L. Elsinore.								X		
Conduct a Nutrient Mass Balance Study for Lake Elsinore/ San Jacinto Watershed.								X		
Advance various projects supporting the San Jacinto River Watershed Council, Watershed Management Plan, and citizen monitoring program.								X		





**TABLE 2-2**

**SANTA ANA REGION (REG. 8) WMI TARGETED PROJECTS,  
NEEDS, OR ACTIVITIES**

**GENERAL CATEGORIES OF WATERSHED PLANNING, MAPPING, ASSESSMENT, AND  
MONITORING PROJECT NEEDS**

**(Shaded projects coincide with regional priorities. See Table 2)**

**1. Regional Planning, Assessment, and Monitoring**

- (a) Conduct stream assessment inventories:
  - 6) Streambank erosion.
  - 7) Streambed aggradation and erosion.
  - 8) Riparian community species diversity.
  - 9) Overall bank stability and priority sites for planting or other stabilization techniques.
  - 10) What streambed restoration projects can be planned at what portions of a stream, and can a project proposal be effectively assembled for the tasks involved?
- (b) Determine the prevalence of dissolved oxygen deficiency in surface waters.
- (c) Conduct water quality modeling and monitoring to analyze/ validate the source, transport, and fate of pollutants, particularly those projects that support Surface Water Ambient Monitoring Program.
- (d) Research and develop rapid indicators of bacterial and pathogenic contamination, acute and chronic toxicity, etc.
- (e) Evaluate the re-growth potential of bacterial indicators and pathogenic organisms in freshwater habitats.
- (f) Implement programs to reduce pathogens, nutrients, pesticides, and sediment from agricultural fields and urban areas.
- (g) Identify and evaluate Best Management Practices (BMPs) for the reduction of bacterial indicators and pathogenic organisms in urban settings.
- (h) Perform beneficial use surveys of inland water bodies.
- (i) Evaluate sources (including air deposition and groundwater) of organochlorine and hydrocarbon pollutants.
- (j) Evaluate a Critical Coastal Area (CCA) as a pilot project from those selected for Region 8, to date, Upper Newport Bay, Newport Beach Marine Life Refuge, or Irvine Coast Marine Life Refuge (CCAs are adjacent to Marine Managed Areas receiving flow from CWA Sec. 303(d) impaired waters, or State Water Quality Protection Areas (formerly ASBS sites).
- (k) Vessel waste-reduction projects.
- (l) Investigation of beach closures and determination of locations of chronic coliform source locations.
- (m) Model nearshore/ tidal currents at marsh and estuary inlets to understand pollutant transport patterns.
- (n) Conduct baseline watershed assessments for sediment load. Inventory locations where sediment chronically enters streams, i.e., rural roads, various streambanks, construction sites, grazing impacts.
- (o) Determine surface waters with detected and elevated endocrine disrupting compounds.
- (p) Address WQ standards compliance and WQ impacts as a result of the October 2003 fires and subsequent debris flows.
- (q) Support studies to update list of impaired water bodies required by CWA Section 303(d), with germane stressors/pollutants.
- (r) Inventory in the field any water bodies and wetlands that may be added or even deleted from Basin Plan list. Redefine any reaches of inland streams.
- (s) Implement Clean Beach Initiative issues, including rapid indicators and diversions.

## 2. Regional Mapping, GIS, and Database Management

- (a) Create and support two full-time Regional Board staff positions: Database Manager and GIS Analyst.
- (b) Provide introductory GIS training for all technical staff and intermediate GIS training for interested staff.
- (c) Upgrade to ArcGIS if there is a staff GIS Analyst.
- (d) Assess Region 8 needs for GIS development, including identification of priority tasks, data and the capability of specific data manipulation, hardware/software to accomplish it, GIS database creation, metadata creation, and associated training.
- (e) Create a pilot GIS project (see below) based on the above needs assessment (Example: watershed analysis indicating spatial and temporal changes in water quality as improved by Regional Board programs. After initial pilot project creation, expand it.)
- (f) Acquire GIS data layers. Obtain appropriate licensed software “off the shelf” or from firms/agencies.
- (g) Acquire the programs to create GIS data layers and attribute tables, and to populate spatial fields from attribute tables.
- (h) Create scripts to automate GIS functions.
- (i) Purchase/acquire software for image manipulation (aerial and satellite imagery), 3D representations (i.e., TDS/TIN distribution), etc.
- (j) Provide a wide range of web-based and compact-disc based watershed education materials.
- (k) Create a geodatabase from which to make a variety of maps.
- (l) Provide STORET training for interested staff.
- (m) STORET setup and input of existing data.
- (n) Input resource monitoring and compliance monitoring data into STORET.
- (o) Create format for batch updates.
- (p) Input all monitoring data from point sources i.e., hydrocarbon, TDS, perchlorate levels in wells, and non-point sources, i.e., wide-area runoff, to allow study of the spatial and temporal trend of water quality in the entire region. Apply to each WMA.
- (q) Gather GIS data pertaining to hydrology (storm drains, concrete-lined portions of channels, etc.).
- (r) Use digitized official Region boundary (CalWaters, DWR) to create maps of Region 8 with detailed boundary lines layered upon topography and streets (political map software). Coordinate this delineation with the other Regions and show some of an adjacent Region’s jurisdiction on the maps. Record changes using GPS or other means in the field wherever boundary and man-made “divides” are now more difficult to distinguish (i.e. Wildomar, Menifee, Aliso Creek).
- (s) Identify a priority task for GIS development from the above, or from projects such as the following, as a mapping project (maps can show “snapshots-in-time” and/or changing conditions). Suggested mapping projects:
  - 1) Map hydrocarbon/ perchlorate/ MTBE plume migration; TIN/ TDS concentrations; high selenium areas.
  - 2) Map potential and selected reference sites, i.e., for biocriteria, nutrients.
  - 3) Map changes in water quality as a result of a Best Management Practice or multiple BMPs used, or a Non-Point Source (NPS) Management Measure (MM).
  - 4) Map changes in water quality as a result of BMP implementation for TMDL compliance. Use monitoring data to assist in evaluating effectiveness of BMPs.
  - 5) Acquire data to assist in TMDL compliance.
  - 6) Map changes in land use patterns linked to changes in water quality.
  - 7) Map habitat types or changes to habitat stand boundaries over time, i.e., change of riparian/CSS/grassland mosaic boundaries; changes to course of a stream, etc.
  - 8) Map Region 8 wetlands/riparian habitat. Indicate existing sites not under protection; reconstructed/created wetlands, restoration efficacy or potential, and impacts over time to wetlands, i.e., size, depth, range, and mitigation sites.
  - 9) Map stream channel erosion areas vs. bank stabilized areas. Map streambank restoration potential.

- 10) Map channelization; soft-bottomed portions; stretches of “gaining” vs. “losing” streams; non-effluent streams and effluent outfalls.

### 3. Referenced Sites/ Biological Indices

- (a) Conduct regional surveys to nominate and establish sites that can be referenced for setting /enforcing water quality standards, etc. These “referenced sites” will be stream segments, reaches of lakes or estuaries, ocean water areas, etc., where water quality, beneficial uses, and the prevailing ecosystem have not been severely disturbed by human activities, i.e., El Morro Creek at Crystal Cove State Park.
- (b) Conduct water quality monitoring and bioassessment of these referenced sites, to establish benchmarks for restoration efforts, setting /enforcing standards, etc.
- (c) Develop biocriteria for each aquatic life use for each water body class (see Module 11 of USEPA’s Water Quality Standards Academy workbook).
- (d) Establish impacts of pollutants on beneficial uses.

### 4. TMDL development

- (a) Compile data (GIS, water quality, etc.) and separate by watershed management areas.
- (b) Evaluate impacts of 303(d) listed constituents on beneficial uses.
- (c) Evaluate data used in placing water body on 303(d) list (what water quality standards were violated?)
- (d) Evaluate where (temporally and spatially), in TMDL-candidate water body, beneficial uses are supported or impaired.
- (e) Develop and update a dynamic water quality model.
- (f) Develop TMDL with defensible calculations and load allocations, consistent with the California Toxics Rule (CCR) and State Implementation Plan (SIP).
- (g) Conduct water quality monitoring in water column and continue monitoring after TMDL adopted.

### 5. TMDL Implementation

- (a) Set up water quality models and updates for watersheds and receiving waters.
- (b) Conduct water quality and watershed model simulations to validate and/or revise load allocations and evaluate compliance with TMDLs.
- (c) Create models to simulate groundwater/ surface water interactions that account for contaminant loadings to the watershed, and assess potential remediation strategies.
- (d) Identify BMPs to reduce/remove nutrients and sediment.
- (e) Review/revise water quality objectives, including nutrients (Ranked on Basin Plan 2002 Triennial Review priority list).
- (f) Evaluate in-lake water quality management strategies and management practices.
- (g) Education/outreach for reducing polluted runoff from urban, agricultural, CAFO, and forested areas.
- (h) Perform field surveys to determine the sources of dry-weather urban nuisance runoff for all WMAs.
- (i) Education/outreach for controlling invasive species.
- (j) Classify and assess condition of “unimproved” creeks and streams.
- (k) Monitor water quality, both biological and geochemical. Monitor for nutrient and pathogens.
- (l) Evaluate the re-growth potential of bacterial indicators and pathogenic organisms in freshwater habitats, even those immediately adjacent to coast.
- (m) Identify and evaluate BMPs for reduction of bacterial indicators and pathogenic organisms in urban settings.
- (n) Identify and evaluate bacterial indicator and pathogen off-site transport mechanisms (and BMPs for their reduction) associated with agricultural operations.
- (o) Implement BMPs and NPS management measures.

- (p) Develop a pollutant budget model that can be used to track water quality changes over time.
- (q) Conduct REC-1 Beneficial Use assessment (Ranked on Basin Plan 2002 Triennial Review priority list).
- (r) Conduct food web and egg studies for detection of bioaccumulative compounds.
- (s) Identify sensitive and indicator species for accumulation of specific contaminants.

## 6. Stakeholder Support and Public Outreach

- (a) Create stakeholder watershed planning groups and develop watershed management plans, including watershed and regional water resources education.
- (b) Promote cooperative relationships and stakeholder partnerships.
- (c) Workshops to educate land developers about state-of-the-art water quality mitigation practices, systems, and devices/retrofits.
- (d) Conduct public outreach and education on the linkage between surface water quality and groundwater quality.
- (e) Promote riparian and adjacent open space preservation.
- (f) Non-Point Source and TMDL workshops, including urban runoff and stormwater education.
- (g) Support Adopt-A-Watershed program.
- (h) CAFO operator workshop/ biosolids workshop, including waste management practices.
- (i) Facilitate coordination of local grass-roots watershed management groups and environmental interest groups among themselves and with the Regional Board, as a way of furthering the goals of the Region 8 and State Board's watershed management initiative.
- (j) Encourage alternatives to concrete, riprap, hardscapes using pervious materials and vegetation.
- (k) Discourage development on floodplains.
- (l) Establish visitor centers that implement watershed education.
- (m) Citizen monitoring tasks:
  - 1) Collect water quality monitoring samples.
  - 2) Collect observational water quality data, such as beneficial use occurrence and assessment.
  - 3) Conduct stream classification and assessment inventories.
  - 4) Assess effectiveness of BMPs implementing pollution prevention, source control, and source reduction.
  - 5) Monitor and prevent spread of invasive species.

## 9. Wetlands/ Riparian/ Stream Restoration and Preservation

- (a) Support acquisition of wetlands and other areas that support WARM, WILD, EST, SPWN, BIOL, COLD and REC1 and/or REC2 beneficial uses.
- (b) Implement measures to restore tidal exchange or freshwater influx in fragmented estuaries, coastal lagoons wetlands, or freshwater wetlands.
- (c) Provide for identification and delineation of vernal pools and their special protection/preservation.
- (d) Support creation of riparian buffers.
- (e) Support wetlands creation, enhancement, and restoration.
- (f) Provide tracking system of wetlands acreages to numerically ensure that there is no net loss of wetland area, including isolated wetlands. Determine area of wetlands with good quality. List loss vs. recovery projects in concert with other Regions, agencies, and NGOs.
- (g) Support stream and bank erosion stabilization projects that use bioengineered solutions.
- (h) Conduct stream classification and assessment studies.
- (i) Establish/ identify reference reaches of surface waters.
- (j) Develop regional hydrologic curves.
- (k) Collaborate in producing a stream restoration handbook.
- (l) Assess condition of mitigation banks and classify them.

- (m) Restore beneficial uses to streams through the application of fluvial geomorphology principles.
- (n) Preserve and protect remaining unimproved stream segments.
- (o) Remove concrete channel linings from streams and flood control channels, and restore beneficial uses, such as WILD, WARM, GWR, REC2 and/or REC1, of these channels.
- (p) “Daylight” fully enclosed drainage channels and similar surface waters and restore the above beneficial uses.
- (q) Implement program of removal for channel “armor”, dams, and weirs with budget and schedule from flood control agencies.
- (r) Encourage environmental easement acquisitions.
- (s) Discourage development on flood plains.
- (t) Where development in a flood plain is already occurring, encourage the use of bioengineering techniques to stabilize and restore water courses to minimize potential destabilization from the loss of the flood plain (i.e., erosion of stream banks, accelerated downcutting, and headward erosion), and to reduce impacts from increased dry weather flows from urban development and flooding.
- (u) Wetlands management projects that are consistent with the Southern California Wetlands Recovery Project goals/objectives.

## 10. Habitat Acquisition and Protection

- (a) Preserve and protect endangered and threatened species (plant and animal), their habitat, and movement corridors.
- (b) Remove barriers to fish spawning (weirs, dams, etc.).
- (c) Create and improve fish habitat.
- (d) Preserve and protect designated Critical Coastal Areas, including State Water Quality Protection Areas (formerly Areas of Special Biological Significance) and certain Marine Managed Areas.
- (e) Establish, preserve and protect wildlife reserves, refuges, and corridor linkages.
- (f) Preserve and protect riparian buffers and “unimproved” streams.
- (g) Preserve and protect important migratory waterfowl layover sites.
- (h) Invasive species management, including projects that:
  - 1) Eradicate Eurasian milfoil (*Myriophyllum spicatum*) in the Big Bear WMA (see below).
  - 2) Eradicate *Arundo donax* region-wide.
  - 3) Eradicate *Caulerpa taxifolia* through education, prevention and removal in coastal lagoons, estuaries, harbors/bays.
  - 4) Eradicate tamarisk (*Tamarix reamosissima*, *T. chinensis*, and hybrids) throughout the watershed.
  - 5) Control, if not eradicate, Castor bean (*Ricinus communis*) throughout the watershed, particularly in riparian areas.
  - 6) Control California (Peruvian) pepper tree (*Schinus molle*) in areas of flowing or standing water.

## 9. Best Management Practices (BMPs), Non-Point Source (NPS) Management Measures (MMs), and Implementation (Focus on Source Control)

- (a) Increase emphasis on BMPs and NPS MMs for control of upper watershed sources of NPS pollutants, including CAFOs and agriculture.
- (b) Develop and/or implement BMPs and MMs for nutrient and sediment reduction/removal.
- (c) Utilize physical/chemical treatment as BMPs and MMs.
- (d) Support water conservation measures.
- (e) In marinas and boatyards, recovery of boatwash and hull-jetting wastewater for sewerage.
- (f) Develop and implement BMPs and MMs for reducing and/or treating recycled water runoff.
- (g) Develop dry weather flow diversion projects (from channels) to “offline” natural filtering treatment system projects, and sewer.
- (h) Develop wet weather runoff treatment projects, including diversions to “offline” natural filtering treatment system projects.

- (i) Support conversions to drip irrigation.
- (j) Develop and/or implement BMPs to reduce toxicity.
- (k) Implement/teach Integrated Pest Management (IPM) practices.
- (l) Develop and/or implement pet waste / good housekeeping BMPs.
- (m) Develop and/or implement fertilizer/manure application rates to cropland.
- (n) Deliver BMP and NPS MM education and outreach, focused on locally important NPS issues, to targeted audiences.

## 10. Groundwater Resource Protection

- (a) Groundwater model for the entire Santa Ana Basin, as well as for each subbasin/management zone.
- (b) Coordinate as many groundwater elevations/water quality data points as possible into one regional database.
- (c) Support Department of Water Resources update on Groundwater Basins of California, providing summary data on subbasins.
- (d) Plan effective uses of brownfields that protect groundwater quality.
- (e) Develop groundwater management plans where none exist.
- (f) Develop and implement a regional groundwater monitoring program. Inventory of impacted drinking water supply wells throughout Region, with primary contaminants/concentrations.
- (g) Support protection of groundwater recharge areas.
- (h) Support protection of groundwater sources, including ephemeral streams, meadows, and vernal pools.
- (i) Plan and construct wellhead treatment facilities for removal of perchlorate from groundwater extracted by municipal supply wells.
- (j) Plan and construct desalters and related peripheral facilities.
- (k) Support for seawater intrusion barrier programs.
- (l) Connect onsite sewage disposal to sewer systems:
  - 1) Facilitate connections to regional sewage collection systems in areas with known or suspected water quality impairment related to use of such systems, particularly in areas close to surface waters or with perched or regionally shallow groundwater.
- (m) Support efforts to upgrade, expand, and modernize regionwide infrastructure of sewage collection and wastewater treatment systems.

## SPECIFIC PROJECTS BY WATERSHED MANAGEMENT AREA

### A. Anaheim Bay/ Huntington Harbour/ Bolsa Chica Watershed Management Area

1. Conduct vessel waste studies including sediment and barnacles (continue recent efforts, with the potential to add sites).
2. Conduct repair/ upgrade/ installations of pumpout stations in Huntington Harbour.
3. Monitor Bay and inlet-wide water quality, biota (macroinvertebrate), and sediment.
4. Build dry weather flow diversion structures that connect to treatment systems, "offline natural treatment systems," or sewer. Build similar wet weather flow treatment systems.
5. Comparisons of traditional pathogen indicator assays and human virus/ coliphage analyses.
6. Remove and relocate sewer line currently located beneath the entrance to the Anaheim Bay National Wildlife Refuge.
7. Support projects of the Huntington Harbour Water Quality Issues Committee and the Bolsa Chica Technical Advisory Committee.
8. Assess and link water quality values to the varying strata of a water body and determine how much of each strata meets water quality standards.
9. Runoff treatment projects for Bolsa Chica Wetlands and East Garden Grove Wintersburg Channel. Monitor latter outlet to Huntington Harbour for metals, pathogens, toxicity.
10. Increase biomass of pickleweed (*Salicornia* sp.) and cord grass (*Spartina foliosa*) in Upper Newport Bay and Anaheim Bay.
11. Increase biomass of eelgrass (*Zostera marina*) in Huntington Harbour and other deep channels.

**B. Lower Santa Ana River Watershed Management Area**

1. Study pathogen pathways from urbanization, aiding development of a pathogen TMDL.
2. Build dry weather flow diversion structures that connect to treatment systems, "offline natural treatment systems," or sewer. Build similar wet weather flow treatment systems.
3. Evaluate as a reference site the watershed of Fremont Canyon, tributary to Santiago Creek in Orange County's Santa Ana Mountains. It is among the few remaining relatively pristine watersheds in Orange County (*Nature Conservancy*).
4. Restore, rehabilitate, preserve and maintain riparian buffers along the Santa Ana River and its tributaries.
5. Support Santiago Creek habitat protection and enhancement programs.
6. Efficiently supply surface water to groundwater recharge basins.
7. Projects protecting Santa Ana Forebay groundwater recharge basins from nitrogen, TDS, and petroleum/chlorinated hydrocarbons.
8. Assess integrity of wetlands, estimate acreage, record and map them.
9. Support WARM, WILD, RARE, REC2 through acquisition and preservation of habitat in the Puente-Chino Hills, Santa Ana Canyon, and Santa Ana Mountains.
10. Studies of surface water and groundwater interactions between the Santa Ana Forebay and the Santa Ana Pressure Zone.
11. Conduct outreach to determine interest in developing subwatershed plans based on specific water quality concerns.

**C. Coyote Creek/ Carbon Creek Watershed Management Area**

1. Support San Gabriel River TMDLs as related to Coyote Creek and Carbon Creek. Given the eventual ocean discharge in Region 4, participate in installation of dry- and wet-weather flow diversion structures, to treatment systems, "offline natural treatment systems," or sewer.
2. Monitor, control and mitigate urban runoff and other impacts from development in the Puente-Chino Hills and Coyote Hills.
3. Support WARM, WILD, RARE, REC2 through acquisitions and preservation in the Puente-Chino Hills and Coyote Hills.
4. Restore, enhance, and create wetlands and waterways.
5. Restore lost and degraded beneficial uses to Coyote and Carbon Creeks, including WARM, WILD, RARE, REC2. Support and develop management and restoration plans for the Coyote/Carbon Creeks Watersheds.

**D. Newport Bay Watershed Management Area**

1. Perform model simulations for nutrients, algae, and oxygen in upper and lower Newport Bay (NB).
2. Implement BMPs to remove nitrogen and selenium from groundwater (as well as other sources) in the NB watershed, specifically one project in Peters Canyon Channel, and a second in San Diego Creek, Reach 2.
3. Implement BMPs to remove nitrogen from agricultural sources in the NB watershed. Encourage agricultural and urban dischargers to implement control measures to reduce fecal coliform levels and to track the effectiveness of all these measures.
4. Design and carry out an urban runoff fecal coliform source identification plan for the NB Fecal TMDL.
5. Design and implement urban runoff fecal coliform source control measures for the NB Fecal TMDL.
6. Design and carry out a natural fecal coliform source identification plan for the NB Fecal TMDL.
7. Design and implement a natural fecal coliform source control plan for the NB Fecal TMDL.
8. Conduct vessel waste studies, including sediment and barnacles (continue recent efforts, with the potential to add sites).
9. Support efforts to make use of hull cleaning/hull management techniques that reduce pollutant loadings to marina waters.
10. Conduct studies of vessel waste pumpout stations and conduct repair/ upgrade/ installations of stations in Newport Bay.

11. Anadromous fish restoration (southern steelhead trout, *Oncorhynchus mykiss irideus*). GIS maps of fish migration blockages and deficiencies.
12. Monitor Newport Dunes water quality, biota (macroinvertebrates) and sediment as part of Baywide program.
13. Focus a project on comparisons of traditional pathogen indicator assays and human virus/coliphage analyses.
14. Install dry weather flow diversion structures and connect to treatment systems, "offline natural treatment systems," or sewer.
15. Develop and implement management plans that specify practices to reduce sediment and chemical pollutant loadings from row crops, nurseries and/or citrus/ avocado orchards.
16. Design a study to evaluate potential pollutant loadings from agriculture in the Newport Bay watershed. Study would screen surface soils to assess current concentrations of organochlorine compounds, soil texture, and soil TOC as predictors of future pollutant loadings.
17. Investigate bioaccumulation of organochlorine compounds and selenium in San Diego Creek and Upper/Lower Newport Bay at multiple trophic levels, and develop site-specific biota-sediment accumulation factors, through rigorous studies.
18. Assess and model long term impacts of Sediment TMDL, MS4 Permit and BMPs, and USACOE dredging on aggradation/degradation of Newport Bay (Is a sediment-heavy system becoming a sediment-starved system?) and beaches – both up-coast and down-coast as well as intra-bay impacts.
19. Evaluate biodiversity and compliance with water quality standards for Upper Newport Bay Critical Coastal Area.
20. Stream restoration projects throughout the watershed that utilize bioengineering techniques to stabilize embankments, or remove "armor" and restore embankments.
21. Support Serrano Creek preservation, restoration and revegetation.
22. Support Borrego Creek preservation, restoration and revegetation.
23. Use development of The Great Park, El Toro to leverage opportunities to "daylight" fully enclosed channels and to initiate restoration efforts on Agua Chinon and Bee Canyon channels.
24. Create areas that support WILD and WARM beneficial use areas in the development of The Great Park, El Toro.
25. Implement NPS Management Measures for The Great Park, El Toro.
26. Determine depth of pollution/contamination in the Rhine Channel. Assess remedial options for cleanup of the Rhine Channel to meet TMDLs.
27. Assess ways to increase oxygen and circulation in the Rhine Channel.
28. Biological and geochemical investigation of the UCI portion of the San Joaquin Marsh for selenium.
29. Egg studies for presence of selenium and other bioaccumulative compounds in both the San Joaquin Marsh and Newport Bay areas. Target live eggs for non-threatened and endangered species. Target unhatched, nonviable eggs for threatened and endangered species such as the Brown Pelican, Least Tern, and Light-footed Clapper Rail.
30. Identification and assessment of remedial options for selenium removal from groundwater and surface water around the Peters Canyon Wash confluence with San Diego Creek (original Swamp of the Frogs area).
31. Natural Treatment System (NTS) Projects focused on urban runoff, legacy contamination, and groundwater influence from the entire watershed.
32. Increase biomass of pickleweed (*Salicornia* sp.) and cord grass (*Spartina foliosa*) in Upper Newport Bay and eelgrass (*Zostera marina*) in Lower Newport Bay.

#### E. Newport Coast Watershed Management Area

1. Build dry weather flow diversion structures that connect to treatment systems, "offline natural treatment systems," or sewer. Build similar wet weather flow treatment systems.
2. Studies determining effects of hydromodification outfalls to coast.
3. Implement water quality management elements of California Department of Parks and Recreation's Crystal Cove Historic District Preservation and Public Use Plan.
4. Projects that focus on comparisons of traditional pathogen indicator assays and human virus/coliphage analyses.

5. Coordinate monitoring of benthic and pelagic fauna for toxics, etc., adjacent to natural drainage modification projects and other outfalls.
6. Restoration program for Little Corona tide pools and biota.
7. Restoration of drainages to improve attainment of water quality standards.
8. Encourage/facilitate Orange County area urban dischargers to develop monitoring programs and evaluate sources of fecal coliform affecting REC1 beneficial use on beaches.
9. Reduce total/fecal coliform to Buck Gully, Pelican Point Creek, Los Trancos (Crystal Cove Creek), and Muddy Creek (impaired REC1, REC2, and MUN due to pathogens).
10. Implement projects to protect beneficial uses, i.e. REC1, REC2, WILD, etc. of "Little Corona," part of the Newport Coast CCA and State Water Quality Protection Area.
11. Restore anadromous fish (steelhead trout) habitat.
12. Conduct projects that protect the integrity of beneficial uses of the San Joaquin Hills natural drainages.
13. Evaluate biodiversity and compliance with water quality standards in Newport Beach Marine Life Refuge Critical Coastal Area.
14. Evaluate biodiversity and compliance with water quality standards in Irvine Coast Critical Coastal Area (shared project with Region 9).

#### F. Upper Santa Ana River Watershed Management Area

1. Restore, rehabilitate, preserve and maintain riparian buffers along the Santa Ana River (SAR) and its tributaries.
2. Maximize floodplain/ wildlife corridor swaths on both sides of SAR before pending urbanization claims all land, up to the active channel.
3. Support San Timoteo Creek watershed management, riparian habitat, and channel restoration from Barton Road upstream.
4. Remove *Arundo donax* and tamarisk along the Santa Ana River and its reaches and tributaries. Support and participate in Team Arundo.
5. Projects to address WQ standards compliance and WQ impacts as a result of the October 2003 and May 2004 fires and subsequent rainy season debris flows.
6. Connect Reche Canyon Mobile Home Park, Colton, to local sewer system. Extend sewer to parts of Grand Terrace/Colton/Rialto/Fontana/Bloomington.
7. Stabilize and restore "Spring Brook," Market Street at Fairmont Park, Riverside. This creek is not concrete-lined where it discharges into Lake Evans, a tributary of the Santa Ana River.
8. Remove concrete linings from flood control channels, such as sections of Temescal Creek (upstream of Prado wetlands) and San Sevaire Creek (from the foothills of the San Gabriel Mountains downstream). Another lined drain, Sunnyslope Drain (upstream from the Louis Rubidoux nature center) has spawning habitat for the endangered Santa Ana Sucker (*Catostomus santaanae*).
9. Programs focusing on Santa Ana Sucker restoration.
10. Coordinate with USEPA on site-specific objectives for un-ionized ammonia.
11. Provide desalters and related peripheral facilities, including pipelines, in groundwater subbasins impacted by excessive TDS concentrations resulting from historic land use practices.
12. Provide wellhead treatment for removal of perchlorate in water produced by municipal supply wells.
13. Support projects that protect and restore alluvial fan scrub.
14. Consolidate monitoring/ ag well data for nitrates, TDS, and pesticides in Riverside area GW subbasins. Coordinate recycled water recharge projects.
15. Study pathogen pathways from urbanization, aiding development of a pathogen TMDL.
16. Projects that support WARM, WILD, RARE, REC2, etc. water quality beneficial uses within areas subject to Multiple Species Habitat Conservation Plans.
17. Projects that implement the Chino Basin Optimum Basin Management Plan.

#### G. Middle Santa Ana River Watershed Management Area

1. Support Basin Studies developing multiple TMDLs for pathogens, nitrogen, etc.

2. Identify and evaluate bacterial indicator and pathogen off-site transport mechanisms (and BMPs for their reduction) associated with agricultural operations.
3. Perform field surveys to determine the sources of dry-weather urban nuisance runoff from Chino Basin sites.
4. Projects supporting Chino Basin Dairy Runoff Management Plan, Chino Basin Optimum Basin Management Plan, and Organics Management Strategy Implementation.
5. Projects supporting Chino Basin Integrated Ground and Surface Water Model (CIGSM), part of Chino Basin Water Resources Management Study.
6. Nitrogen removal activities from consolidated basin drainage at Prado Lake Park and wetlands.
7. Support measures to protect riparian habitats at Prado Wetlands.
8. Provide wellhead treatment for removal of perchlorate in water produced by municipal supply wells.

#### H. Lake Elsinore/ San Jacinto River Watershed Management Area

1. Revise nutrient water quality objectives for Lake Elsinore, Canyon Lake and San Jacinto River (SJR).
2. Update model simulations for nutrients, sediments, and pathogens in the San Jacinto River Watershed.
3. Conduct monitoring studies to identify sources of toxicity, sediment, and nutrients entering Lake Elsinore, Canyon Lake, and San Jacinto River, leading to the development of multiple TMDLs.
4. Monitor and track pesticide/ fertilizer/ manure application to cropland in SJR watershed. Implement BMPs to prevent over-application.
5. Support efforts of Reclaimed Water Task Force to evaluate use of reclaimed water to stabilize level of Lake Elsinore and reduce impairments of beneficial uses from excessive nutrients.
6. Restore SJR near Mystic Lake and enhance the riparian habitats on CDFG properties.
7. Restoration programs for Mystic Lake and vernal pools in this WMA.
8. Extend regional sewers to Quail Valley and the south shore of Lake Elsinore, and abandon existing septic tank discharges in these areas.
9. Implement recommended lake management practices.
10. Provide phosphorus removal treatment for all tertiary effluent proposed to be discharged into Lake Elsinore.
11. Conduct a Nutrient Mass Balance Study for Lake Elsinore/San Jacinto Watershed.
12. Advance various projects supporting the San Jacinto River Watershed Council, Watershed Management Plan, and citizen monitoring program.
13. Reduce nutrients in Canyon Lake.
14. Assist Canyon Lake aeration program.
15. Conduct inorganic constituent studies for the San Jacinto River.
16. Preserve existing "unimproved" waterways, reaches, and tributaries of the San Jacinto River, by protecting their natural condition, by establishing adequate buffers, and by stream restoration.
17. Plan and construct desalters and related peripheral facilities, including pipelines, in groundwater subbasins impacted by TDS concentrations resulting from historic resource and land use practices.
18. Conduct dynamic water quality models for Lake Elsinore and Canyon Lake to simulate and predict the impacts of activities in the SJR watershed, and of in-lake treatment technology on the in-lake water quality/beneficial uses.
19. Assess and link water quality values to the strata of a water body and determine how much of each strata meets water quality standards.
20. Assist septic tank removal program by Elsinore Valley Municipal WD.
21. Projects that support WARM, WILD, RARE, REC2, etc. water quality beneficial uses within areas subject to Multiple Species Habitat Conservation Plans.

#### I. Mountain Watershed Management Area

1. Conduct water quality monitoring to assess effectiveness of the San Bernardino Co. Designated Maintenance Mill Creek Area (DMA).
2. Support alluvial fan scrub protection, preservation, and restoration projects.

3. Studies of pathogen pathways from urbanization, aiding development of a pathogen TMDL.
4. Support efforts to protect habitat and provide open space for endangered and threatened species, consistent with the Multiple Species Habitat Conservation Plans.
5. Protect and maintain COLD beneficial uses.
6. Assess impacts of bark beetle spraying on water quality standards.
7. Address water quality standards compliance and WQ impacts as a result of tree mortality in upper watershed areas, and the subsequent treatment to minimize fire threat.

#### J. Big Bear Area Watershed Management Area

1. Revise nutrient water quality objectives for Big Bear Lake (BBL).
2. Perform model simulations for nutrients, sediment, and macrophytes in BBL and its watershed.
3. Implement BMPs to reduce sediment and nutrient loading into/within BBL.
4. Utilize volunteer monitors for stream classification and assessments of creeks.
5. Identify stream candidates for a referenced reach(es).
6. Restore beneficial species of plants within BBL.
7. Evaluate in-lake water quality management strategies.
8. Protect /conserve/ restore water quality standards of Shay Meadows through purchase, restrictive easements, etc.
9. Programs educating marina operators and boat owners about washing techniques and wastewater recovery.
10. Address WQ standards compliance and WQ impacts as a result of tree mortality, forest treatment to minimize fire threats, and October 2003 fires.
11. Assess and link water quality values to the different strata of BBL and determine how much of each stratum meets water quality standards.
12. Assess impacts to surface waters and soil from bark-beetle spraying.
13. Support expansion of sewer to subbasin communities.