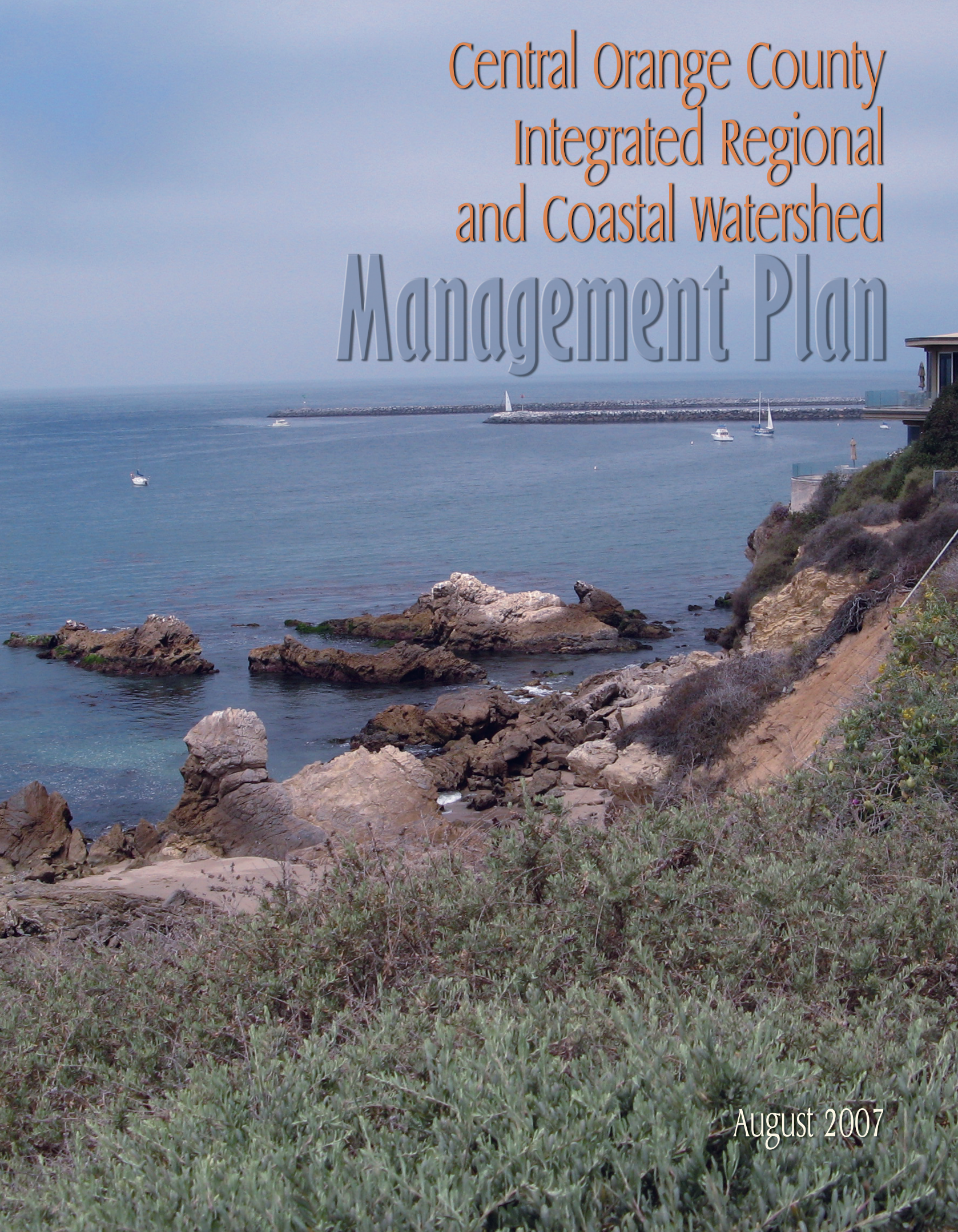
Central Orange County Integrated Regional and Coastal Watershed Management Plan



August 2007

Central Orange County
Integrated Regional and Coastal Watershed Management Plan

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ACRONYMS

ACOE	U.S. Army Corps of Engineers
AMP	Allen-McColloch Pipeline
ASBS	area of special biological significance
BMP	best management practice
BPP	basin pumping percentage
CAS	California Aquifer Susceptibility assessment
CCA	critical coastal area
CDFG	California Department of Fish and Game
CEDEN	California Environmental Data Exchange Network
CEIC	California Environmental Information Catalog
CEQA	California Environmental Quality Act
CERES	California Environmental Resources Evaluation System
CWTF	colored water treatment facility
DAMP	Drainage Area Management Plan
DFP	Diemer Filtration Plant
DWR	Department of Water Resources
EDC	Endocrine Disrupting Compounds
EPA	Environmental Protection Agency
ETWD	El Toro Water District
GAMA	Groundwater Ambient Monitoring and Assessment Program
HATS	Harvard Avenue Trunk Sewer
HCP	Habitat Conservation Plan
IRCWM	Integrated Regional and Coastal Watershed Management
IRWD	Irvine Ranch Water District
LLFA	Landscape Level Functional Assessment
MCAS	Marine Corps Air Station
MCWD	Mesa Consolidated Water District
MSAA	Master Streambed Alteration Agreement

MWD	Metropolitan Water District of Southern California
MWDOC	Municipal Water District of Orange County
MWRP	Michelson Water Reclamation Plant
NCCP	Natural Community Conservation Plan
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
NTS	Natural Treatment System
OCEMA	Orange County Environmental Agency
OCFD	Orange County Flood Control District
OCHBP	Orange County Harbors, Beaches, and Parks
OCSD	Orange County Sanitation District
OCWD	Orange County Water District
PCB	polychlorinated biphenyl
PCP	pharmaceuticals and personal care products
RDMD	Resources and Development Management Department
RWQCB	Regional Water Quality Control Board
SCAG	Southern California Association of Governments
SAMP	Special Area Management Plan
SWP	State Water Project
SWPPP	Storm Water Pollution Prevention Plan
SWQPA	State Water Quality Protection Area
SWRCB	State Water Resources Control Board
SWAMP	Surface Water Ambient Monitoring Program
TDS	total dissolved solids
TIN	total inorganic nitrogen
TMDL	total maximum daily load
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compound
WMA	watershed management area
WQMP	Water Quality Management Plan

WQT	water quality treatment
WUE	water use efficiency

EXECUTIVE SUMMARY

The Central Orange County Integrated Regional and Coastal Watershed Management Plan (IRCWM Plan) addresses critical water resource management needs for the Newport Bay and Newport Coast Watersheds, a highly urbanized area with a population of 705,000 people. Within this developed area exist fragile coastal ecosystems with three designated Critical Coastal Areas (CCAs) and two Areas of Special Biological Significance (ASBSs); the Upper Newport Bay CCA, Newport Beach Marine Life Refuge ASBS, and Irvine Coast Marine Life Refuge (ASBS) are the receiving waters for drainage from throughout the watershed area. The IRCWM Plan incorporates the tenets of integrated regional water management planning to address challenging issues for water quality, habitat protection and enhancement, flood control, water supply and stormwater management. This Plan is a programmatic planning document for the region and has been prepared in accordance with the State's Integrated Regional Water Management Plan Standards as required per California Water Code §79560 et seq.

IRCWM Plan Purpose

The purpose of the Central Orange County IRCWM Plan is to provide a bridge between existing and developing watershed planning efforts, allowing for more effective collaboration and greater opportunity to leverage agency resources across jurisdictions. Extensive water resource program development and implementation has occurred in this region over the past three decades, with agency partnerships, agreements, and the formation of a formal stakeholder involvement structure. The water quality issues are daunting; within this region there are eight water segments listed on the State Water Resources Control Board 2006 Section 303(d) list and there are five Total Maximum Daily Loads (TMDLs) for nutrients, fecal coliform, sediment, toxics, and organophosphate pesticides, with more TMDLs pending. Water quality has been the overarching issue that has brought the water resource and land use agencies, environmental groups, and other stakeholders within the region together in the spirit of collaboration. Public agencies and private interests have entered into numerous cooperative agreements to leverage financial resources for the development of programs that implement studies, best management practices (BMPs), and other control measures consistent with regulatory requirements and regional goals for watershed conditions. These include the Orange County Stormwater Program; the Nitrogen and Selenium Management Program; an agreement to fund nutrient, fecal coliform, and toxics TMDL studies for the Newport Bay Watershed; and the Newport Bay Watershed Sediment Control Monitoring and In-Channel Maintenance Program; as well as other programs and specific water resource related projects.

These water quality-related projects and programs have not been undertaken with a narrow focus or single purpose; the stakeholders within this region, both public and private, understand the nexus between growth, land use decisions, water resource management, and watershed impacts. This region has experienced significant population growth over the past 20 years, with

development of former agricultural lands and increased numbers of people in the established urban areas. In addition to addressing water quality issues, the water and wastewater agencies have established partnerships to develop local resources, including groundwater and recycled water, to ensure a reliable source of water supply and to minimize the need for imported water. Public agencies and private entities have implemented a broad range of multi-purpose projects and programs to protect and enhance watershed conditions. The IRCWM Plan builds on this history of successful collaboration and furthers the interests of the stakeholders through this integrated planning approach.

IRCWM Plan Objectives

The Central Orange County IRCWM region faces unique challenges for water resource management. While the region shares groundwater resources and an imported water system with other areas in the Santa Ana region, the watershed management issues within this area are distinct and integrally linked to the region's fragile coastal ecosystem. The headwaters originate in the local foothills, and the entire area drains to the ocean, making this a separate and distinct planning area for water quality and ecosystem processes. This region's 9-mile coastline includes three CCAs and two ASBSs:

- Upper Newport Bay (CCA No. 69)
- Newport Beach (Robert E. Badham) Marine Life Refuge (ASBS No. 32/CCA No. 70)
- Irvine Coast Marine Life Refuge (ASBS No. 33/CCA No. 71).

The Upper Newport Bay Ecological Reserve is unique, providing important coastal Mediterranean habitat along the Pacific flyway and is home to many federal- or state-listed rare or endangered species.

Given the current watershed conditions, history of agency cooperation, and state agency priorities, the major theme of the Central Orange County IRCWM Plan is addressing the habitat, resource, and water quality needs of the three CCAs and two ASBSs through regional cooperation on projects and programs to improve water quality and restore ecosystems within the Newport Bay and Newport Coast Watersheds.

Protecting sensitive marine life areas from direct impacts in Upper Newport Bay and the ASBSs is key. As a Critical Coastal Area with a significant ecosystem, Upper Newport Bay is the receiving waters for impaired flows emanating from the watershed. Upper Newport Bay supports seven diverse estuarine habitats with several hundred species of marine and terrestrial flora and fauna including six federal and state listed threatened and endangered species (five bird species, one plant species). Newport Bay's fish diversity is rated as the highest of the seven major coastal embayments between San Diego and Point Conception and provides critical habitat

for commercially and ecologically important species of fish, such as California halibut, sand bass, gobies, topsmelt, and anchovy.

As the receiving body for all of the subwatersheds in the Newport Bay Watershed, Bay water quality potentially impacts the coastal ecosystem through discharges to the open coastal waters of suspended and dissolved sediment and pollutants in the Bay, including dead and/or decaying plant and animal matter, nutrients from fertilizers, heavy metals and hydrocarbon, pesticides and bacteria.

The seven objectives of the Central Orange County IRCWM Plan protect these important resources and are as follows:

Central Orange County IRCWM Plan Objectives

1. Improve water quality in streams and channels, particularly those that are listed as impaired, and those discharging to Upper and Lower Newport Bay, Newport Beach Marine Life Refuge, and Irvine Coast Marine Life Refuge in order to reduce impacts on these CCAs and ASBSs.
2. Provide for implementation of restoration projects, BMPs, and other control measures to support beneficial uses of creeks, streams, bays and estuaries, and to facilitate attainment of TMDL targets, receiving water quality objectives, the Santa Ana RWQCB's Watershed Management Initiative, and NPDES permit requirements.
3. Provide a comprehensive, regional, watershed-wide approach to address runoff and its related impacts from existing and future land uses, in accordance with the Non-point Source Pollution Plan.
4. Protect, restore, enhance, and connect wetland and wildlife habitats and support ecosystem processes in the coastal zone and upper watershed, while maintaining flood protection.
5. Enhance quantity and quality of local water supplies, including groundwater, to reduce reliance on imported water.
6. Provide a safe, reliable drinking water supply and recreational opportunities for disadvantaged communities within the region, consistent with other areas of the region.
7. Provide a framework for efficient intra-regional cooperation, planning, and implementation of this and other plans that have been developed for the region, which encourages integrated implementation of watershed improvement projects with multiple benefits.

Water Management Strategies, Regional Priorities, and Projects

The IRCWM Plan incorporates a broad range of water management strategies that can be used to achieve the objectives for reduction in impacts to CCAs and ASBSs, water quality improvements, ecosystem restoration, and improved local water supply reliability. The IRCWM Plan fully incorporates the 11 water management strategies that are required to be considered per California Water Code §79562.5 and §79564 and includes all 20 of the water management strategies identified in the State's IRWM Guidelines.

Strategies were evaluated to determine whether they are appropriate for inclusion in the Plan based on the following criteria:

- Is the strategy already incorporated into adopted plans for land use and water resource management by agencies within the Central Orange County region?
- Does the strategy provide a regionally appropriate means to resolve watershed management issues?
- Can the strategy be implemented through an integrated effort involving more than one agency or more than one project?

The strategies were carefully considered with respect to watershed management challenges and opportunities, agency experience, and a given strategy's appropriateness for the region. Each strategy was further identified as a potential means to achieve each of the objectives. *Table ES.1, Integration of Strategies to Achieve Objectives***,** summarizes the integration of strategies to achieve the IRCWM Plan objectives. The relative importance of a strategy for a given objective is indicated by the size of the circle.

The objectives of this IRCWM Plan and the appropriate mix of strategies to achieve those objectives directly respond to the critical watershed management issues that have been identified for the Central Orange County region given current watershed conditions, including the following:

- Water quality and impacts on the CCAs and ASBSs
- Flood control and loss of habitat
- Compliance with water quality regulations
- Enhancing quantity and quality of local water supplies
- Impacts on sensitive coastal habitats due to heavy recreational use.

Table ES.1
Integration of Strategies to Achieve Objectives

(Note: The size of the circle shows the relative significance within the watershed)

Strategy / Objective	(1) Improve Water Quality to reduce impacts on CCAs, ASBSs	(2) Implement restoration projects, BMPs, & control measures to support beneficial uses, attain TMDL targets, NPDES permit reqmts	(3) Watershed-wide approach to address runoff and related impacts	(4) Protect, restore, enhance & connect wetland and wildlife habitats; support ecosystem processes	(5) Enhance quantity and quality of local water supplies	(6) Provide safe water supply, recreational opportunities to disadvantaged communities	(7) Intra-regional cooperation, planning and implementation
Ecosystem Restoration	●	●	●	●			●
Habitat Protection	●	●	●	●			●
Water Supply Reliability		•			●	•	●
Flood Management	●	●	●	●		•	●
Groundwater Management		•			●	•	●
Recreation/Public Access	●			•		●	•
Stormwater Management	●	●	●	●			●
Water Conservation	●	●	•		●	●	•
Water Quality Protection	●	●	●	●	●	●	●
Water Recycling					●	•	●
Wetlands Enhancement/Creation	●	●	●	●			●
Conjunctive Use					●	•	●
Desalination					●	●	●
Imported Water					•	●	•

Table ES.1
Integration of Strategies to Achieve Objectives

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Land Use Planning	●	●	●	●	●	●	●
Non-Point Source Pollution Control	●	●	●				●
Surface Storage					●	●	●
Watershed Planning	●	●	●	●	●	●	●
Water/Wastewater Treatment					●	●	●
Water Transfers					●	●	●

Project identification and prioritization were developed by the IRCWM Group and reviewed by the Newport Bay Watershed Stakeholders Group. For purposes of this Plan, the highest priority is given to capital improvement projects that were collectively determined by the IRCWM Group to most strongly support the multipurpose objectives of the IRCWM Plan. High-priority projects were determined based on the following criteria:

- Importance of the project to reducing impacts to CCA Nos. 69, 70 and 71 and ASBS Nos. 32 and 33
- Importance of the project to reducing threat of property loss (with linkage to sediment issues downstream)
- Importance of the project to progress on regional objectives
- Availability of matching funds

- Readiness to proceed: Environmental clearance under CEQA and state and federal environmental and permitting requirements is already achieved, in progress, or readily achievable for the project; project implementation will begin by 2008-2010.
- Equitable geographic distribution and level and diversity of participation by agencies and stakeholders within the watershed.

Based on these criteria, 26 projects were identified and prioritized, as shown in Table ES.2 below:

Table ES.2
Priority Projects for the IRCWM Plan

Project Name	Description
Newport Coast Runoff Reduction Project (CCA #69, ASBS #32 and ASBS #33)	Incentive Program for residential weather based (ET) Controllers to reduce irrigation runoff into CCA #69 and ASBS #32 and #33
Serrano Creek Reach 2 Bank Stabilization and Sediment/Pollution Reduction to CCA #69 and ASBS #32	Stabilize 1.2 miles of Serrano Creek bank to reduce erosion and sediment reaching CCA #69 and pollutants to ASBS #32; prevent loss of property and life.
Restoration of ASBS #32 and Ecosystem Impact Metric	Remove invasive brown algae in rocky inter-tidal zone, re-establish native algae, restore eelgrass; ASBS Impact Metric Assessment; develop information management tools for ASBS restoration
Low Impact Design BMP projects: Reducing Sediment, Metals and Bacteria Load – Treatment Train with Solids Removal, Fine Sediment Removal and Bio-retention	Implement Pilot BMPs for dry weather and low wet weather flows with treatment train approach to benefit ASBS #32, ASBS #33 and CCA #69, #70 and #71
Copper Reduction Program for CCA #69, ASBS #32 and ASBS #33	Implement boat paint management program to reduce presence of toxics in CCA #69, ASBS #32 and ASBS #33
Buck Gully and Morning Canyon: Canyon and Creek Bank Erosion Control BMPs and Riparian and Freshwater Wetland Restoration Project (ASBS #32)	Erosion control and bank stabilization to reduce sediment loads; riparian corridor restoration; construction of natural treatment system at Poppy Lane and Buck Gully to reduce nutrient sediment and bacterial loads entering ASBS # 32
Newport Bay Watershed Natural Treatment Systems (CCA#69, ASBS #32, ASBS #33)	Construct several regional water quality wetlands for removal of nitrogen, pathogens, phosphorus and other regulated pollutants to benefit CCA #69, ASBS #32, ASBS #33
Pharmaceutical Disposal Program/ "No Drugs Down the Drain" Pharmaceutical Education Outreach Tool Box (CCA #69, ASBS #32, ASBS #33)	Establish collection sites for unused pharmaceuticals; establish tool box for public education program to reduce disposal into sewer system
Stormwater Diversion at Pelican Point (ASBS #33)	Construct diversion at Pelican Point to reduce storm drain runoff to ASBS #33
Upper Newport Bay Ecosystem Restoration (CCA #69)	Restore storage capacity of existing in-bay sediment detention basins

Project Name	Description
	(CCA#69)
Public Impact Reduction Program for CCA #69, ASBS #32	Implement pilot "Exclusion Zone" modeled from State Park Programs to re-establish vegetation along CCA trails; expand docent program to further limit public impact on CCA and ASBSs and implement cooperation program with education groups/Institute to use touch tanks, rotation of study areas and docent coordination.
Nitrogen and Selenium Management Pilot Program (CCA #69, ASBS #32, ASBS #33)	Implement pilot BMPs for management of nitrogen and selenium
Buck Gully Habitat Restoration and Fire Prevention (CCA #70, ASBS #32)	Buck Gully fuel modification program and residential incentive program; restore native coastal scrub habitat
Cienega Filtration Project (CCA #69, ASBS #32)	Construct biofilter to remove selenium from surface water in Peters Canyon Channel tributary of San Diego Creek
Nitrogen and Selenium Management Program (CCA #69, ASBS #32 and #33)	Implement BMPs to manage nitrogen and selenium
South San Joaquin Marsh Natural Treatment System (CCA #69, ASBS #32)	Construct 10-acre wetland for urban runoff treatment serving entire San Diego Creek Watershed
San Diego Creek Levee System FEMA Certification Study (CCA #69, ASBS #32)	Study to determine improvements needed for FEMA Certification of San Diego Creek levee system to protect Michelson Water Reclamation Plant
Michelson Water Reclamation Plant Permanent Flood Wall (CCA #69, ASBS #32)	Construct flood wall adjacent to San Diego Creek to prevent inundation of MWRP from 200-year flood
Study of Nutrient Load in Bay and Algae Blooms – Cross Contamination Study to CCA #69, ASBS #32	Assess cause of algae blooms and correlation to high nutrient load into the Bay; conduct cross-contamination model to evaluate migration of nutrient to ASBSs
Baker Pipeline Regional Water Treatment Plant	Construct 25 mgd microfiltration plant to treat raw water from Santiago Lateral and/or Irvine Lake
Lake Forest Recycled Water Expansion Project	Expand IRWD recycled water system into Lake Forest
District-Wide Recycled Water Expansion Project	Design / Construct expanded recycled water distribution system
Siphon Reservoir Conversion to Recycled Water Storage	Acquire and convert imported water storage from agricultural use to recycled water storage for agricultural use
Peters Canyon Reservoir Conversion to Recycled Water Storage	Acquire and convert imported water storage for agricultural use to recycled water storage for agricultural use.
Irvine Wildlife Corridor	Create a wildlife corridor for migration between natural habitats located in and adjacent to City of Irvine
Orange County Great Park	Convert approximately 2,300 acres of former El Toro Marine Corp Air Station into open space, natural drainage, groundwater recharge, and valuable habitat corridors, along with sports fields and educational and cultural facilities for countywide benefit

Integration of IRCWM Plan into Newport Beach Watershed Planning Efforts Funded through Propositions 40 and 50

The IRCWM Plan is integral to the watershed planning efforts being lead by the City of Newport Beach. In 2002, the City began efforts for watershed planning, assessments, and implementation projects for the Newport Coast Watershed using Proposition 13 Funding from the Santa Ana RWQCB. The watershed planning was extended to include the ASBS and CCA areas along Newport Coast. On January 2, 2006, the City of Newport Beach was awarded a planning grant by the State Water Resources Control Board through Proposition 40 for preparation of a Integrated Coastal Watershed Management Plan (ICWMP) to specifically address ASBS and CCA issues along Newport Coast. The extensive assessments partially funded under this Proposition 40 grant have been incorporated into the draft ICWMP which will be circulated for comments in August 2007. Much of the material in the ICWMP has been used during the preparation of the Central Orange County IRCWM Plan.

On May 31, 2006, the City of Newport Beach was awarded a planning grant by the California Department of Water Resources through Proposition 50, Chapter 8 for preparation of an Integrated Regional Watershed Management Plan for the Newport Bay Watershed including data collection, analysis, and formulation of policy and guidelines. This effort (also referred to as the Final Plan) is currently underway and will incorporate the Central Orange County IRCWM Plan (referred to as the first phase for planning purposes). However, the Final Plan will include new elements that, to our knowledge, have not been explicitly included in any previous watershed plan for an urbanized area in California. These elements include:

- The collaborative definition of the Desired State for the watershed ecosystem that balances and integrates the many competing needs and priorities within the system.

- The identification of the projects and programs that will be needed to achieve the Desired State for the Watershed system.

- An adaptive management process that utilizes the existing technical information and monitors on-going project information (including projects that will be implemented in the first phase) to continually refine how specific actions impact the system.

- A project prioritization approach for the long-term that is science based and continually informed by the adaptive management of the watershed.

Because these additional elements involve more extensive and focused contributions from the watershed stakeholders, the two-phase approach for producing the watershed management plan is practical and necessary.

Governance of the IRCWM Plan

The County of Orange, RDMD Watershed and Coastal Resources Division, will serve as the Central Orange County IRCWM Plan Administrator. Plan implementation will be in accordance with the proposed project priorities and schedule, as periodically amended, by each project proponent. The Newport Bay Watershed Management Committee will be formed through a Memorandum of Understanding (MOU) between agencies with authority to implement this Plan; up to three non-governmental organizations will be invited to participate as well. The focus of this Committee will be on the IRCWM Plan; as such, the Committee will be responsible for developing regional objectives, assessing strategies, and identifying projects and implementation approaches to achieve the objectives. Meetings will be held quarterly and will focus on the status of the Plan and project implementation; project funding; monitoring, data management, and reporting; and review and consideration of regional priorities and necessary refinement. The County will be responsible for drafting and distributing meeting minutes to the Committee and other interested stakeholders. The Newport Bay Watershed Executive Committee will serve in the leadership role to oversee policy issues and budget decisions related to the Central Orange County IRCWM Plan.

1.0 INTRODUCTION AND PLANNING APPROACH

1.1 Introduction to the Central Orange County Region

The Central Orange County Integrated Regional and Coastal Watershed Management (IRCWM) Plan encompasses the Newport Bay and Newport Coast Watersheds, a highly urbanized area with challenging issues related to water quality and protection of coastal resources and habitat (see *Figure 1.1, Watershed Planning Area*). These two adjoining subregional watersheds lie at the southern edge of the broader Santa Ana River Watershed, which originates in the San Bernardino Mountains and extends westward to the Pacific Ocean (see *Figure 1.2, Santa Ana River Watershed*). While the Central Orange County planning area shares groundwater resources and an imported water system with other areas in the Santa Ana region, the watershed management issues within this area are distinct and integrally linked to the region's fragile coastal ecosystem. The headwaters originate in the local foothills, and the entire area drains to the ocean, making this a separate and distinct planning area for water quality and ecosystem processes. This region's 9-mile coastline includes three Critical Coastal Areas (CCAs)[1] and two Areas of Special Biological Significance (ASBSs)[2]:

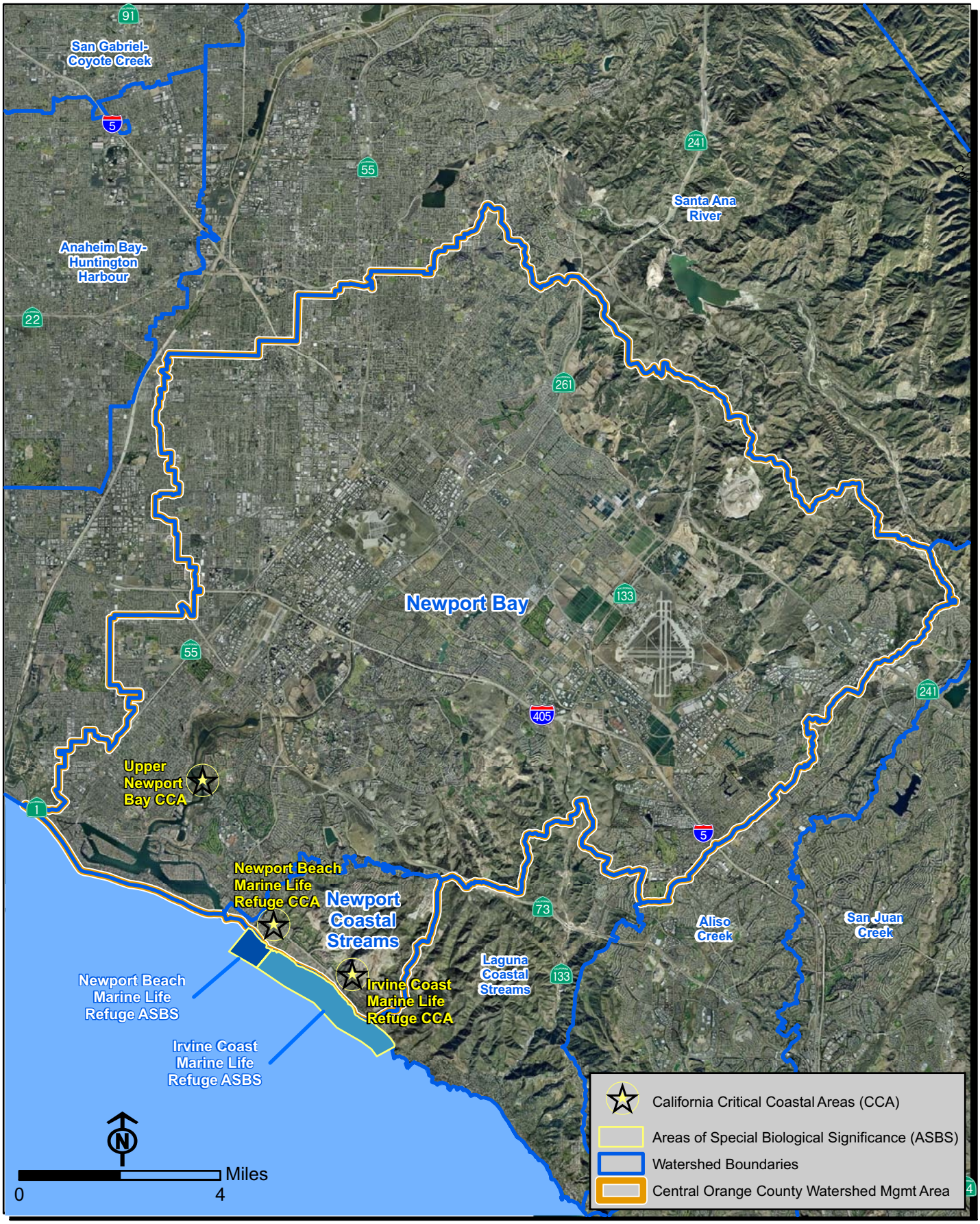
- Upper Newport Bay (CCA No. 69)
- Newport Beach (Robert E. Badham) Marine Life Refuge (ASBS No. 32/CCA No. 70)
- Irvine Coast Marine Life Refuge (ASBS No. 33/CCA No. 71).

1.1.1 Watershed Management Challenges

Within the Central Orange County region, the nexus between land use decisions, water resource management including water quality, and coastal zone impacts has been firmly established through numerous studies and ongoing monitoring programs that form the foundation for this IRCWM Plan (Plan). The Central Orange County IRCWM planning area covers approximately 162 square miles with an estimated population of 705,000 people. Within this area, approximately 154 square miles drain into Newport Bay through several tributary subwatersheds, including San Diego Creek, Santa Ana-Delhi Channel, Big Canyon Creek, Costa Mesa Channel, and Arches Channel. Upper Newport Bay drains to Lower Newport Bay (which includes Newport Harbor), and then to the receiving waters of the

[1] CCAs are specially designated land areas of the California coast where state, federal, and local government agencies and other stakeholders have agreed to coordinate expertise and resources for the purpose of improving degraded water quality and protecting exceptional coastal water quality from the impact or threat of nonpoint source pollution (SARWQCB Watershed Management Initiative Chapter 2004).

[2] ASBSs are considered State Water Quality Protection Areas (SWQPAs), which are non-terrestrial marine or estuarine areas designated to protect marine species or biological communities from an undesirable alteration in natural water quality. ASBSs have been designated by the State Water Resources Control Board (SWRCB) through its water quality control planning process. All ASBSs are classified as a subset of SWQPAs and require special protection as determined by the SWRCB (California Public Resources Code §36700 (f)).

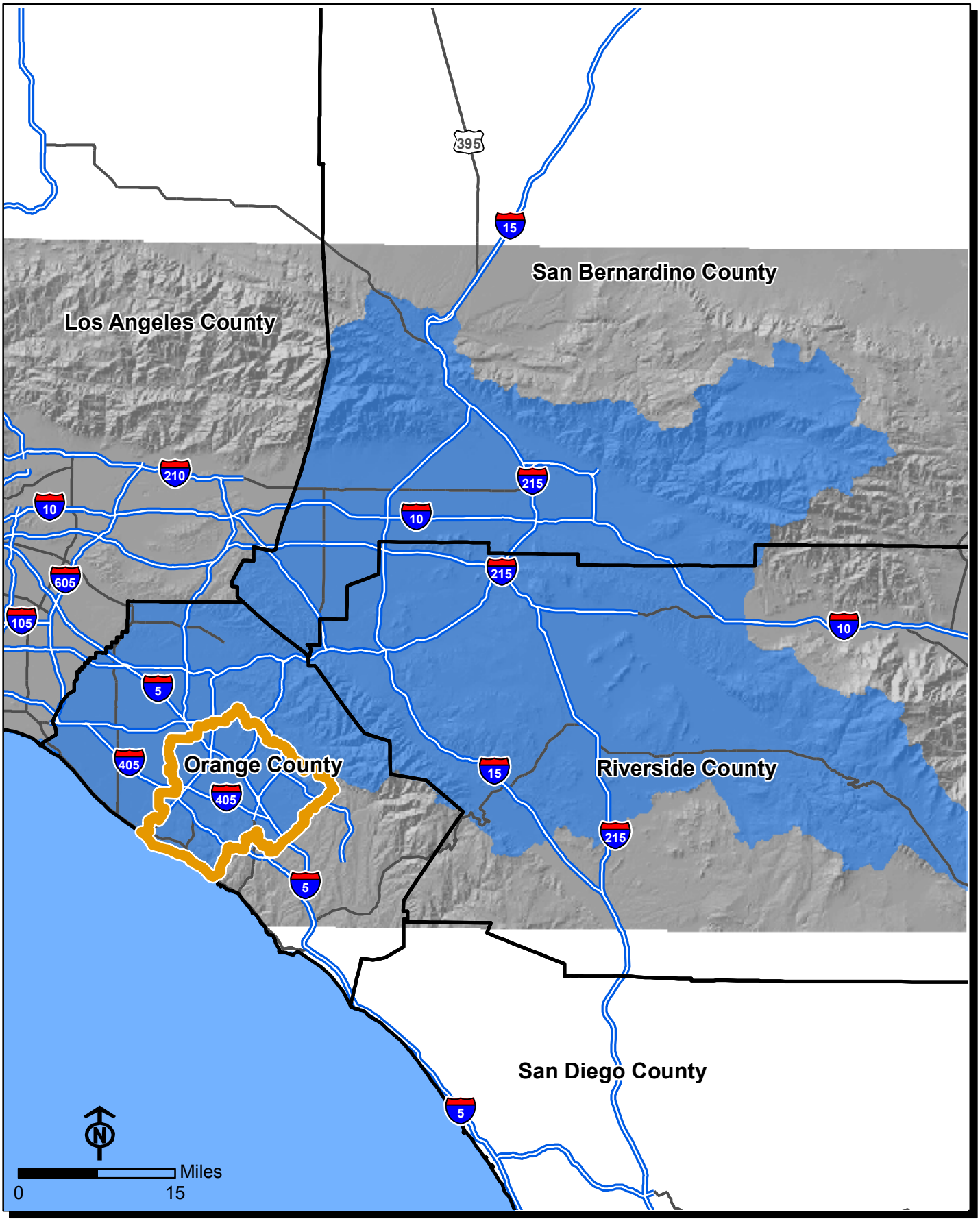


Source: RDMD 2007, AirPhoto USA 2006

Central Orange County Integrated Regional
and Coastal Watershed Management Plan

Watershed Planning Area

FIGURE
1.1



Source: RDMD 2007, USGS 2007

Central Orange County Watershed Mgmt Area
Santa Ana River Watershed

Central Orange County Integrated Regional and Coastal Watershed Management Plan

Santa Ana River Watershed

FIGURE 1.2

Pacific Ocean approximately 0.1 miles north of the Newport Beach Marine Life Refuge (ASBS No. 32). Approximately 80-percent of the flow tributary to Newport Bay emanates from the San Diego Creek subwatershed, 15-percent from the Santa Ana-Delhi Channel, and the remaining 5-percent from other drainages. Six reaches within this watershed are listed on the SWRCB's 2006 Section 303(d) list. Total maximum daily load (TMDL) allocations have been developed for the Newport Bay and San Diego Creek Watersheds for nutrients, sediment, and toxics (including organophosphate pesticides, selenium, metals, and organochlorinated compounds); there is also a fecal coliform TMDL for Newport Bay. Additional TMDLs are pending.[3]

Directly south of the Newport Bay Watershed, the Newport Coast Watershed includes eight coastal canyons that drain directly to the ASBSs. Development within this watershed has resulted in hydromodifications within the canyons, and the area is experiencing a significant increase in urban runoff containing fertilizers, metals, bacteria, and sediment. Two reaches within this watershed are listed on the SWRCB's 2006 Section 303(d) list for impaired water quality.

The CCAs and ASBSs are directly impacted by urban activities within the planning area, including fresh water drainage carrying pollutants of concern from the upper watershed and coastal canyons, creek bed erosion due to the increase of impervious surfaces, legacy pesticides from former agricultural operations, boat maintenance in Newport Harbor, and high levels of selenium and nitrogen in the groundwater that may rise to the surface and move downstream. These fragile coastal ecosystems are further impacted by heavy recreational use within the coastal zone: Newport Harbor has approximately 10,000 registered yachts and boats, and Corona del Mar State Beach is very popular due to easy access, sandy beaches, and the nearby rocky tide pools. Exhibit A shows the relationship between the exit of the Newport Harbor jetty and the downcoast ASBS areas that begin within 500-feet south of the jetty.

[3] The toxics TMDL will be split into five separate TMDLS: organophosphate pesticides, selenium, metals, organochlorinated compounds, and a TMDL for the Rhine Channel in Newport Harbor. The organophosphate pesticide TMDL has been amended into the Basin Plan.

Exhibit 1.A
Relationship of Newport Harbor Exit and ASBS Areas
ASBS areas are 500-feet downcoast of the Newport Harbor jetty

Land use within the Central Orange County IRCWM planning area has changed dramatically over the past 40 years, as agricultural lands have been converted to urban uses, including large master-planned communities and commercial/industrial areas that have created a dynamic regional economy. The Central Orange County region contains two former military bases for which major re-use programs are underway. These environmentally impaired sites are being redeveloped to include mixed-use communities that will be a significant source of population growth in the next 20 years. The former Marine Corps Air Station (MCAS)–Tustin is the site of Tustin Legacy, a 1,600-acre mixed-use community that incorporates residential, commercial, and institutional uses with over 110 acres of parkland, including a new regional park. The 4,600-acre former MCAS–El Toro will be the site of Heritage Fields, a 2,300-acre mixed-use development, and the Orange County Great Park, a 2,300-acre park that will offer open space, natural drainage, groundwater recharge, and valuable habitat corridors, along with sports fields and educational

and cultural facilities for countywide benefit. Land use within the Central Orange County region is the cornerstone for the region's future, and integrated planning is used on multiple levels to address the challenge of ensuring that there are livable communities, a wide range of recreational opportunities, and a growing economy, along with healthy, functioning ecosystems.

1.1.2 Regional Water Supply

The agencies within the Central Orange County IRCWM region have worked cooperatively over the past two decades to develop a diverse mix of water supplies to ensure reliability, including the following: developing local groundwater resources and treatment processes for desalted groundwater; treatment and distribution of recycled water and supplemental imported water from the State Water Project (SWP) and Colorado River; leveraging conjunctive use programs; and water banking strategies. The area overlies the southern end of the Orange County Groundwater Basin; each of the Central Orange County IRCWM water agencies is a groundwater producer and therefore responsible for groundwater management.[4] In certain areas, groundwater requires treatment due to high nitrate levels, colored water, and toxic plumes from the former military bases.

Both treated and untreated imported water is delivered through a regional system owned and operated by the Metropolitan Water District of Southern California (MWD) and used for potable, non-potable, and conjunctive uses. The Irvine Ranch Water District (IRWD) has developed an extensive recycled water treatment and delivery system and will expand capacity through 2013 to meet expected recycled water demand at buildout. Recycled water is also available through the Orange County Water District (OCWD)'s Green Acres Project and the El Toro Water District (ETWD).

Although these sources of water supply are reliable, California is experiencing the driest year on record in 2007, and the agencies within the Central Orange County region are providing leadership on regional and statewide levels to enhance local water supplies and decrease dependence on imported water.

1.1.3 Focus of the Central Orange County IRCWM Plan

The conditions described above for the Central Orange County region present both challenges and opportunities for land use jurisdictions, water resource agencies, non-governmental organizations, and private landowners with a vested interest or responsibility for water quality and habitat protection and enhancement, particularly in the coastal zone. Given the valuable coastal resources and ecosystem processes within the region and the high level of cooperation

[4] With the exception of the Municipal Water District of Orange County (MWDOC). MWDOC provides imported water in the region.

that exists between the agencies with land use and water resource management authority, the focus of the Central Orange County IRCWM Plan is as follows:

> *The major theme of the Central Orange County IRCWM Plan is protection of the CCAs and ASBSs through regional cooperation on projects to improve water quality and restore ecosystems, with mutual benefits for local water supply reliability and enhanced recreational opportunities.*

The stakeholders within the Central Orange County region have a long history of working collaboratively on studies, programs, and projects to address water quality, ecosystem restoration, and water supply. As a result, there is an extensive library of technical information about the watersheds that has been created through numerous studies and project planning efforts. This effort continues, and this region is at the forefront in developing science-based studies to analyze coastal water quality impacts and identify effective solutions. Not only do the unique ecological resources in this region provide the impetus for integrated water resource planning, but the history of collaboration and availability of the technical information make effective planning, analysis, and project implementation possible. The planning approach and framework of the Central Orange County IRCWM Plan ensures that solution-oriented projects are coordinated within the region and that funding and project benefits are leveraged to the greatest extent possible.

1.2 Purpose and Need for the IRCWM Plan

Extensive water quality program development and implementation in the Newport Bay Watershed has occurred over the past three decades, originating with the passage of the Clean Water Act (33 U.S.C. 1251 et seq.) in 1972. The formation of the Newport Bay Watershed Executive Committee and Newport Bay Watershed Stakeholders Group expanded the planning focus, creating a structure which provides for broad stakeholder involvement, leveraging agency resources, and integrated planning for Newport Bay, its watershed, and related water quality issues. Although agency partnerships and related agreements have changed over the years, the strategic focus continues to be on water quality issues and collaborative planning. This effort has always included the San Diego Creek subwatershed, the upper watershed area that is integrally related to the Newport Bay Watershed through drainage and ecosystem processes. In 2002, development of the Newport Coast area began and the planning efforts broadened to include that area as well.

1.2.1 Existing Cooperative Agreements

Water quality has been the overarching issue that has brought the agencies, environmental groups, and other stakeholders within the region together in the spirit of collaboration. To

comply with the municipal National Pollutant Discharge Elimination System (NPDES) permit and achieve TMDL targets, public agencies and private interests have entered into cooperative agreements to leverage financial resources for the development of programs that implement studies, best management practices (BMPs), and other control measures consistent with regulatory requirements and regional goals for watershed conditions. Four examples are noted below.

Orange County Stormwater Program: The Orange County Stormwater Program is a cooperative municipal regulatory compliance initiative focused on the management of urban and stormwater runoff for the protection and enhancement of Orange County's creeks, rivers, streams, and coastal waters. The main objective of the program is to fulfill the commitment of Orange County's cities, the County of Orange, and the Orange County Flood Control District to develop and implement a program that satisfies the requirements of the area-wide municipal NPDES permit. Accomplishments of the third term permit include: completion of the 2003 Drainage Area Management Plan; establishment of two separate, highly interdependent planning processes targeting control of pollutants in urban runoff; development and implementation of a Model Municipal Activities program at 2,302 municipal facilities and an established best management practice (BMP) reporting program; and development and implementation of a public education program, and others. Each of the cities in the Central Orange County region is a permittee and participant in this program along with the other Orange County cities.

Nitrogen and Selenium Management Program: In December 2004, the Santa Ana RWQCB issued an order specifying waste discharge requirements for short-term groundwater-related discharges and *de minimis* discharges within the Newport Bay Watershed. The Nitrogen and Selenium Management Program was launched as a compliance effort. The program, which extends through December 2009, is a comprehensive, multi-stakeholder program that is charged with the development of watershed-wide management strategies for both selenium and nitrogen. The program has a budget of $2.5 million (for planning only) that is cost-shared by approximately 21 entities. Participants include the following:

- County of Orange
- City of Costa Mesa
- City of Irvine
- City of Laguna Hills
- City of Laguna Woods
- City of Lake Forest
- City of Newport Beach
- City of Orange
- City of Santa Ana
- Golden State Water Company
- The Irvine Company
- The Great Park Corporation
- Orange County Flood Control District
- Tustin Legacy Community Partners
- Lennar
- Maguire Properties
- Nexus Construction Services
- Integral Communities, Inc.

- City of Tustin
- Irvine Ranch Water District
- California Department of Transportation
- Orange County Flood Control District
- Orange County Coastkeeper*
- Stop Polluting Our Newport*
- Santa Ana Regional Water Quality Control Board*

**Supporting partner, does not provide funding*

Agreement to Fund Nutrient, Fecal Coliform, and Toxics Total Maximum Daily Load Studies for the Newport Bay Watershed (TMDL Agreement D99-128): This agreement commits various entities throughout Orange County to participate in studies for TMDL compliance. The agreement, and its amendments, provide for cost sharing to study the management of the three TMDLs within the Newport Bay watershed. Participants in the Agreement are the same as those listed in the Nitrogen and Selenium Management Program.

Newport Bay Watershed Sediment Control Monitoring and In-Channel Maintenance Program: This cost-sharing agreement includes the County; Orange County Flood Control District; the Cities of Lake Forest, Irvine, Tustin, and Newport Beach; and The Irvine Company. This ongoing program has an annual budget of $505,000 (FY 2007-2008) and will continue for as long as sediment monitoring of the watershed and maintenance of an in-channel basin is required.

1.2.2 Coordination with Watershed Planning Efforts

The Central Orange County IRCWM Plan is an extension of the valuable planning efforts that have been developed for this region so far, incorporating goals, objectives, research, strategies, and projects that have been identified and received stakeholder support. Some of these efforts are driven by regulations and others are the result of regional vision and goals for the quality and function of the Newport Bay and Newport Coast Watersheds. Some of these major planning efforts are listed below. Additional studies are listed in *Appendix A, Environmental Studies within the Newport Bay and Newport Coast Watersheds.*

Drainage Area Management Plan and Watershed Action Plans: The 2003 Drainage Area Management Plan (DAMP) addresses the requirements of the countywide NPDES Stormwater Permit and includes watershed action plans specific to each watershed. The DAMP is implemented by means of the watershed action plans and local implementation plans developed by each permittee.

Total Maximum Daily Load Compliance Plans: The Newport Bay Watershed currently has five TMDLs. Working groups have been formed with partnering agencies to make management decisions, implement management plans, and share costs.

U.S. Army Corps of Engineers Newport Bay/San Diego Creek Watershed Study: The Army Corps of Engineers (ACOE) conducted a study focused on broad watershed ecosystem planning issues. The 2005 study created a list of multipurpose watershed-scale ecosystem restoration projects in which the ACOE had a federal interest, as well as a watershed management plan that focused on management issues within the watershed rather than on project issues.

U.S. Army Corps of Engineers Special Area Management Plan for the San Diego Creek Watershed: The draft 2004 Special Area Management Plan (SAMP), prepared in conjunction with the California Department of Fish and Game's (CDFG's) Master Streambed Alteration Agreement (MSAA), is a cohesive, watershed-specific plan that addresses anticipated permitting needs and compensatory mitigation, including long-term management of aquatic resources within the watershed. The SAMP/MSAA will undergo environmental review pursuant to the California Environmental Quality Act (CEQA) (California Public Resources Code, Section 21000 et seq.) and the National Environmental Policy Act of 1969 (NEPA) (42 U.S.C. 4321 et seq.) in the future. Upon completion of the process, the participating agencies will establish permitting and mitigation policies and guidelines to protect conservation values and functions of the aquatic resource ecosystem.

Newport Coast Watershed Management Plan: The City of Newport Beach is developing a watershed management plan specific to the Newport Coast. The Plan includes an analysis of the critical issues and recommends programs and projects to reduce impacts to the CCAs and two ASBSs that border the coastline.

Newport Harbor Area Management Plan, Upper Newport Bay Watershed Management Plan and San Diego Creek Strategic Watershed Plan: The City of Newport Beach is developing a watershed management plan for Newport Harbor within Lower Newport Bay, Upper Newport Bay and the San Diego Creek subwatershed. These integrated plans will be based on a collaborative definition of the desired state of the watershed and an adaptive management process (further described in *Section 1.2.4* below).

Serrano Creek Collaborative Use Plan: The Serrano Creek Collaborative Use Plan was prepared for the City of Lake Forest and addresses erosion and flood control, recreation and landscaping improvements, biological resource enhancement, and funding for improvements along Serrano Creek.

Natural Treatment System Plan: In 2005, IRWD, in cooperation with the County of Orange and the Cities of Irvine, Lake Forest, Newport Beach, Orange, Santa Ana, and Tustin, developed a Natural Treatment System (NTS) Plan, an ecosystem-based network of constructed water quality treatment (WQT) wetlands for improving water quality in San Diego Creek.

Great Park Preliminary Master Plan: The Preliminary Master Plan for the 2,300-acre Great Park incorporates natural treatment systems, recycled water use, and other sustainable features (Great Park Design Studio, 2006). The wildlife corridor is part of an important linkage between the Cleveland National Forest and coastal open space. The Agua Chinon, part of the backbone infrastructure for the site, serves dual functions as a wetlands mitigation area and flood control facility and is being designed as a naturalized channel.

Urban Water Management Plans: The water agencies within the Central Orange County IRCWM planning area have each adopted a 2005 Urban Water Management Plan in accordance with the Urban Water Management Planning Act (California Water Code §10610 et seq.).

Groundwater Management Plan: The Orange County Water District has adopted a Groundwater Management Plan (2004) in compliance with the Groundwater Management Act and California Water Code §10753.7 (Assembly Bill 3030, 1999.).

1.2.3 Statement of Purpose for IRCWM Plan

The primary purpose of the Central Orange County IRCWM Plan is to provide a bridge between existing and developing watershed planning efforts, allowing for more effective collaboration and greater opportunity to leverage agency resources across jurisdictions. The Plan provides a means to evaluate project outcomes and link benefits so that projects and programs can be prioritized on a watershed scale. The integrated approach used for this Plan encompasses a broad range of resource management objectives, necessitating a regional perspective. As such, the Central Orange County IRCWM Plan is intended to be used as a regional and local planning tool. To ensure that it remains an effective tool for project planning and funding, a basic tenet of the Central Orange County IRCWM Plan is to support the State's goals for integrated regional water management planning.

1.2.4 Integration of IRCWM Plan into Newport Beach Watershed Planning Efforts Funded through Propositions 40 and 50

The IRCWM Plan is integral to the watershed planning efforts being lead by the City of Newport Beach. In 2002, the City began efforts for watershed planning, assessments, and implementation projects for the Newport Coast Watershed using Proposition 13 Funding from the Santa Ana RWQCB. The watershed planning was extended to include the ASBS and CCA areas along

Newport Coast. On January 2, 2006, the City of Newport Beach was awarded a planning grant by the State Water Resources Control Board through Proposition 40 for preparation of a Integrated Coastal Watershed Management Plan (ICWMP) to specifically address ASBS and CCA issues along Newport Coast. The extensive assessments partially funded under this Proposition 40 grant have been incorporated into the draft ICWMP which will be circulated for comments in August 2007. Much of the material in the ICWMP has been used during the preparation of the Central Orange County IRCWM Plan.

On May 31, 2006, the City of Newport Beach was awarded a planning grant by the California Department of Water Resources through Proposition 50, Chapter 8 for preparation of an Integrated Regional Watershed Management Plan for the Newport Bay Watershed including data collection, analysis, and formulation of policy and guidelines. This effort (also referred to as the Final Plan) is currently underway and will incorporate the Central Orange County IRCWM Plan (referred to as the first phase for planning purposes). However, the Final Plan will include new elements that, to our knowledge, have not been explicitly included in any previous watershed plan for an urbanized area in California. These elements include:

- The collaborative definition of the Desired State for the watershed ecosystem that balances and integrates the many competing needs and priorities within the system.

- The identification of the projects and programs that will be needed to achieve the Desired State for the Watershed system.

- An adaptive management process that utilizes the existing technical information and monitors on-going project information (including projects that will be implemented in the first phase) to continually refine how specific actions impact the system.

- A project prioritization approach for the long-term that is science based and continually informed by the adaptive management of the watershed.

Because these additional elements involve more extensive and focused contributions from the watershed stakeholders, the two-phase approach for producing the watershed management plan is practical and necessary.

1.3 IRCWM Plan Management Group

The agencies and organizations participating in the development of the Central Orange County IRCWM Plan are shown below in *Table 1.1, Central Orange County IRCWM Plan Management Group*. These agencies have the authority to implement this Plan and, with the inclusion of the non-governmental organizations and private entities, represent the group necessary to successfully achieve the stated objectives of this IRCWM Plan. The members of this group are

committed to collaborating on regional issues, demonstrated by their long-term involvement in the Newport Bay Watershed Executive Committee, Newport Bay Watershed Stakeholders Group, and cooperation on the Orange County Stormwater Program, Newport Bay Watershed Sediment Control Monitoring and In-Channel Maintenance Program, Nitrogen and Selenium Management Program, TMDL implementation programs, and others. Through the planning process, this IRCWM Group will continue to build on this history to create stronger regional partnerships, maximize the efficiency and benefits of their efforts, and continue to develop a comprehensive, integrated, and balanced IRCWM Plan.

Table 1.1
Central Orange County IRCWM Plan Management Group

Entity	IRCWM Plan Authority/Responsibilities/Support
Public Agencies	
County of Orange	Land use, recreational facilities, stormwater protection, water quality
City of Newport Beach	Land use; water service; water conservation; sanitary sewer service; groundwater management; recreational programs/facilities; economic and community development; stormwater protection; water quality; planning and implementation of projects and programs to protect the CCAs and ASBSs; habitat protection and restoration
City of Irvine	Land use, recreational programs/facilities, economic and community development, stormwater protection, water quality
City of Costa Mesa	Land use, recreational programs/facilities, economic and community development, stormwater protection, water quality
City of Lake Forest	Land use, recreational programs/facilities, economic and community development, stormwater protection, water quality
City of Laguna Hills	Land use, recreational programs/facilities, economic and community development, stormwater protection, water quality
City of Laguna Woods	Land use, recreational programs/facilities, stormwater protection, water quality
City of Orange	Land use; water service; water conservation; sanitary sewer service; groundwater management; recreational programs/facilities; economic and community development; stormwater protection; water quality
City of Santa Ana	Land use; water service; water conservation; sanitary sewer service; groundwater management; recreational programs/facilities, economic and community development; stormwater protection; water quality
City of Tustin	Land use; water service; water conservation; sanitary sewer service; groundwater management; recreational programs/facilities; economic and community development; stormwater protection; water quality
Irvine Ranch Water District	Land use; potable and recycled water service; groundwater management; water conservation; wastewater collection and treatment; habitat protection and restoration; water quality
El Toro Water District	potable and recycled water service; water conservation; wastewater collection and treatment
Golden State Water Company (regulated by the CA Public Utilities Commission)	Water service; groundwater management; water conservation
East Orange County Water District	Water service; groundwater management; water conservation
Orange County Water District	Water resource planning; groundwater management
Orange County Sanitation District	Water resource planning (recycled); wastewater collection and treatment

Table 1.1
Central Orange County IRCWM Plan Management Group

Entity	IRCWM Plan Authority/Responsibilities/Support
Orange County Flood Control District	Land use; flood control; stormwater protection; water quality
Mesa Consolidated Water District	Water service; groundwater management; water conservation
Costa Mesa Sanitation District	Wastewater collection service
Municipal Water District of Orange County	Water resource planning; water conservation
Orange County Great Park Corporation (City of Irvine)	Recreational programs/facilities; stormwater protection; water quality; wetlands/habitat enhancement
California Department of Transportation	Manages California's highway and freeway lanes and adjacent property within rights of way
Non-Governmental Organizations	*IRCWM Support*
Newport Bay Naturalists and Friends	Funding, volunteers and organizational support for programs for habitat protection in Upper Newport Bay, public education
Stop Polluting Our Newport	Support for water quality programs
Surfrider Foundation – Newport Beach Chapter	Funding, volunteers, and organizational support for programs related to coastal water quality
Orange County Coastkeepers	Funding, volunteers, and organizational support for programs for habitat protection in Upper Newport Bay, public education
Nature Reserve of Orange County	Manage open space areas within Central/Coastal Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP)
Irvine Ranch Land Reserve Trust (managed by the Nature Conservancy)	Manage 50,000-acre Irvine Ranch Land Reserve
Friends of Harbors, Beaches, and Parks	Support for programs to improve harbors, beaches, and parks in Orange County
Latino Health Access	Programs and facilities related to health for disadvantaged communities (water quality, recreation)
University of California Cooperative Extension	Support for water quality/water conservation programs
Private Entities	*IRCWM Support*
The Irvine Company	Landowner; support and involvement in watershed planning
Lennar	Landowner; support and involvement in watershed planning
Maguire Properties	Landowner; support and involvement in watershed planning
Nexus Construction Services	Support and involvement in watershed planning
Integral Communities, Inc.	Landowner; support and involvement in watershed planning

All agencies necessary to address the objectives and water management strategies of the Plan participated in development of the IRCWM Plan. The agencies of the IRCWM Group and their jurisdictional areas are described in *Section 2.3, Jurisdictional Boundaries*.

1.4 IRCWM Planning Approach

The planning approach used for the Central Orange County IRCWM Plan builds off the significant planning efforts that have occurred within the region thus far and brings forward the objectives, opportunities, and recommendations identified in those studies (see *Section 1.1* above and *Appendix A*). With this foundation, the IRCWM planning approach incorporates the following:

- **Regional Objectives:** The objectives of the IRCWM Plan specifically address the watershed management issues of this region and are consistent with the tenets of integrated resource planning (see *Chapter 3, IRCWM Objectives*).
- **Integrated Strategies:** The Plan identifies a broad array of water management strategies to achieve the objectives; by nature, these strategies encourage integration and the implementation of projects and programs that are multi-beneficial and will have measurable results (see *Chapter 4, Water Management Strategies and Integration*).
- **Implementation Priorities:** Based on the objectives and integrated strategies, the Plan sets forth both short-term and long-term implementation priorities with specific projects identified under each category (see *Chapter 5, Regional Priorities and Implementation*).
- **Measuring, Monitoring, and Performance Evaluation:** Effective integrated resource planning requires adaptive management and information sharing on a regional and statewide level. The Plan incorporates project measuring, monitoring, and performance protocols that allow for future Plan and/or project adjustments, fill data gaps, and support information sharing and further analysis on a regional and statewide basis (see *Chapter 5, Regional Priorities and Implementation*).
- **Integration with Local Planning:** One of the strengths of the IRCWM Plan is the degree to which it relates to local planning for land use and other resource management issues. Land use represents challenges and opportunities for this region and is a key component in determining regional priorities and appropriate strategies to address watershed management issues (see *Chapter 6, Relation to Local Planning*).
- **Coordination with Stakeholders, Disadvantaged Communities, and State and Federal Agencies:** The maximum benefit of the IRCWM Plan is achieved through ongoing coordination with the stakeholders, disadvantaged communities, and state and federal agencies where they can assist with communication, cooperation, and implementation. The stakeholders within this region—public agencies, non-governmental organizations, and the public—are critical to the process to ensure the objectives reflect regional priorities, the strategies are appropriate for the region, conflicts are avoided, and the Plan is supported and will achieve its intended purpose (see *Chapter 7, Coordination for Implementation*).

This integrated resource planning approach is appropriate for the Central Orange County region for a number of reasons:

1. The upper, middle, and lower areas of the watersheds are integrally linked to the CCAs and ASBSs by dry-weather and storm drainage flows. Because the entire Newport Bay Watershed drains to Newport Bay and the Newport Coast Watershed drains directly to

the ocean, land use decisions throughout the region impact the ecosystems in these sensitive coastal areas. Water quality improvements can be achieved through a variety of means, such as land use planning, water conservation to reduce runoff, flood control improvements, and habitat restoration and enhancement. There are a number of cooperative agreements in place within the Newport Bay Watershed whereby the agencies share in the management, implementation, and cost of water quality projects and programs related to the TMDLs, as well as water resource management, including wastewater collection and treatment. Significant public funding is directed each year toward stormwater and other water quality programs, including protection of the coastal ecosystems. Those efforts will benefit from the Central Orange County IRCWM Plan and the ability to leverage funding and project benefits to achieve regional water quality objectives.

2. The communities within the planning area place a high social (especially recreation) and economic value (due especially to tourism) on the coastal resources and the protection of those areas is a regional responsibility.
3. The Orange County Groundwater Basin is a regional resource. Groundwater quality issues, such as naturally occurring selenium, toxic plumes from former military operations, and high nitrate and total dissolved solids (TDS) levels require regional solutions.
4. The imported water system and water resources are shared regionally. California is experiencing the driest year on record in 2007. Agencies are continuing to work collaboratively on programs to enhance local supplies and reduce demand. Regional programs are more cost-effective and provide greater benefit locally and regionally.
5. The Central Orange County IRCWM Plan synchronizes local planning efforts with statewide planning and priorities, encouraging the broader use of statewide management strategies. The Plan enables agencies to leverage financial resources through cooperation with other implementing agencies.

1.5 IRCWM Planning Process

The members of the IRCWM Group have worked individually and collaboratively over the years to develop and integrate regional strategies that address environmental issues, raise community awareness, and coordinate numerous and varied projects to:

- Optimize watershed and coastal resources
- Improve water quality throughout the region
- Safeguard habitat

- Protect communities from drought
- Enhance local water supply and system reliability
- Ensure continued water security.

The Central Orange County IRCWM Plan builds on those efforts, incorporating the goals, objectives, and recommendations of existing plans, research documents, and ongoing studies within the Newport Bay and Newport Coast Watersheds in a manner that integrates regional objectives, strategies, and projects to accomplish the following: (1) address water quality issues (particularly those impacting the CCAs and ASBSs); (2) improve beneficial uses of water within the region; and (3) enhance local water supplies to improve reliability and reduce dependence on imported water. The Plan establishes a priority ranking, grouped by short-term and long-term priority, to help further regional efforts to investigate the feasibility of, and identify funding for, these projects. Individual projects are required to go through the appropriate environmental review and permitting process.

Coordination with Other Subregional Plans

In 2005, the South Orange County Integrated Regional Water Management (IRWM) Plan was completed for the watersheds in the south Orange County region, an area under the jurisdiction of the San Diego RWQCB. The Central Orange County IRCWM Plan was publicly reviewed and adopted in July 2007. The North Orange County IRWM Group launched its planning process in 2007. Upon completion, the three IRWM Plans will cover the entirety of Orange County and will be closely related to allow for integration and coordination between these and adjacent watershed management regions.

1.5.1 Stakeholder Involvement in Plan Development

This IRCWM Plan was developed with extensive stakeholder support; in fact, the history of strong collaborative relationships among the stakeholders within the region makes development and successful implementation of this Plan possible. There is a formal stakeholder structure for this region, comprised of two closely related groups. It should be noted that early stakeholder groups formed over a decade ago, and, despite the names, the geographic focus is regionwide and encompasses the entire Newport Bay and Newport Coast Watersheds.

Newport Bay Watershed Executive Committee: The Executive Committee serves in a leadership role to oversee policy issues and budget decisions related to water quality regulatory issues and the Central Orange County IRCWM Plan. The Committee is the successor to the Upper Newport Bay Sediment Control Executive Committee established through a cooperative agreement in the early 1980s. The Cities of Newport Beach, Tustin, and Irvine, the County of

Orange, CDFG, and The Irvine Company entered into an agreement to develop and implement a comprehensive program to manage sediment in the San Diego Creek Sub-Watershed and Upper Newport Bay. The Newport Bay Watershed Executive Committee was formed by amendment of the cooperative agreement in 1999 and its purview includes impairment of Newport Bay caused by nutrients, toxics, and pathogens in addition to sediment, as well as related environmental enhancement.

The Executive Committee later expanded by adding the Orange County Flood Control District, City of Lake Forest, IRWD, and the Santa Ana RWQCB. These agencies were added because of their responsibility for managing water quality in the Newport Bay Watershed and their authority to participate in various water quality programs.

Members of the Executive Committee are elected or appointed officials or are executive-level managers, with one member from each of the signatories to the agreement. The committee meets at least twice a year. Meetings are governed by the Brown Act.

Membership: (Membership comprises one representative from each member agency.)

- County of Orange
- City of Irvine
- City of Lake Forest
- City of Newport Beach
- City of Tustin
- Irvine Ranch Water District
- CDFG
- Santa Ana RWQCB
- The Irvine Company
- Orange County Flood Control District

Newport Bay Watershed Stakeholders Group: The Newport Bay Watershed Stakeholder Group is open to all interested stakeholders. The group strives to achieve balance between multiple and sometimes competing issues associated with the natural and built environments of the watershed through education, outreach, and coordination of watershed management issues. The group shares information on issues, solutions, and priorities. Through an open, collaborative, consensus-based approach, the group seeks to provide leadership in the watershed by working to achieve common goals for the long-term management of the watershed, using an interdisciplinary approach grounded in sound science.

The Newport Bay Watershed Stakeholders Committee meets monthly. The distribution list for meeting notices and information is included in *Appendix B, Newport Bay Watershed Stakeholders Group*.

The stakeholders participated in the development of the IRCWM Plan by reviewing and confirming the regional objectives and participating in the project review and prioritization. This input is particularly valuable as stakeholders have been involved in a majority of the planning

efforts that have been conducted within the region. They understand the data gaps for different ecosystems and recognize where additional study is needed; through collaboration, they have determined where project implementation is a priority. Stakeholder discussions at each level were key to bringing forward projects with synergies and opportunities for multiple benefits that clearly reflect the goals of integrated regional planning.

Outreach Efforts

Multiple stakeholder meetings were held in preparation for this Plan, with meeting groups organized for general discussion and others focused on specific groups or issues.

The Newport Bay Watershed Stakeholder Group meets regularly. Integrated regional water management planning has been discussed since the passage of Proposition 50; discussions have been further refined as it was determined how integrated planning could best be used to benefit this region. A brief history of meeting dates is as follows:

- 2005: 1/19, 2/16, 3/16, 4/20, 5/18, 6/15, 7/20, 8/17, 9/21, 10/19
- 2006: 1/18, 5/17, 6/21, 7/19, 9/20
- 2007: 1/17, 2/21, 3/21, 4/18, 5/16, 6/20.

The Environmental Restoration Task Force is a select group of environmentalists representing key non-governmental organizations in the watershed with specific technical knowledge regarding the issues of water quality, habitat restoration, and watershed functions. This group meets to determine what the goals and priorities are for habitat protection and restoration, particularly with respect to Upper Newport Bay. This group met on the following dates and is expected to complete its recommendations in 2007:

- 2007: 5/07, 5/29, 6/12, 6/26, 7/10

Specifically for preparation of the IRCWM Plan, the cities, County, and water and wastewater agencies met on the following dates:

- 2007: 4/18, 5/01, 5/16, 5/30.

The IRCWM Plan Working Group, responsible for development of the Plan, includes the County, City of Newport Beach, and IRWD. This group met on the following dates:

- 2007: 4/09, 4/16, 4/23, 4/30, 5/07, 5/14, 5/21, 7/05.

The Newport Bay Watershed Executive Committee has been updated on the progress of integrated regional planning, and specifically the IRCWM Plan. The Committee has been

provided opportunity for input throughout the process. Committee meeting dates are as follows. Going forward, the Committee intends to meet semi-annually on a regular basis.

- 2005: 5/26, 11/03
- 2007: 5/02, scheduled for 11/07.

In addition to the meetings listed above, members of the IRCWM Group met individually with cities and environmental groups to encourage their participation and identify projects to be included in the Plan. This effort resulted in several new projects being identified and elicited even broader stakeholder support for the IRCWM planning process.

The stakeholders have an essential role in Plan implementation, as well as future plan updates. The process by which that involvement will occur is discussed in *Chapter 7, Coordination for Implementation*.

1.5.2 Participation of Disadvantaged Communities in the Planning Process

The Central Orange County IRCWM planning area includes several disadvantaged communities, as defined by the State of California. These communities are primarily within the Cities of Costa Mesa, Irvine, Lake Forest, Santa Ana, and Tustin. During the development of this Plan, the interests of these communities were represented by the respective cities and special districts serving those areas as well as Latino Health Access, a non-profit organization that supports efforts for public health and wellness, including recreational programs and facilities. In particular, their concerns for recreational opportunities at the beaches and parks were considered; the projects identified for funding in Round 2 were evaluated to ensure that none would create an environmental justice issue. For future phases of this Plan, these communities will continue to have an important voice in the planning process. This will be coordinated through collaboration with Latino Health Access and other non-profit organizations that serve those communities.

1.5.3 Central Orange County IRCWM Plan Public Review

The Public Review Draft of the Central Orange County IRCWM Plan was released for public review on Friday, June 22, 2007. The public was notified of its availability through email to the Newport Bay Watershed Stakeholders Group and a press release issued by the County of Orange. The draft plan was available on IRWD's website, and hard copies were placed in the Newport Beach Public Library and made available at the City of Lake Forest, City of Irvine, City of Newport Beach, City of Tustin and the County of Orange Resources and Development Management Department.

The 30-day public review period closed on Monday, July 23, 2007. Comment letters were received from the County of Orange Resources and Development Management Department (RDMD) Environmental Resources Division, Orange County Great Park Corporation, Tustin Legacy Community Partners (draft), and the US Fish and Wildlife Service and California Department of Fish and Game (joint letter). In summary, the comments clarified water quality regulations, discussed the potential of the Great Park to achieve the regional objectives over the long term, and confirmed the participation and support of the resource agencies in implementing the plan. The comments have been incorporated as appropriate and will be considered again in the preparation of the next phase of this Plan.

1.5.4 Central Orange County IRCWM Plan Adoption and Acceptance

The IRCWM Group identified the County of Orange as the lead agency for implementation of this Plan. Additionally, the City of Newport Beach and IRWD are identified as essential to this Plan in terms of achieving its objectives. These two agencies currently provide significant regional leadership, staff, and financial resources for watershed management, coastal protection, water resource management, and water quality projects. Therefore, the Orange County Board of Supervisors, the Newport Beach City Council, and the IRWD Board of Directors have accepted and adopted the Central Orange County IRCWM Plan by resolution. The following resolutions are included in *Appendix C, Resolutions and Letters of Support*:

- County of Orange, Board of Supervisors Acceptance, July 24, 2007, Resolution No. 07-107
- City of Newport Beach, City Council Adoption, June 26, 2007, Resolution No. 2007-43
- IRWD, Board of Directions Acceptance, June 25, 2007, Resolution No. 2007-18.

The long-term success of the IRCWM Plan is dependent on the affirmed support of members of the IRCWM Group. Letters supporting the Central Orange County IRCWM Plan include the following (copies of the letters are included in *Appendix C)*:

- Latino Health Access, May 1, 2007, America Bracho, MPH, CDE President and CEO. Supports the development and implementation of the Central Orange County Integrated Regional Water Management Plan.
- City of Tustin, May 10, 2007, Lou Bone, Mayor. Supports the Plan and the benefits it will bring to the communities of Central Orange County.
- City of Irvine, May 15, 2007, Manuel Gomez, Director of Public Works. Supports the Plan and the benefits it will bring to the communities of Central Orange County.
- City of Laguna Beach, June 19, 2007, David Shissler, Director of Water Quality. Supports the benefits the Plan will bring to the communities of Central Orange County.

- University of California, Irvine, June 19, 2007, William J. Cooper, Director of Urban Water Research Center and Professor. Supports the Plan and considers working jointly on this effort.
- Orange County Coastkeeper, June 26, 2007, Raymond Heimstra, Associate Director-Programs. Supports the Plan as it will engage the community at a more fundamental decision-making level and will provide a significant forum for all those advocating for a safe, clean, and healthy environment.
- California Regional Water Quality Control Board Santa Ana Region, June 27, 2007, Mark G. Adelson, Senior Environmental Scientist. Supports the Plan as it will engage the community at a more fundamental decision-making level and will provide a significant forum for all those advocating for a safe, clean, and healthy environment.
- California State University, Fullerton, June 27, 2007, Dr. Steven N. Murray, Dean of College of Natural Sciences and Mathematics and Professor in Biology. Supports the importance of the activities included in the Plan.
- Newport Beach Chapter of Surfrider Foundation, July 25, 2007, Nancy Gardner, Steering Committee. Supports the development and implementation of the Plan since it will benefit communities, particularly water management efforts.
- Newport Bay Naturalists and Friends, July 25, 2007, Dennis J. Baker, President. Supports and has been directly involved in the development and implementation of the Plan. Believes the Plan will provide benefits to the communities in the region and specifically Newport Beach.
- Orange County Fifth District, July 24, 2007, Supervisor Patricia C. Bates. Supports the development and implementation of the Plan since portions of the Fifth District, including Serrano Creek, flow into Newport Bay.

1.6 Governance of the IRCWM Plan

1.6.1 Plan Administration and Management

The County of Orange, RDMD Watershed and Coastal Resources Division, will serve as the Central Orange County IRCWM Plan Administrator. Plan implementation will be in accordance with the proposed project priorities and schedule, as periodically amended, by each project proponent.

The Newport Bay Watershed Management Committee will be formed through a Memorandum of Understanding (MOU) between agencies with authority to implement this Plan. Each signatory to the MOU will have one voting representative. Up to three non-governmental organizations will be included in the MOU. The focus of this Committee will be on the IRCWM Plan; as such, the Committee will be responsible for developing regional objectives, assessing strategies and identifying projects and implementation approaches to achieve the objectives.

Meetings will be held quarterly and will focus on the status of the Plan and project implementation; project funding; monitoring, data management, and reporting; and review and consideration of regional priorities and necessary refinement. The County will be responsible for drafting and distributing meeting minutes to the Committee and other interested stakeholders.

1.6.2 Executive Committee

The Newport Bay Watershed Executive Committee will serve in the leadership role to oversee policy issues and budget decisions related to the Central Orange County IRCWM Plan (see *Section 1.5.1* for description of the Executive Committee). The Committee meets on a semi-annual basis and will receive an update on Plan implementation, including identification of any issues of concern.

1.6.3 Benefits of Governance Approach

This approach to governance of the Central Orange County IRCWM Plan promotes partnership opportunities between cities, special districts, other stakeholders, and funding agencies. It facilitates ongoing and meaningful public and private stakeholder involvement and group participation and decision making, with one administering agency for coordination and management. The County as the administering agency will be accountable to the IRCWM Group and the Executive Committee, along with funding agencies that require regional applications and agreements. The existing Newport Bay Watershed Stakeholders Group will continue to be updated on IRWCMP development and will serve as the public voice during the process.

1.7 Process for Plan Implementation

As discussed earlier, participants of the IRCWM Group have worked individually and collaboratively over the years to develop and integrate regional strategies that address environmental issues, raise community awareness, and coordinate numerous and varied water management projects. Many of the projects within this Plan are being planned collaboratively and will continue in this effort.

As noted above in *Section 1.6.1*, the Newport Bay Watershed Management Committee will meet regularly, no less than quarterly, to discuss implementation of the IRCWM Plan, collaborative opportunities, status on existing projects, proposals for new projects that meet the objectives and strategies of the IRCWM Plan, available resources, and need for Plan refinement. Planning reports, position papers, meeting minutes, and policy statements, combined with the strength of the IRCWM Plan will be used to forward the objectives and strategies identified within this Plan. See *Chapter 5* for a full discussion on implementation.

Implementation of the Central Orange County IRCWM Plan is expected to achieve the same high level of cooperation among the IRCWM Group members and other stakeholders as has been experienced in other planning efforts. The collaboration which occurred on developing the Plan is expected to reduce a number of potential impediments to implementation. Environmental review, permitting, and funding on individual projects may require Plan adjustments and re-prioritization to ensure there is progress made toward the goals and objectives set forth in the Plan. However, the integrated regional planning approach, agency relationships, and Plan framework provide the means for these adjustments to occur without a major restructuring of the IRCWM Plan.

1.7.1 Coordination with Federal and State Agencies

Participants of the IRCWM Group met with staff from the SWRCB, Department of Water Resources, and the Santa Ana RWQCB during the planning process. Local and Sacramento meetings were held to discuss planning efforts, including coordination of IRCWM Plan development, objectives, strategies, project prioritization, and implementation.

The IRCWM Group intends to continue this collaborative approach with state and federal resource and planning agencies. A number of the regional and local plans and proposed projects have been prepared by or in coordination with agencies such as the ACOE, CDFG, and California Coastal Commission. These and other state and federal agencies will be involved in implementation as necessary for regulatory requirements, cooperation for collaborative projects, and communication between project proponents. The IRCWM Group will continue to involve state and federal agencies in planning meetings, implementation strategies, and actions to carry out projects. See *Chapter 7* for further discussion on federal and state agency involvement during implementation.

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2.0 REGIONAL DESCRIPTION

The Central Orange County IRCWM region encompasses the entire Newport Bay Watershed and the northern portion of the adjacent Newport Coast Watershed that lies within the jurisdiction of the Santa Ana RWQCB. This region includes three Critical Coastal Areas (CCAs), two Areas of Special Biological Significance (ASBSs), 9 miles of coastline, and a functioning estuary designated as a State Ecological Reserve. The planning area, located approximately 40 miles south of Los Angeles and 70 miles north of San Diego, is highly urbanized, with a current estimated population of 705,000 residents expected to reach 787,000 by 2030. There are currently five Total Maximum Daily Loads (TMDL) in the watershed, with more pending. The entire area within the IRCWM region drains to the CCAs and ASBSs, a condition that impacts the coastal ecosystem (see *Figure 2.1, Regional Drainages*). Water supplies are diverse, including groundwater (with water quality issues in certain areas), desalted groundwater, recycled water, and imported water.

Key watershed management issues within the Central Orange County region include the following:

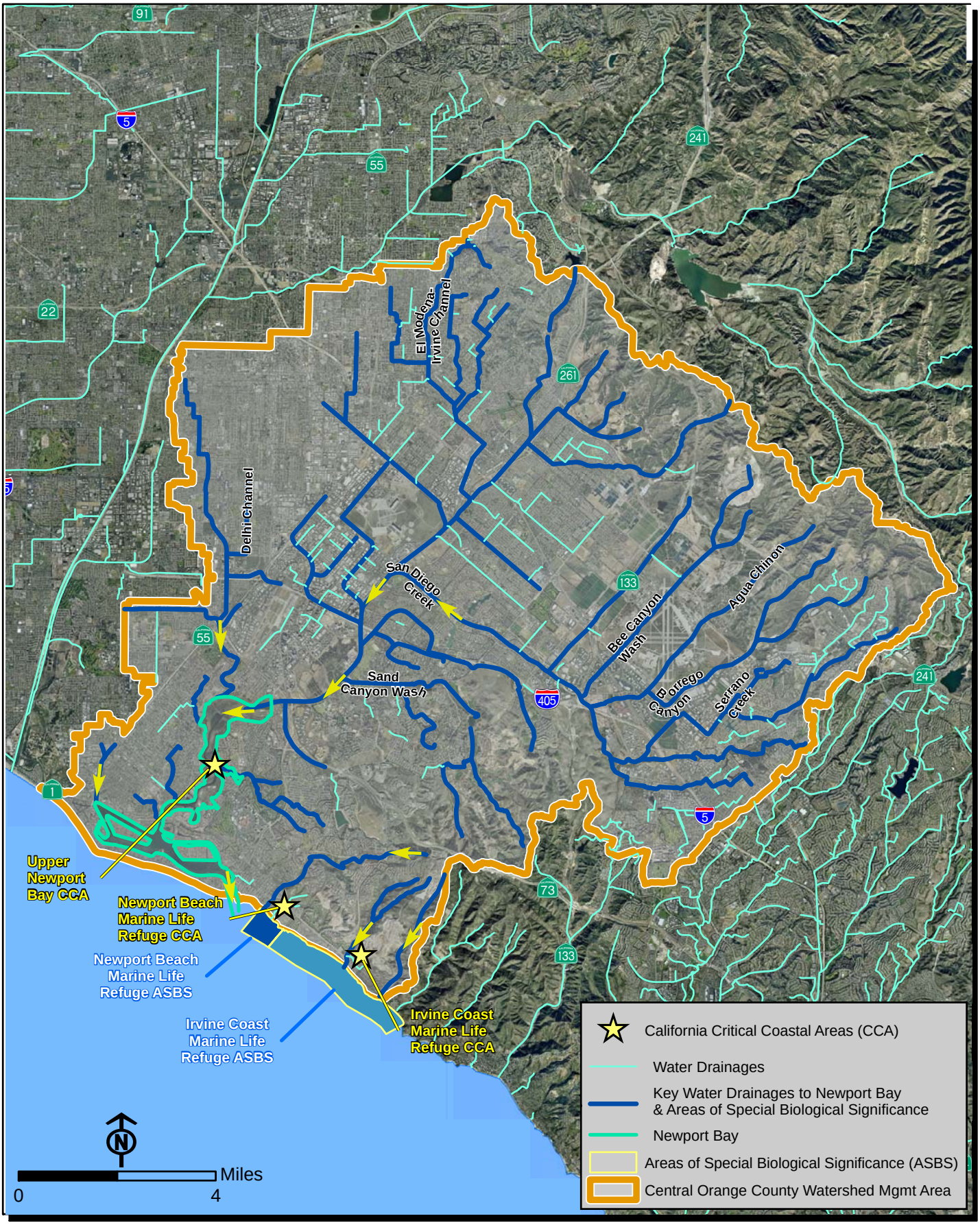
- The CCAs and ASBSs are significant, sensitive ecological resources; however, the drainage from the entire region flows to these areas, concentrating the impact of poor water quality. In addition, these areas receive heavy recreational use due to their accessibility and value as recreational amenities. (see *Exhibit 2.A* below)
- Growth and development, vital to the economy of the region, has led to a conflict between urban land uses and runoff water quality and its impact on coastal ecosystems.
- The increase in area covered by impervious surfaces results in increased stormwater runoff and greater need for adequate flood control capacity; current conditions have led to loss of habitat and water quality degradation due to erosion and sedimentation.
- With TMDLs, a countywide NPDES stormwater permit, and the state's Non-point Source Pollution Plan, there is a need to implement structural and non-structural BMPs to meet water quality targets; there are limited opportunities in certain areas due to developed conditions within the watershed.
- Groundwater is the primary local water supply but certain areas of the basin are impacted due to nitrates, TDS, toxic plumes, and colored water; there is a need to enhance local water supplies to reduce reliance on imported water.

Exhibit 2.A
Impacts to the ASBS Areas

Impacts to the ASBS areas include public use and canyon flows.

2.1 Hydrologic Units

The Central Orange County region is located within the Santa Ana River Hydrologic Unit (HU 801.0), Lower Santa Ana River Hydrologic Area (HA 801.1), and East Coastal Plain Hydrologic Sub-Area (HSA 801.11).



Source: IRWD 2007, RDMD 2007, AirPhoto USA 2006

Central Orange County Integrated Regional and Coastal Watershed Management Plan

Regional Drainages

FIGURE 2.1

Santa Ana River Hydrologic Unit

The Santa Ana River Hydrologic Unit includes portions of Riverside, San Bernardino, and Los Angeles counties, as well as a significant portion of northern and central Orange County. The Santa Ana River Hydrologic Unit is approximately 2,700 square miles and makes up the majority of the jurisdictional area of the Santa Ana RWQCB (RWQCB Region 8; USGS 2007). The Santa Ana River Hydrologic Unit is comprised of Lower Santa Ana River, Middle Santa Ana River, Upper Santa Ana River, Lake Matthews, Colton Rialto, San Timoteo, and San Bernardino Mountain Hydrologic Areas. In addition, the Santa Ana River Hydrologic Unit is divided into 10 watershed management areas (WMAs): Mountain, Big Bear Area, Upper Santa Ana River, Middle Santa Ana River, Lake Elsinore/San Jacinto Area, Lower Santa Ana River, Coyote Creek and Carbon Creek, Newport Bay, Anaheim Bay/Huntington Harbor/Bolsa Chica, and Newport Coast. Two of these WMAs, Newport Bay and Newport Coast, are included within this IRCWM planning area. Some of the largest groundwater basins in the Santa Ana River Hydrologic Unit include the Chino Basin, the Orange County Basin, the Bunker Hill Basin, the San Timoteo Basin, and the San Jacinto/Hemet Basins (Santa Ana Watershed Project Authority 2007).

Lower Santa Ana River Hydrologic Area

The Lower Santa Ana River Hydrologic Area covers area in northern and central Orange County and southern Los Angeles County and includes the East Coastal Plain, Santiago, and Santa Ana Narrows Hydrologic Sub-Areas. This includes portions of the Santa Ana River, the San Diego Creek Drainage, the San Gabriel River Drainage, and the Santiago Creek Drainage.

East Coastal Plain Hydrologic Sub-Area

The East Coastal Plain Hydrologic Sub-Area covers approximately 302 square miles and includes the Newport Bay and Newport Coast Watersheds.

2.1.1 Watersheds

The Newport Bay and Newport Coast Watersheds form the Central Orange County IRCWM region (see *Figure 1.1, Watershed Planning Area*). The Newport Bay Watershed has several tributary subwatersheds, including San Diego Creek, Santa Ana-Delhi Channel, Big Canyon Creek, Costa Mesa Channel and Arches Channel.

Newport Bay Watershed

The Newport Bay Watershed encompasses an area of approximately 154 square miles with overland flows draining toward the Pacific Coast into Newport Bay. The watershed is bounded on the north by the Santiago Hills (Loma Ridge) and on the south by the Santiago Hills. The Tustin Plain, a broad alluvial valley, occupies the major portion of the watershed. Major cities within the watershed include Newport Beach, Irvine, Tustin, and portions of Orange, Lake Forest, Laguna Hills, Costa Mesa and Santa Ana. The watershed has been rapidly urbanizing over the past two decades with large tracts of agricultural land being transformed into commercial and residential uses. Other land uses include light industrial, county and state open spaces, and federal properties.

The principal watercourse of the Newport Bay watershed is San Diego Creek, with a drainage area that covers approximately 122 square miles of the Newport Bay Watershed. The main tributary to San Diego Creek is Peters Canyon Wash; smaller tributaries include Serrano Creek, Borrego Creek, Agua Chinon Wash, Bee Canyon Wash, Sand Canyon Wash, and Bonita Canyon Creek. The Santa Ana-Delhi Channel subwatershed covers approximately 17 square miles. The channel is an artificial drainage that conveys water from the city of Santa Ana into Upper Newport Bay. The San Diego Creek and Santa Ana-Delhi Channel are the major inputs into Upper Newport Bay. The San Diego Creek Watershed accounts for roughly 80-percent and Santa Ana-Delhi Channel for about 15-percent of discharges into Upper Newport Bay, with the balance from other small tributaries.

The following present or potential beneficial uses have been designated within the Newport Bay Watershed by the Santa Ana RWQCB: water contact recreation; non-contact water recreation; commercial and sport fishing; wildlife habitat; rare, threatened, or endangered species; spawning, reproduction, and development; marine habitat; and shellfish harvesting. The present or potential beneficial use of navigation is also designated in the Basin Plan for Lower Newport Bay. The present or potential beneficial use of preservation of ASBSs and estuarine habitat is also designated in the Basin Plan for the Upper Newport Bay (see *Table 2.1, Beneficial Uses of Water in Central Orange County IRCWM Region*).

The following present or potential beneficial uses are designated by the Santa Ana RWQCB in the Basin Plan for San Diego Creek Reach 1: water contact recreation; non-contact water recreation; warm freshwater habitat; and wildlife habitat. The present or potential beneficial use of preservation of ASBSs and rare, threatened, or endangered species are also designated by the Santa Ana RWQCB in the Basin Plan for San Joaquin Freshwater Marsh. The following intermittent beneficial uses are designated by the Santa Ana RWQCB in the Basin Plan for San Diego Creek Reach 2,: groundwater recharge; water contact recreation; non-contact water recreation; warm freshwater habitat; and wildlife habitat (see *Table 2.1*).

Newport Bay is a combination of two distinct bodies of water, termed "Lower" and "Upper" Newport Bay which are separated by the Pacific Coast Highway Bridge boundary feature. The 1,000-acre Upper Newport Bay is a drowned river valley that is geologically much older than the 752-acre Lower Bay that was formally a coastal lagoon.

Upper Newport Bay is designated as a CCA (No. 69). The Upper Bay is an estuary that is bounded by the high bluffs of the San Joaquin Terrace on the east and the Newport Mesa on the west. Fresh water inflow from San Diego Creek, the Santa Ana-Delhi Channel, Big Canyon, local springs and drainage from adjacent areas flow into the Upper Bay. The primary and most impacting source is the San Diego Creek where discharge is constant but highly variable throughout the year. Flows generally average about 30 cubic feet per second (cfs) during the dry summer months, and storm runoff can exceed 30,000 cfs during extreme events. The cumulative effects of this freshwater flow into the Upper Bay means that its salinity is generally less than ocean levels most of the time.

Newport Coast Watershed

The Newport Coast Watershed covers approximately 11 square miles and is located between Corona Del Mar and Laguna Beach. The RWQCB boundary for the Santa Ana and San Diego regions bifurcates this watershed between Muddy Canyon and Moro Canyon. Moro Canyon is a reference canyon for a number of the studies conducted within the watershed. Therefore, the Central Orange County IRCWM Plan coordinates with the South Orange County IRWM Plan and there will be cross-cooperation on mutually beneficial projects that involve Moro Canyon.

The Newport Coast Watershed consists of nine small coastal channels (listed from north to south): Buck Gully Creek, Morning Canyon Channel, Pelican Point Creek, Pelican Point Middle Creek, Pelican Point Waterfall Creek, Los Trancos Creek, Muddy Canyon, and Moro Canyon. All surface water in this coastal watershed drains to the Pacific Ocean via overland flow and storm drain systems. It is bordered on the north by the Newport Bay Watershed, on the northeast by the San Diego Creek subwatershed, and contoured on the east and south by the Laguna Coastal Streams Watershed.

The following near-shore-zone present or potential beneficial uses have been designated within the Newport Coast Watershed by the Santa Ana RWQCB in the Basin Plan: navigation; water contact recreation; non-contact water recreation; commercial and sport fishing; wildlife habitat; rare, threatened, or endangered species; spawning, reproduction, and development; marine habitat; and shellfish harvesting. The near-shore-zone present or potential beneficial use of preservation of ASBSs is also designated by the Santa Ana RWQCB in the Basin Plan from Poppy Street in Corona Del Mar to the southeast regional boundary (see *Table 2.1*).

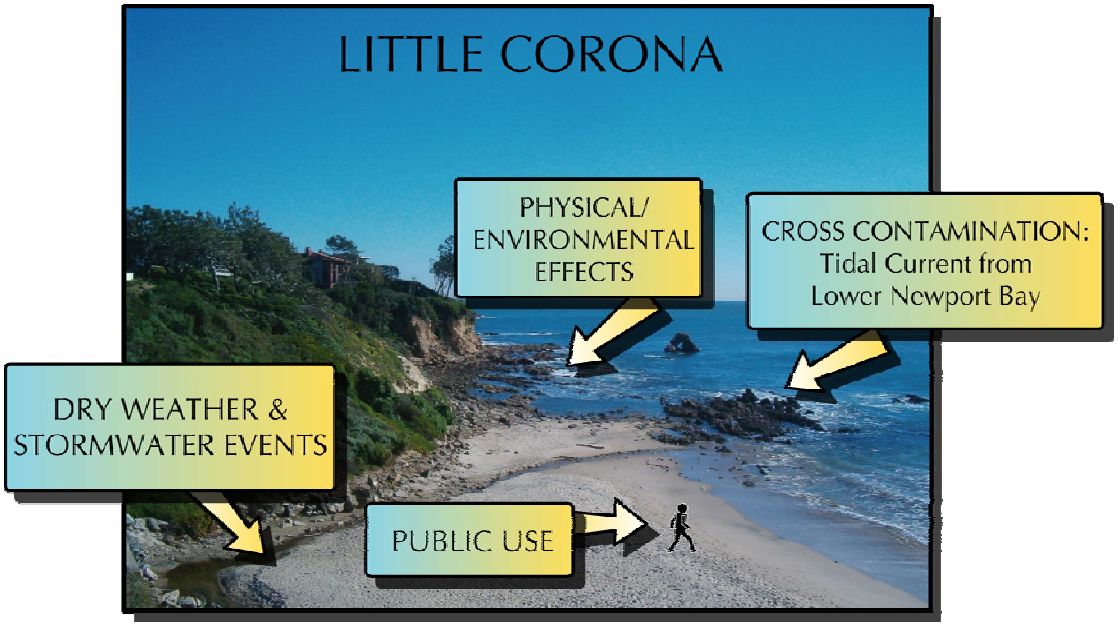
Two CCAs and two ASBSs are located in the Newport Coast Watershed: Newport Beach (Robert E. Badham) Marine Life Refuge (ASBS No. 32/CCA No. 70) and Irvine Coast Marine Life Refuge (ASBS No. 33/CCA No. 71).

The **Newport Beach Marine Life Refuge** area is bounded to the west by a line heading oceanward 1000' along Poppy Avenue in Corona Del Mar (a community within the corporate boundaries of Newport Beach) and to the east by a line heading oceanward 1000' along the westerly limits of Crystal Cove State Park. It extends from the mean high tide line to 1000' offshore or 100' of ocean depth, whichever is nearer. This ASBS is so designated to protect dolphin breeding areas and other waterborne species. It is impacted by the following:

- Stormwater and dry weather runoff from Buck Gully, its major tributary. Buck Gully is on the SWRCB's Section 303(d) list and subject to TMDL development.
- Stormwater and dry weather runoff from over two dozen direct discharge pipes from residences and streets along the coastward (northerly) edge of the ASBS.
- Beachgoer scavenging of its near-shore species, despite local and regional attempts to educate and discourage beachgoers from taking tidepool species.
- Sediment transported from Buck Gully and coastal bluffs.
- Pollutants from sources outside of its boundaries, including upcoast and downcoast discharges, such as ebb tides and currents from the Newport Bay watershed.

Exhibit 2.B below pictorially shows these impacts.

Exhibit 2.B
Multiple Impacts at the Sensitive ASBS Areas



The **Irvine Coast Marine Life Refuge** is bounded by the Newport Beach Marine Life Refuge to the west and at its eastern edge by a line heading oceanward 1000' along the Irvine Cove cliffs at the edge of Laguna Beach, California. It extends from the mean high tide line to 1000' offshore or 100' of ocean depth, whichever is nearer. Like its Newport Beach neighbor, this ASBS is so designated to protect dolphin breeding areas and other waterborne species. It is impacted by the following:

- Stormwater and dry weather runoff from the Pelican Hill/Point area and from Los Trancos Canyon and Muddy Creek, its major tributaries.
- Stormwater and dry weather runoff from direct discharge facilities draining through Crystal Cove State Park properties, from Pacific Coast Highway, and from the Pelican Point residential area.
- Beachgoer scavenging (though less so than with ASBS No. 32) of its near-shore species, despite local and regional attempts to educate and discourage beachgoers from taking tidepool species.
- Sediment transported from Los Trancos Canyon, Muddy Creek, and coastal bluffs.
- Pollutants from sources outside of its boundaries, including upcoast and downcoast discharges, such as ebb tides and currents from the Newport Bay watershed.

The **Upper Newport Bay CCA** (CCA No. 69) in the center of Newport Beach is a 750-acre water body that is on the Clean Water Act's Section 303 (d) list for the following contaminants:

- Sediment
- Nutrients (primarily nitrogen and phosphorous)
- Fecal Coliform
- Toxic Pollutants

Preliminary studies indicate that there is a distinct possibility that the pollutants in the waters of the CCA may reach the ASBS. The CCA area's primary problems are sediment and nutrients, though selenium levels may be of concern as well. Total Maximum Daily Loads have been established for each of the four contaminants and actions and studies are underway to comply with the TMDLs.

2.1.2 Groundwater Basin

The Orange County Groundwater Basin is approximately 350 square miles, and the coastal plain of the basin underlies the Lower Santa Ana River Watershed in Orange County. The Orange County Groundwater Basin is bounded on the north by consolidated rocks exposed in the Puente and Chino Hills, on the east by the Santa Ana Mountains, and on the south by the San Joaquin Hills. It is bounded on the southwest by the Pacific Ocean and on the northwest by a low topographic divide approximated by the Orange County–Los Angeles County line. The

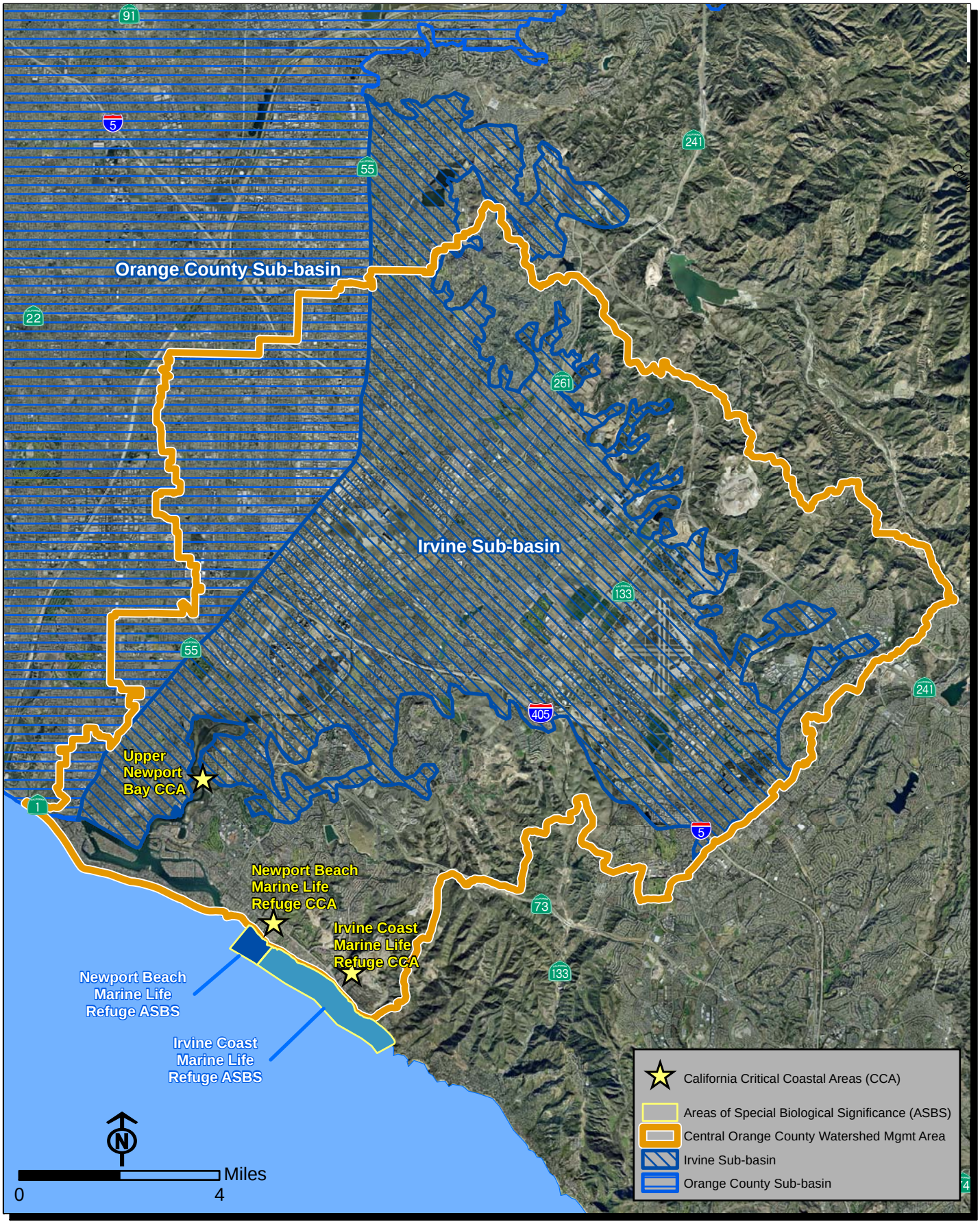
southwestern portion of the Orange County Groundwater Basin is located within the planning area for this IRCWM Plan (see *Figure 2.2, Orange County Groundwater Basin*).

The Orange County Groundwater Basin is a three-aquifer system, consisting of shallow, principal, and deep aquifers. The total groundwater storage capacity of the Orange County Groundwater Basin is 38 million acre-feet (DWR 1967). The upper aquifer system consists of Holocene alluvium, older alluvium, stream terraces, and the upper Pleistocene deposits represented by the La Habra Formation (DWR 2004). The average thickness of the upper aquifer system is 800 feet (DWR 2004). The upper aquifer system contains a lower percentage of water-bearing strata in the northwest and coastal areas since clays and clayey silts dominate. Recharge occurs primarily in the northeastern portions of the basin. The upper aquifer system provides most of the irrigation water for the overlying areas (DWR 2004). The middle aquifer system consists of lower Pleistocene Coyote Hills and San Pedro Formations. The average thickness of the middle aquifer is 1,600 feet and is composed of sand, gravel, and minor amounts of clay. The primary recharge of the middle aquifer occurs through a series of recharge basins receiving flows from the Santa Ana River in the northeast portion of the basin. The middle aquifer system provides 90 to 95 percent of the groundwater produced from the basin (DWR 2004). The lower aquifer system consists of the Upper Fernando Group of upper Pliocene age and is composed of sand and conglomerate 350 to 500 feet thick (DWR 2004). The lower aquifer system is not widely used as it has colored water issues; both IRWD and Mesa Consolidated Water District (MCWD) are operating colored water treatment facilities (CWTFs).

Recharge to the Orange County Groundwater Basin originates from percolation of Santa Ana River flow, infiltration of precipitation, and injection into wells. The Santa Ana River flow contains natural flow, reclaimed water, and imported water that is spread in the basin forebay (DWR 2004). When the Groundwater Replenishment System is fully activated, approximately 72,000 acre-feet per year of advance treated wastewater will be used for recharge.

2.1.3 Beneficial Uses of Water within the Region

The Water Quality Control Plan for the Santa Ana River Basin lists Newport Bay as tributary to the Pacific Ocean and also as the receiving waters for San Diego Creek. Existing beneficial uses are designated in the Basin Plan for the reservoirs, bays, estuaries and tidal prisms, watershed streams, and wetlands within the Newport Bay Watershed. For the Newport Coast Watershed, only the near-shore zone of the ocean waters have designated beneficial uses. *Table 2.1* summarizes the designated beneficial uses within the region.



Source: IRWD 2007, RDMD 2007, AirPhoto USA 2006

Central Orange County Integrated Regional and Coastal Watershed Management Plan

Orange County Groundwater Basin

FIGURE 2.2

Table 2.1
Beneficial Uses of Water in Central Orange County IRCWM Region

	MUN	AGR	IND	PROC	GWR	NAV	POW	REC-1	REC-2	COMM	WARM	LWRM	COLD	BIOL	WILD	RARE	SPWN	MAR	SHEL	EST	Hydrologic unit
Lakes																					
Laguna, Lambert, Peters Canyon, Rattlesnake, Sand Canyon, and Siphon Reservoirs	+	X						X[1]	X		X				X						801.11
Bays, Estuaries, and Tidal Prisms																					
Lower Newport Bay	+					X		X	X	X					X	X	X	X	X		801.11
Upper Newport Bay	+							X	X	X				X	X	X	X	X	X	X	801.11
Tidal Prisms of Flood Control Channels Discharging to Coastal or Bay Waters	+							X	X	X					X			X			801.11
Ocean Waters																					
SWQPA (former ASBS)						X		X	X					X				X			
Newport Bay						X		X	X	X									X		
Inland Surface Streams																					
Buck Gully		X			X						X	X									
Morning Canyon		X			X						X	X									
Pelican Point		X			X						X	X									
Pelican Point Middle Creek		X			X						X	X									
Los Trancos		X			X						X	X									
Muddy Canyon		X			X						X	X									
San Diego Creek:																					
Reach 1 – below Jeffrey Road	+							X[2]	X		X				X						801.11
Reach 2 – above Jeffrey Road to headwaters	+				•			•	•		•				•						801.11
Other Tributaries: Bonita Creek, Serrano Creek, Peters Canyon Wash, Hicks Canyon Wash, Bee Canyon Wash, Borrego Canyon Wash, Agua Chinon Wash, Laguna Canyon Wash, Rattlesnake Canyon Wash, and other	+				•			•	•		•				•						801.11

Table 2.1
Beneficial Uses of Water in Central Orange County IRCWM Region

	MUN	AGR	IND	PROC	GWR	NAV	POW	REC-1	REC-2	COMM	WARM	LWRM	COLD	BIOL	WILD	RARE	SPWN	MAR	SHEL	EST	Hydrologic unit
Tributaries to these Creeks																					
Sand Canyon Wash	+				•			•	•		•				•						801.11
Wetlands																					
San Joaquin Freshwater Marsh	+							X	X		X			X	X	X					801.11

X Present or Potential Beneficial Use
• Intermittent Beneficial Use
+ Excepted from MUN
1 Access prohibited by Irvine Ranch Company
2 Access prohibited in all or part by Orange County Environmental Agency (OCEMA)

Definitions of beneficial uses are as follows:

MUN Municipal and Domestic Supply (**MUN**) waters are used for community, military, municipal, or individual water supply systems. These uses may include, but are not limited to, drinking waters supply.

AGR Agricultural Supply (**AGR**) waters are used for farming, horticulture, or ranching. These uses may include, but are not limited to, irrigation, stock watering, and support of vegetation for range grazing.

IND Industrial Service Supply (**IND**) waters are used for industrial activities that do not depend primarily on water quality. These uses may include, but are not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, and oil well repressurization.

PROC Industrial Process Supply (**PROC**) waters are used for industrial activities that depend primarily on water quality. These uses may include, but are not limited to, process water supply and all uses of water related to product manufacture or food preparation.

GWR Groundwater Recharge (**GWR**) waters are used for natural or artificial recharge of groundwater for purposes that may include, but are not limited to, future extraction, maintaining water quality, or halting saltwater intrusion into freshwater aquifers.

NAV Navigation (**NAV**) waters are used for shipping, travel, or other transportation by private, commercial, or military vessels.

POW Hydropower Generation (**POW**) waters are used for hydroelectric power generation.

REC-1 Water Contact Recreation (**REC-1**) waters are used for recreational activities involving body contact with water where ingestion of water is reasonably possible. These uses may include, but are not limited to, swimming, wading, water-skiing, skin and SCUBA diving, surfing, whitewater activities, fishing, and use of natural hot springs.

REC-2 Non-contact Water Recreation (**REC-2**) waters are used for recreational activities involving proximity to water but not normally involving body contact with water where ingestion of water would be reasonably possible. These uses may include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, and aesthetic enjoyment in conjunction with the above activities.

COMM Commercial and Sportfishing (**COMM**) waters are used for commercial or recreational collection of fish or other organisms, including those collected for bait. These uses may include, but are not limited to, uses involving organisms intended for human consumption.

WARM Warm Freshwater Habitat (**WARM**) waters support warm-water ecosystems that may include, but are not limited to, preservation and enhancement of aquatic habitats, vegetation, fish, and wildlife, including invertebrates.

LWRM Limited Warm Freshwater Habitat (**LWRM**) waters support warm-water ecosystems that are severely limited in diversity and abundance as the result of

Table 2.1
Beneficial Uses of Water in Central Orange County IRCWM Region

	MUN	AGR	IND	PROC	GWR	NAV	POW	REC-1	REC-2	COMM	WARM	LWRM	COLD	BIOL	WILD	RARE	SPWN	MAR	SHEL	EST	Hydrologic unit

concrete-lined watercourses and low, shallow dry weather flows that result in extreme temperature, pH, and/or dissolved oxygen conditions. Naturally reproducing finfish populations are not expected to occur in **LWRM** waters.

COLD — Cold Freshwater Habitat (**COLD**) waters support cold-water ecosystems that may include, but are not limited to, preservation and enhancement of aquatic habitats, vegetation, fish, and wildlife, including invertebrates.

BIOL — Preservation of Biological Habitats of Special Significance (**BIOL**) waters support designated areas or habitats, including, but not limited to, established refuges, parks, sanctuaries, ecological reserves or preserves, and ASBSs, where the preservation and enhancement of natural resources require special protection.

WILD — Wildlife Habitat (**WILD**) waters support wildlife habitats that may include, but are not limited to, the preservation and enhancement of vegetation and prey species used by waterfowl and other wildlife.

RARE — Rare, Threatened, or Endangered Species (**RARE**) waters support habitats necessary for the survival and successful maintenance of plant or animal species designated under state or federal law as rare, threatened, or endangered.

SPWN — Spawning, Reproduction, and Development (**SPWN**) waters support high-quality aquatic habitats necessary for reproduction and early development of fish and wildlife.

MAR — Marine Habitat (**MAR**) waters support marine ecosystems that include, but are not limited to, preservation and enhancement of marine habitats, vegetation (*e.g.*, kelp), fish and shellfish, and wildlife (*e.g.*, marine mammals and shorebirds).

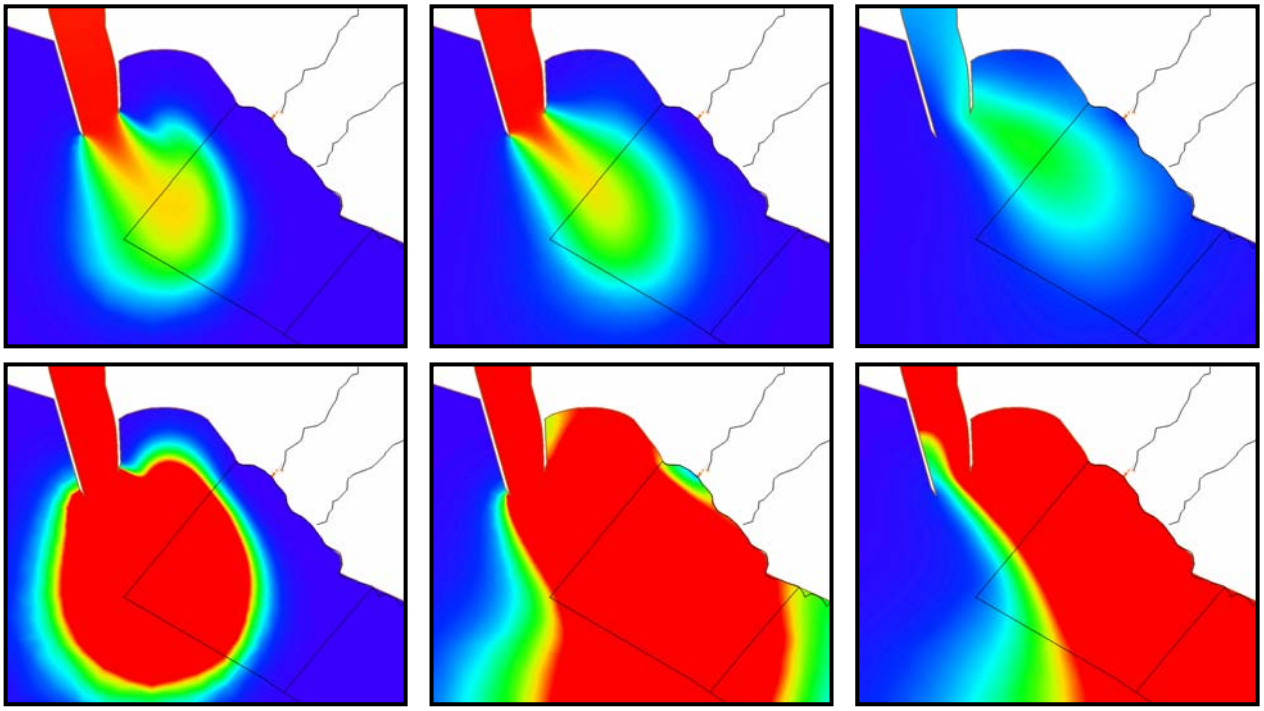
SHEL — Shellfish Harvesting (**SHEL**) waters support habitats necessary for shellfish (*e.g.*, clams, oysters, limpets, abalone, shrimp, crab, lobster, sea urchins, and mussels) collected for human consumption, commercial, or sports purposes.

EST — Estuarine Habitat (**EST**) waters support estuarine ecosystems, which may include, but are not limited to, preservation and enhancement of estuarine habitats, vegetation, fish and shellfish, and wildlife, such as waterfowl, shorebirds, and marine mammals.

2.2 Appropriateness of Region and Geographic Boundaries

Extensive research and on-going studies of this highly urbanized watershed show that the water supply, water quality, flood control, and ecological issues facing Newport Bay Watershed pose the highest level of difficulty and that these complex challenges are intimately interconnected with the economic and environmental well-being of the watershed. Also, preliminary studies show an explicit link between pollutant discharges from Newport Bay to the down-coast ASBS areas along the Newport Coast Watershed as shown in *Exhibit 2.C* below.

Exhibit 2.C
Evolution of Pollutant Plume Exiting Newport Harbor



The top row depicts the evolution of a pollutant plume exiting Newport Harbor during normal tidal flushing. The first two panels show the plume exiting the harbor during an ebb tide. Panel 3 shows the plume being drawn toward the shoreline during the flood tide. The lower row shows the plume evolution during a storm event.

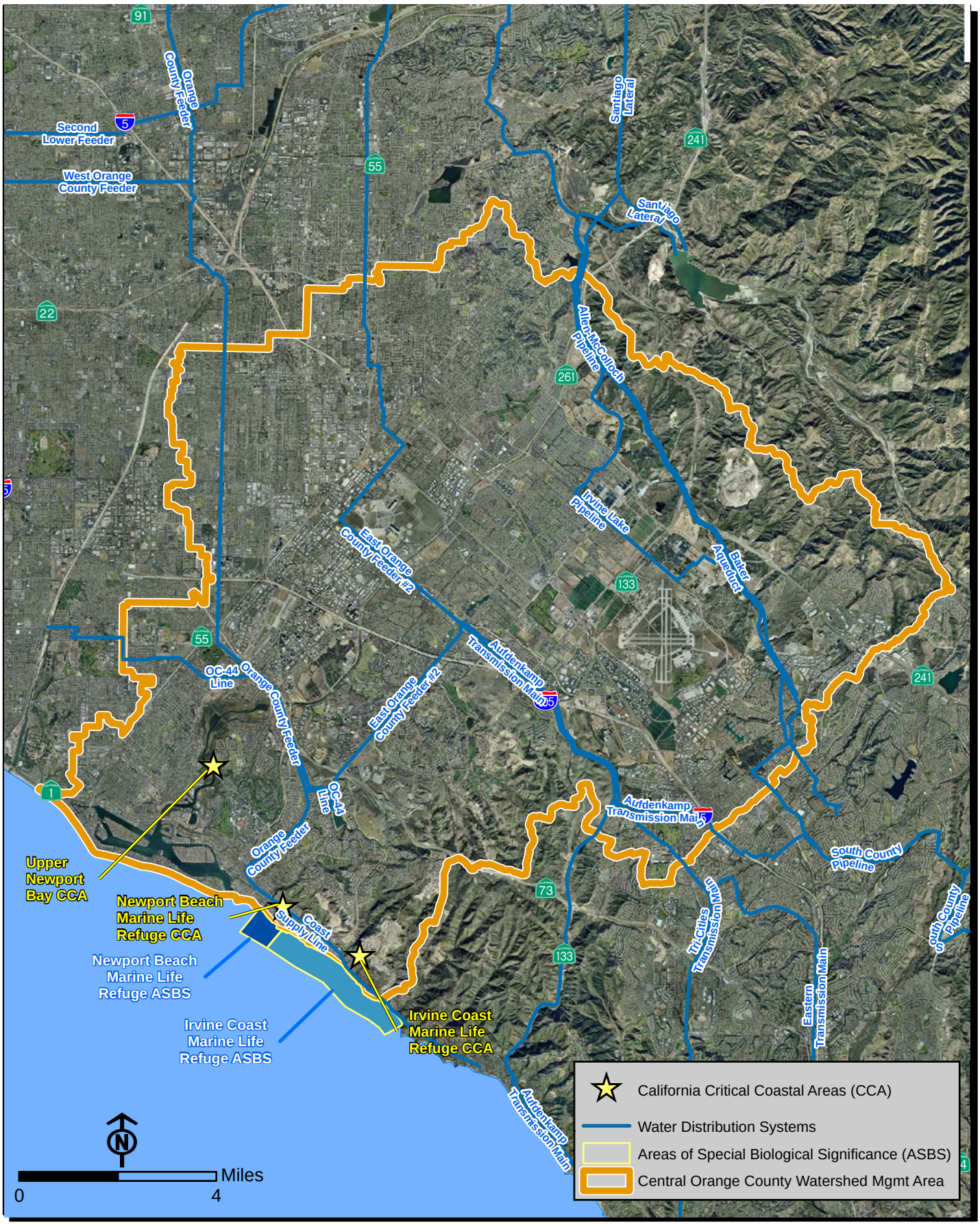
The high level of complex and difficult issues that stakeholders face in the Newport Bay and Newport Coast Watersheds is qualitatively different from adjacent watersheds that are not subject to TMDL requirements or with issues of discharge to the sensitive marine life areas within the receiving waters. With potential costs running into the hundreds of millions of dollars for remediation projects to protect shared water resources, sensitive marine life areas, and the

coastal ecosystem as a whole, the Central Orange County IRCWM Group determined that the Central Orange County region, as defined herein, is an appropriate region for integrated water resource and coastal watershed planning. The Central Orange County region is defined by the boundaries of the watershed areas that drain into Upper Newport Bay (CCA No. 69), Lower Newport Bay, the Newport Beach (Robert E. Badham) Marine Life Refuge (ASBS No. 32), and the Irvine Coast Marine Life Refuge (ASBS No. 33). The area lies at the southern edge of the Santa Ana RWQCB boundaries (see *Figure 1.2, Santa Ana River Watershed*).

Water resources within the Central Orange County region include groundwater, surface water, recycled water, and imported water. The region overlies the southern end of the Orange County Groundwater Basin and has major infrastructure systems for groundwater production and treatment, imported water, wastewater collection and treatment, and recycled water delivery, all of which provide regional benefits (see *Figure 2.3, Major Water System Infrastructure*, and *Figure 2.4, Major Wastewater System Infrastructure*). A discussion of regional infrastructure is included in *Section 2.9.1*. The beneficial uses of surface waters are primarily for ecosystem processes and recreation rather than municipal or industrial uses.

The participants of the Central Orange County IRCWM Group, as identified in *Section 1.3*, work cooperatively to provide effective and efficient management of the region's water and natural resources, including addressing water quality issues. They share in the planning and cost of TMDL compliance and capital improvements to regional water and wastewater system infrastructure. The appropriateness of the region for integrated water resource and coastal watershed planning is demonstrated in the following regional attributes:

1. Drainage patterns for this region and impacts to receiving waters attributable to upstream land uses;
2. Boundaries for the Santa Ana RWQCB (Region 8); and
3. Long-term commitment of stakeholders within this region to achieve environmentally sound management of the region's hydrologic and ecologic resources.

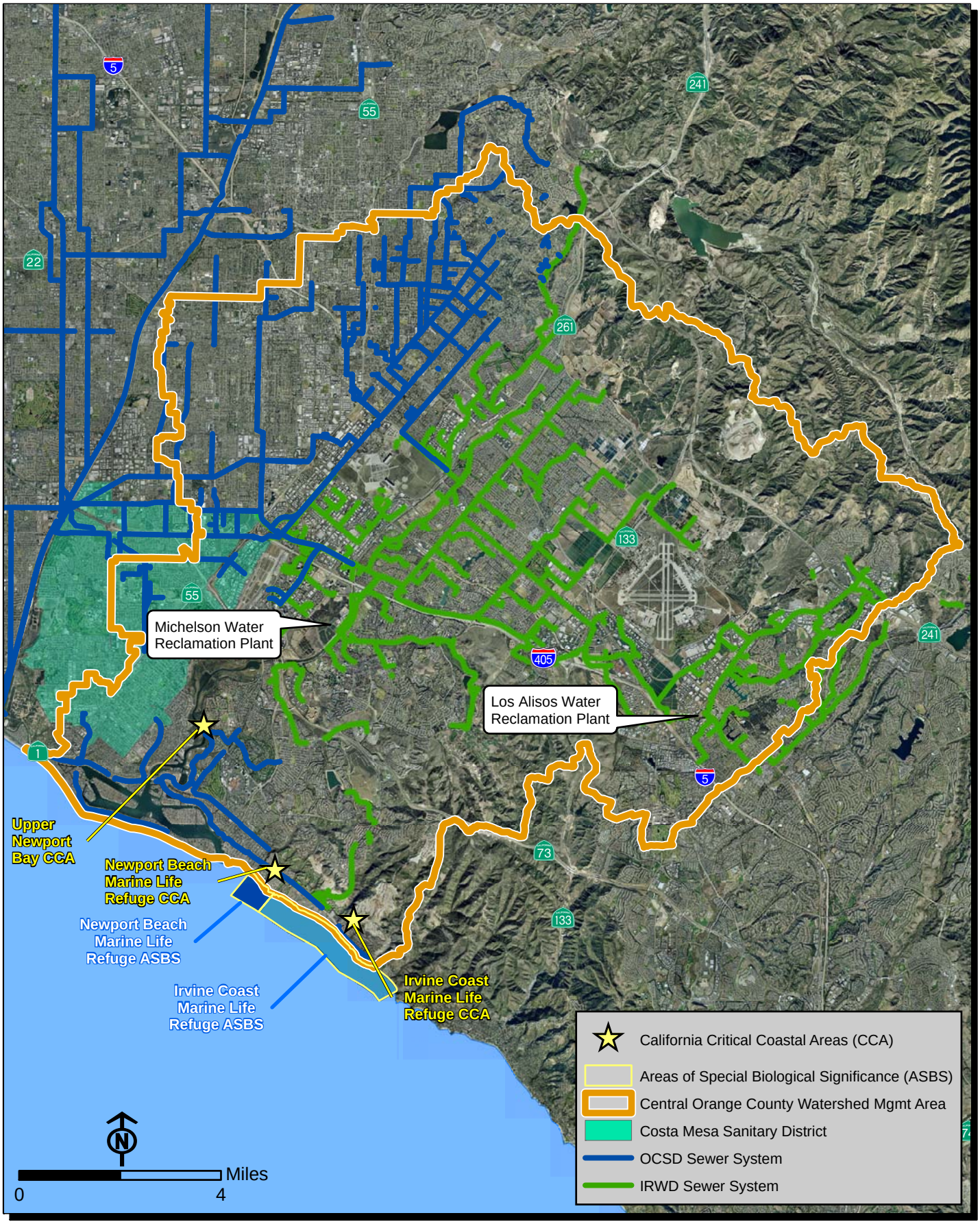


Source: IRWD 2007, RDMD 2007, AirPhoto USA 2006

Central Orange County Integrated Regional and Coastal Watershed Management Plan

Major Water System Infrastructure

FIGURE 2.3



Source: OCSD 2007, OC LAFCO 2007, RDMD 2007, AirPhoto USA 2006

Central Orange County Integrated Regional and Coastal Watershed Management Plan

Major Wastewater System Infrastructure

FIGURE 2.4

2.3 Jurisdictional Boundaries

Federal, state, and local agencies have jurisdiction within the Central Orange County region. On a federal level, the region is within the EPA's Region 9, which covers the entire Pacific Southwest. On a state level, the region is within the Santa Ana RWQCB and the DWR Southern District. Under the CDFG, the Central Orange County region is within CDFG's South Coast Region, and the Newport Beach Marine Life and Irvine Coast Marine Life Refuges are in CDFG's Marine Region. CDFG has jurisdiction over the Upper Newport Bay State Ecological Reserve. The California Department of Parks and Recreation has jurisdiction over certain areas, including Corona Del Mar State Beach and Crystal Cove State Park.

On a local level, several cities, the County of Orange, and special districts have jurisdictional boundaries with authority for land use, water resources, habitat protection, water quality, flood control, and recreation facility management. The local agencies are described below.

2.3.1 Municipalities

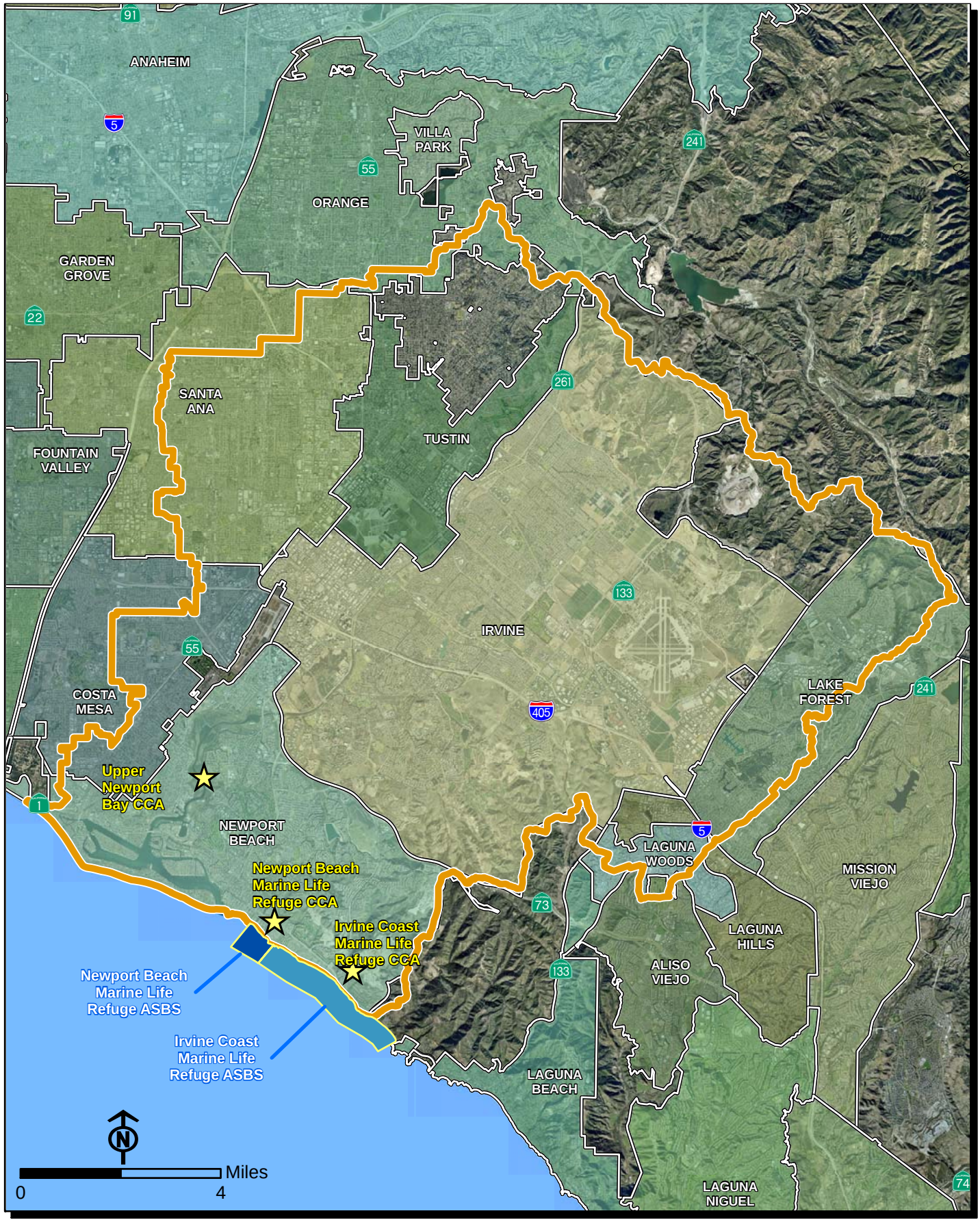
The cities located within the IRCWM region are shown on *Figure 2.5, City Jurisdictions,* and are described below.

Cities Entirely within the Central Orange County IRCWM Region

City of Irvine

- IRCWM Implementation Authority: Land use, recreational programs/facilities, economic and community development, stormwater protection, water quality.

The City of Irvine encompasses more than 55 square miles and has a current population of nearly 170,000 residents. There will be significant growth over the next decade with the development of Heritage Fields on the former 4,600-acre MCAS–El Toro site, redevelopment in the Irvine Business Complex from commercial/industrial to high-density mixed use, and build-out of large master-planned communities by The Irvine Company. The MCAS–El Toro site will also be the location of the 2,300-acre Orange County Great Park, a regional park that will be designed with a framework that is based on sustainability and connectivity for communities as well as habitat. Irvine is the largest city within the IRCWM region in terms of area; the entire city lies within the Newport Bay Watershed.



Source: RDMD 2007, AirPhoto USA 2006

California Critical Coastal Areas (CCA)

Areas of Special Biological Significance (ASBS)

Central Orange County Watershed Mgmt Area

Central Orange County Integrated Regional and Coastal Watershed Management Plan

City Jurisdictions

FIGURE 2.5

City of Newport Beach

- IRCWM Implementation Authority: Land use; potable water service; water conservation; groundwater management; sanitary sewer service; recreational programs/facilities; economic and community development; stormwater protection; water quality; planning and implementation of projects and programs to protect the CCAs and ASBSs; habitat protection and restoration.

The City of Newport Beach, on the Pacific Coast, covers an area of 25.2 square miles with a population of just over 83,000 residents. In 2002, the city annexed the Newport Coast area so that the city now lies within both the Newport Bay Watershed and the Newport Coast Watershed. Land uses within the city are diverse, ranging from residential and commercial uses to the Newport Harbor and the ecological reserve of Upper Newport Bay. The three CCAs are within, and the two ASBSs are adjacent to, the City of Newport Beach boundaries. Because the entire Newport Bay Watershed drains to Newport Bay, the city provides leadership within the IRCWM planning area for water quality programs and watershed planning.

The City is a member of the Municipal Water District of Orange County (MWDOC) which is a sub-agency of the Metropolitan Water District of Southern California (MWD). The Utilities Department delivered 17,723 acre feet in 2005 to about 60,000, primarily residential, customers. Approximately 69-percent of the water source is from MWD with the remaining 31-percent produced from City-owned groundwater wells.

City of Tustin

- IRCWM Implementation Authority: Land use; water service; water conservation; sanitary sewer service; groundwater management; recreational programs/facilities; economic and community development; stormwater protection; water quality.

The City of Tustin covers an area of approximately 11 square miles with nearly 77,000 residents. The entire city lies within the Newport Bay Watershed. The former 1,600-acre MCAS-Tustin is located within the city boundaries and is being redeveloped as Tustin Legacy. Tustin Legacy includes master-planned communities along with commercial, institutional, and industrial uses and will be the site of a new regional park. The City is a member of the Municipal Water District of Orange County (MWDOC).

Cities Partially within the Central Orange County IRCWM Region

City of Costa Mesa

- IRCWM Implementation Authority: Land use, recreational programs/facilities, economic and community development, stormwater protection, water quality.

The City of Costa Mesa covers an area of 16 square miles with a population of approximately 114,000 residents. The eastern half of the city lies within the Newport Bay Watershed.

City of Laguna Hills

- IRCWM Implementation Authority: Land use, recreational programs/facilities, economic and community development, stormwater protection, water quality.

Covering an area of approximately 6.6 square miles, the City of Laguna Hills has a population of approximately 34,000 people. The northern portion of the city lies within the Newport Bay Watershed.

City of Laguna Woods

- IRCWM Implementation Authority: Land use, recreational programs/facilities, stormwater protection, water quality.

The City of Laguna Woods is approximately 4.4 square miles with 18,500 residents. The majority of the city lies within a gated senior community. The northern portion of the city lies within the Newport Bay Watershed.

City of Lake Forest

- IRCWM Implementation Authority: Land use, recreational programs/facilities, economic and community development, stormwater protection, water quality.

The City of Lake Forest has a population of approximately 80,000 residents within 17 square miles. Significant development is occurring in the northern end of the city with the development of Baker Ranch, a master-planned community. Approximately two-thirds of the city lies within the Newport Bay Watershed.

City of Orange

- IRCWM Implementation Authority: Land use; water service; water conservation; sanitary sewer service; groundwater management; recreational programs/facilities; economic and community development; stormwater protection; water quality.

The City of Orange covers an area of approximately 38 square miles with a population of 140,000 residents. A small portion of the city lies just within the northern boundary of the Newport Bay Watershed.

City of Santa Ana

- IRCWM Implementation Authority: Land use; water service; water conservation; sanitary sewer service; groundwater management; recreational programs/facilities, economic and community development; stormwater protection; water quality

The City of Santa Ana is approximately 27 square miles with a population of over 350,000 residents. Approximately two-thirds of the city lies within the Newport Bay Watershed. This area includes the Santa Ana Delhi Channel, a major flood-control facility that drains to Upper Newport Bay.

2.3.2 County of Orange

The County of Orange has jurisdiction over land use in unincorporated areas and is responsible for management of county-owned parks and drainage facilities. The County is also responsible for managing the Orange County Stormwater Programs in compliance with the NPDES stormwater permit, monitoring water quality, and providing for flood protection.

Resources and Development Management Department

The County's Resources and Development Management Department (RDMD) provides three levels of service: regional, municipal, and county department services. Regional services provide assistance to all of Orange County by providing regional flood control (through the Orange County Flood Control District), water quality enhancement, recreation, and agricultural services. These regional services are county-wide and are provided equally within city boundaries as well as in unincorporated areas.

Municipal services are provided for inhabited unincorporated areas for which the County has land use authority. Within the Central Orange County IRCWM planning area, the County has authority for the following unincorporated areas and is responsible for neighborhood parks and trails:

- **North Tustin:** The unincorporated community of North Tustin, located in the upper Newport Bay Watershed, is approximately 7.2 square miles with an estimated population of 23,500 residents. This area is predominantly single-family residences with a large number of parcels still on septic systems.
- **Santa Ana Heights:** The unincorporated community of Santa Ana Heights is located between Costa Mesa and Newport Beach, directly adjacent to the Upper Newport Bay Ecological Reserve. This area contains residential and commercial land uses, as well as recreational facilities.

- **Morro Canyon:** A small area of undeveloped land in Morro Canyon is unincorporated and under County jurisdiction.

Orange County Harbors, Beaches, and Parks

Orange County Harbors, Beaches, and Parks (OCHBP) is a division of RDMD. OCHBP manages regional recreational facilities and historical and natural resources throughout Orange County, including 37,000 acres of parkland and open space, including regional and wilderness parks, nature preserves and recreational trails, historic sites, and harbors and beaches. Within the Central Orange County IRCWM planning area, OCHBP manages the following facilities:

- Limestone Canyon/Whiting Ranch Wilderness Parks
- Upper Newport Bay Nature Preserve
- Newport Harbor
- Irvine, Mason, and Peters Canyon Regional Parks.

Orange County Health Care Agency

The Orange County Health Care Agency is highly involved with water quality in the region and is responsible for monitoring water quality at over 150 locations along the Orange County coastline.

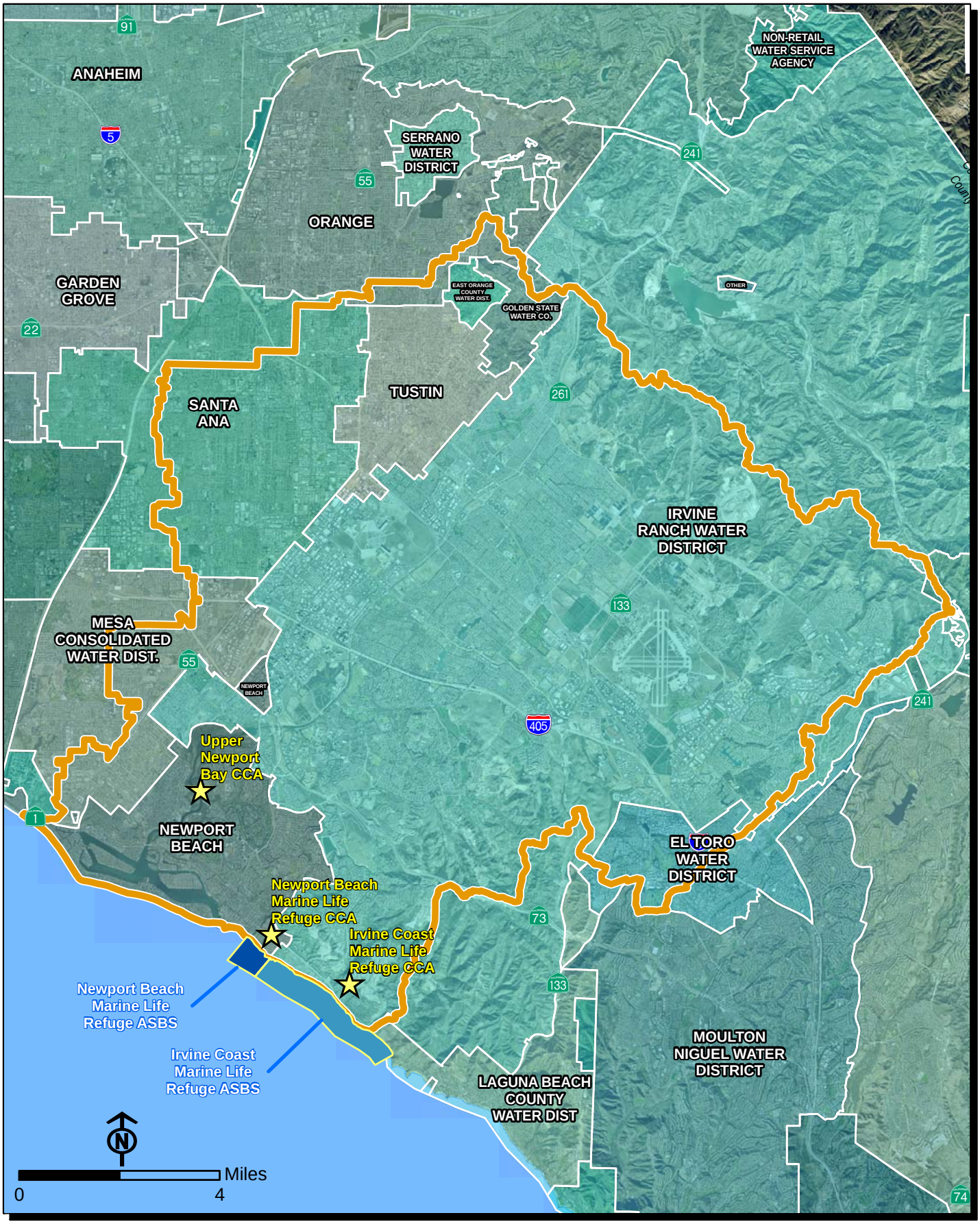
2.3.3 Water Districts

The districts providing water service within the Central Orange County IRCWM region are shown on *Figure 2.6, Water Agencies,* and described below.

El Toro Water District

- IRCWM Implementation Authority: potable and recycled water service; water conservation; wastewater collection and treatment.

The ETWD service area encompasses approximately 8.5 square miles, providing both potable and recycled water to Laguna Woods and parts of Lake Forest, Laguna Hills, Mission Viejo, and Aliso Viejo. ETWD provides water service to approximately 51,000 residents. Its six reservoirs have a combined capacity of 136 million gallons. Additionally, it provides sanitation services through its wastewater treatment plant, supplying recycled water to a portion of its service area.



Source: IRWD 2007, RDMD 2007, AirPhoto USA 2006

California Critical Coastal Areas (CCA)

Areas of Special Biological Significance (ASBS)

Central Orange County Watershed Mgmt Area

Central Orange County Integrated Regional and Coastal Watershed Management Plan

Water Agencies

FIGURE 2.6

East Orange County Water District

- IRCWM Implementation Authority: water service; groundwater management; water conservation.

The East Orange County Water District operates as a wholesale and retail water supplier. The District's wholesale pipeline distribution system delivers water to five sub-agencies within its boundaries, including the Golden State Water Company, City of Tustin, City of Orange, Orange Park Acres Mutual Water Company, and its own retail zone. The District's retail zone serves portions of the unincorporated community of North Tustin and has 1,192 service connections.

Golden State Water Company

- IRCWM Implementation Authority: water service; groundwater management; water conservation.

The Golden State Water Company is a public utility company operating under the authority of the California Public Utilities Commission. Within the Central Orange County region, the Golden State Water Company provides retail water service in Cowan Heights, an unincorporated area north of Tustin.

Irvine Ranch Water District

- IRCWM Implementation Authority: Land use; potable and recycled water service; groundwater management; water conservation; wastewater collection and treatment; habitat protection and restoration; water quality.

The IRWD provides potable and non-potable water service; wastewater collection, treatment, and disposal; and wastewater reclamation. IRWD serves all of the City of Irvine and portions of the surrounding Cities of Tustin, Santa Ana, Orange, Costa Mesa, Lake Forest, Newport Beach, and unincorporated areas of the County of Orange. IRWD operates the Michelson Water Reclamation Plant (MWRP), a major regional facility providing recycled water throughout the District's service area. Currently, IRWD serves a 133-square-mile area with an estimated population of 316,000. In 2001, the California Legislature passed Assembly Bill 810, adding the diversion and treatment of urban runoff to the list of services that the District may provide. This gave the District authority to construct and operate NTSs for water quality throughout its service area.

Mesa Consolidated Water District

- IRCWM Implementation Authority: water service; groundwater management; water conservation.

The MCWD services an 18-square-mile area with a population of approximately 112,000. The District's service area includes the City of Costa Mesa, portions of the City of Newport Beach, and a small portion of unincorporated Santa Ana Heights.

Municipal Water District of Orange County

- IRCWM Implementation Authority: water resource planning; water conservation.

The Municipal Water District of Orange County (MWDOC) is a member agency of the MWD and purchases imported water from the State Water Project and the Colorado River Aqueduct for the benefit of MWDOC member agencies. MWDOC's current services include: representation at MWD, water use efficiency programs, emergency preparedness, reliability studies, project development, water awareness/public information school programs, and legislative advocacy.

Orange County Water District

- IRCWM Implementation Authority: water resource planning; groundwater management.

The OCWD is an independent special district formed by an act of the State Legislature to protect Orange County's water rights for the Santa Ana River and to manage the groundwater basin that underlies northern and central Orange County. OCWD holds rights to all Santa Ana River flows that reach Prado Dam. The District recharges the Orange County groundwater basin primarily with water from the Santa Ana River, supplemented by untreated imported water purchased from the MWD. The groundwater basin is not adjudicated but is cooperatively managed by OCWD according to the basin management plan developed in collaboration with the groundwater producers and adopted by the OCWD Board of Directors in December 2002. OCWD is partnering with the Orange County Sanitation District (OCSD) on the Groundwater Replenishment System and also operating the Green Acres Project to enhance the supply of recycled water for irrigation and industrial uses.

2.3.4 Flood Control and Wastewater Districts

Orange County Flood Control District

- IRCWM Implementation Authority: Land use; flood control; stormwater protection; water quality.

The Orange County Flood Control District (OCFD) is a separate political entity, governed by the Orange County Board of Supervisors and staffed by RDMD. OCFD's purpose is to: (1) provide control of flood and stormwaters within the District's boundary (which is the boundary of the Orange County) and of streams flowing into the District (e.g., the Santa Ana River and San Juan

Creek); (2) to mitigate the effects of tides and waves; and (3) to protect the harbors, waterways, public highways, and property in the district from such waters. To fulfill these duties, the District owns land and assesses an annual benefit on real property.

Costa Mesa Sanitary District

- IRCWM Implementation Authority: wastewater collection service.

The Costa Mesa Sanitary District provides sanitary sewer service to a 16-square-mile area which includes most of the City of Costa Mesa, a portion of the City of Newport Beach, and some unincorporated area.

Orange County Sanitation District

- IRCWM Implementation Authority: water resource planning (recycled); wastewater collection and treatment

The Orange County Sanitation District (OCSD) manages wastewater collection and treatment for approximately 471 square miles in central and northwest Orange County, which includes 21 cities, 3 special districts, and 2.5 million residents. OCSD's system consists of 581 miles of sewer lines and 16 off-site pumping stations. OCSD utilizes Reclamation Plant No. 1 in Fountain Valley and Treatment Plant No. 2 in Huntington Beach to treat a combined daily average of 238 million gallons of wastewater. OCSD is partnering with OCWD in the Groundwater Replenishment System that will provide purified wastewater for recharge use. Within the Central Orange County IRCWM region, OCSD provides service for Santa Ana and Costa Mesa and portions of Tustin and Newport Beach.

2.3.5 Agency Involvement in Other Regional IRWM Efforts

The Central Orange County IRCWM region has watershed management issues that are distinct from other areas within the greater Santa Ana River Watershed as they are integrally linked to the region's fragile coastal ecosystem. The headwaters originate in the local foothills and the entire area drains to CCAs and ASBSs, making this a separate and distinct planning area for water quality and ecosystem processes. However, due to the nature and benefits of integrated regional planning, several of the agencies are involved in other regional IRWM planning efforts due to geographic conditions and objectives. As noted in *Section 1.1*, the Central Orange County IRCWM region lies at the southern edge of the broader Santa Ana River watershed and shares groundwater resources and an imported water system with other areas in the Santa Ana region. Therefore, agencies within the Central Orange County region participated in the development of the Santa Ana Region IRWM Plan led by the Santa Ana Watershed Project Authority.

In 2005, the South Orange County Integrated Regional Water Management Plan was completed for the watersheds in the South Orange County region, and the North Orange County IRWM Group launched its planning process in 2007. Central Orange County agencies that have land use authority or service areas within the boundaries of those IRWM planning areas are participating in the development and implementation of those plans. For example, the Cities of Costa Mesa, Orange, and Santa Ana lie within the Central and Northern Orange County subregions. IRWD is providing service by contract outside the Central Orange County region and will be participating in the North Orange County plan. Regional agencies, such as MWDOC, OCWD, and OCSD, are participating in the development of two or more of the subregional plans, based on their service areas. The county, with regional responsibilities for stormwater management and flood control, is the lead agency for the South and Central Orange County Plans (the lead agency for the North Orange County IRWM plan has yet to be determined). This level of involvement in other IRWM plans further supports the purpose of integrated regional planning through identifying multi-beneficial opportunities and leveraging agency resources to accomplish regional goals.

2.4 Major Land Uses and Population within the Region

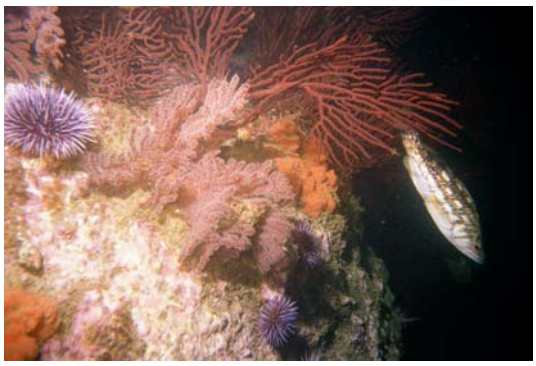
Land use within the Central Orange County IRCWM region includes a balance of residential, commercial, industrial, and institutional uses, along with recreation and open space areas. Land use is shown in *Figure 2.7a, Newport Bay Watershed Land Use* and *Figure 2.7b, Newport Coast Watershed Land Use.*

Three major land use elements should be noted: coastal ecosystem, former Department of Defense properties, and open space.

Coastal Ecosystem

The Central Orange County IRCWM region includes a coastal ecosystem encompassing the Upper Newport Bay Ecological Reserve, Newport Beach (Robert E. Badham) Marine Life Refuge, and Irvine Coast Marine Life Refuge. This ecosystem represents three CCAs and two ASBSs. The Upper Newport Bay Ecological Reserve is unique, providing important coastal Mediterranean habitat along the Pacific flyway and is home to many federal- or state-listed rare or endangered species. (see *Exhibit 2.D*)

Exhibit 2.D
Sensitive Marine Life Along Newport Coast



City of Costa Mesa, Irvine, Laguna Woods, Lake Forest, Tustin, and Santa Ana; SCAG

Central Orange County Integrated Regional and Coastal Watershed Management Plan

Newport Bay Watershed Land Use

FIGURE 2.7a

Source: City of Newport Beach

Central Orange County Integrated Regional and Coastal Watershed Management Plan

Newport Coast Land Use

FIGURE 2.7b

The Newport Bay Watershed has been the subject of numerous studies regarding watershed management, ecosystem restoration, and habitat protection. In 1998, the ACOE completed a Reconnaissance Report (905b Analysis) for the Newport Bay Watershed Management Study that identified the following problems affecting the ecosystem processes within the watershed: urbanization; aquatic and riparian habitat degradation; habitat fragmentation and loss of wildlife corridors; invasive, non-native species; stream bank and invert erosion; and poor water quality.

Re-Use of Two Former Department of Defense Properties

There are two former military bases within the Central Orange County IRCWM region: the 1,600-acre MCAS–Tustin and the 4,600-acre MCAS–El Toro. These sites have significant environmental impairments requiring soil and groundwater remediation. The Tustin base is being redeveloped as Tustin Legacy and will include a mixed-use master-planned community, along with commercial, institutional, and some industrial uses. It will also be the site of a new regional park. This area has high levels of naturally occurring selenium, and groundwater management, runoff avoidance, and limiting surface water ponds are critical management strategies.

The MCAS–El Toro will be redeveloped into the 2,300-acre Heritage Fields, a master-planned mixed-use community, and the 2,300-acre Orange County Great Park. Sustainability goals will be established for the park with objectives for energy, water, materials, nature, and people. The master design focuses on opportunities to create or strengthen ecological, social, and cultural connections:

- Ecologically, the park is a vital link in the chain of land reserves stretching from the Pacific Coast to the Cleveland National Forest. The park will tie into existing land reserves and make critical connections linking together ecological systems and water reserves in the central part of the county. In support of this, the Great Park Board of Directors approved $13.5 million in funding in June 2007 for the design and construction of enhanced features in a wildlife corridor extending from Irvine Boulevard to the Borrego Flood Control Channel, leveraging the infrastructure to be constructed as a requirement for private development in the adjacent Heritage Fields. The wildlife corridor will provide a dedicated open space for wildlife between natural habitats located with and adjacent to the City of Irvine. The wildlife corridor presents a strategy to use habitat creation and restoration to reconnect two large areas of open space – the Limestone-Whiting Wilderness Park and the proposed El Toro National Wildlife Refuge to the north of the City of Irvine and the Irvine Open Space Preserve, Irvine Ranch Land Reserve, Laguna Coast Wilderness Park and Crystal Cove State Park to the south.

- Development of the wildlife corridor within the Park will include significant habitat creation and restoration along Borrego Canyon Wash and Serrano Creek, including the creation of intermittent ponds and wetlands. These features will provide flood protection through the diversion of a portion of the flows in Borrego Canyon Wash, as well as water quality benefits associated with the wetlands functions of the wildlife corridor.

- Socially, the park will connect to communities throughout Orange County through the incorporation of sports fields and a multitude of passive and active recreational amenities. The new sports fields will expand the number of recreational facilities in the county, a key amenity for disadvantaged communities with limited recreational space. Public access is a key issue, and the park will connect to public transit systems to ensure regional access. The park will incorporate riding, hiking, and multi-use trails from all parts of the county, completing an existing bicycle network. The agricultural operations will provide growing fields for local produce for the purpose of ending malnutrition for disadvantaged populations within the county within 5 years.

- Culturally, the park connects and celebrates the sense of history from the former base through museums, fields, a timeline, and a memorial.

The Great Park Master Plan is shown in *Figure 2.8, Great Park; Figure 2.8a, Agua Chinon Proposed Design;* and *Figure 2.8b, Wildlife Corridor Proposed Design*.

Open Space

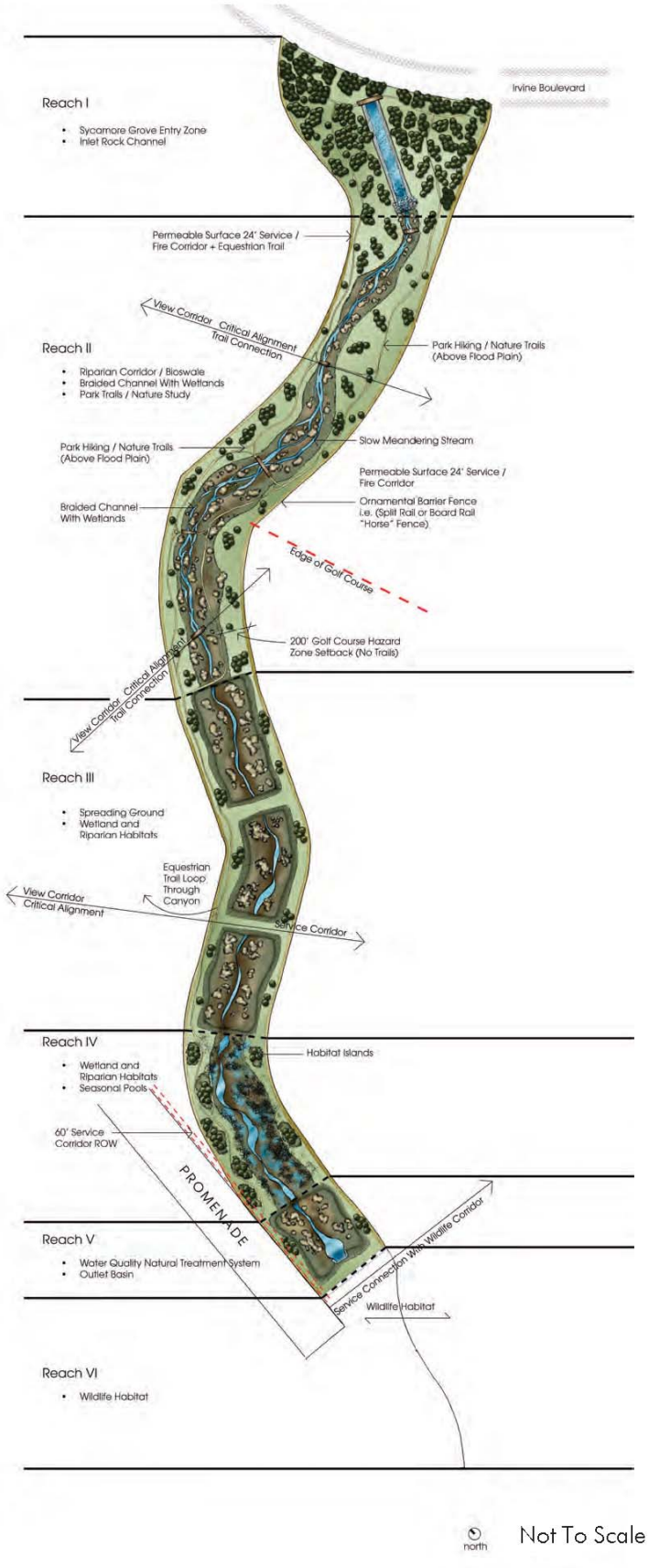
The Central Orange County region includes a number of protected areas that form a network of interconnected and isolated biological communities. The Orange County Central/Coastal NCCP/HCP is a regional conservation plan approved by CDFG and the U.S. Fish and Wildlife Service (USFWS) in July 1996. The Central/Coastal subregional NCCP/HCP consists of the following elements: (1) a 37,378-acre reserve system; (2) special linkages and existing use areas to enhance biological connectivity within the reserve system and subregion; (3) an adaptive management program; (4) an interim management plan; (5) funding; and (6) a mitigation option for non-participating landowners. The Central Orange County IRCWM region is located within the boundaries of the Central/Coastal NCCP/HCP. The following areas are included in the reserve system: Laguna Coast Wilderness Park, Mason Regional Park, Peters Canyon Regional Park, Upper Newport Bay Nature Preserve, Whiting Ranch Wilderness Park, Upper Newport Bay Ecological Reserve, and the University of California Irvine Reserve. The Central/Coastal NCCP/HCP reserve system is managed by the Nature Reserve of Orange County.

Source: Fuscoe 2007

Central Orange County Integrated Regional and Coastal Watershed Management Plan

Great Park

FIGURE 2.8

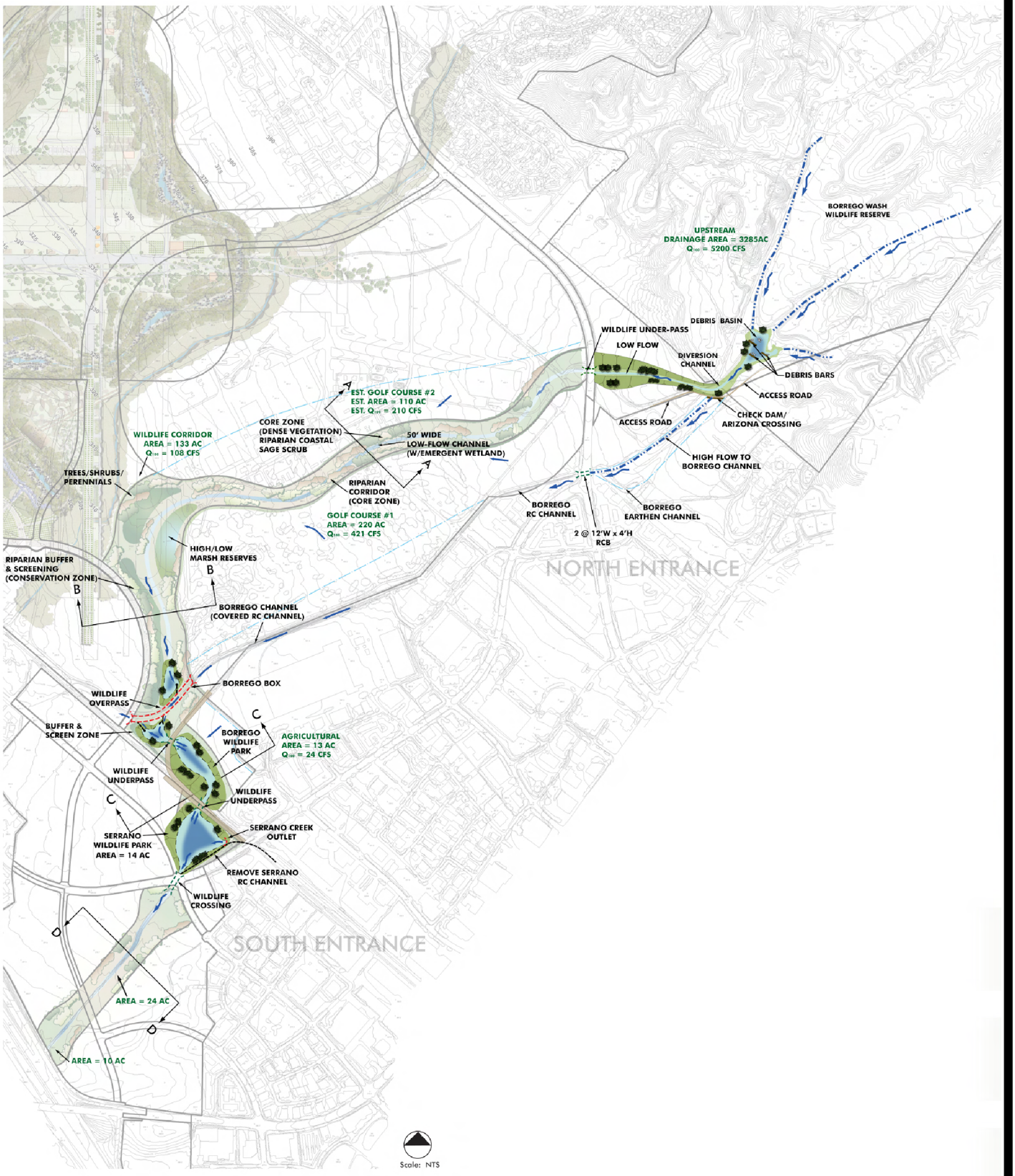


Source: Fuscoe 2007

Central Orange County Integrated Regional and Coastal Watershed Management Plan

Agua Chinon Proposed Design

FIGURE 2.8a



Source: Fuscoe 2007

Central Orange County Integrated Regional and Coastal Watershed Management Plan

Wildlife Corridor Proposed Design

FIGURE 2.8b

In addition, the 50,000-acre Irvine Ranch Land Reserve is located within the Central Orange County IRCWM planning area, extending from Upper Newport Bay to the foothills with watershed headwaters. The Mountains to Sea Trail is the backbone of the reserve. This permanent open space area is managed by the Nature Conservancy on behalf of the Irvine Ranch Land Reserve Trust.

2.4.1 Population

Population within the Central Orange County IRCWM region will increase significantly over the next 25 years due to build-out of remaining developable lands, redevelopment and infill, and increases in the number of persons per household in certain urban areas. The growth projected for the cities and unincorporated areas is shown below in *Table 2.3, Existing and Projected Population – Cities.* Within Santa Ana, density levels are currently near 13,000 persons per square mile. Future growth increases the pressure on environmental resources and makes effective collaboration even more imperative to ensure the sustainable management of water resources, including addressing water quality and habitat issues, as well as water supply and recreational amenities.

Table 2.2
Existing and Projected Population – Cities and Unincorporated Areas

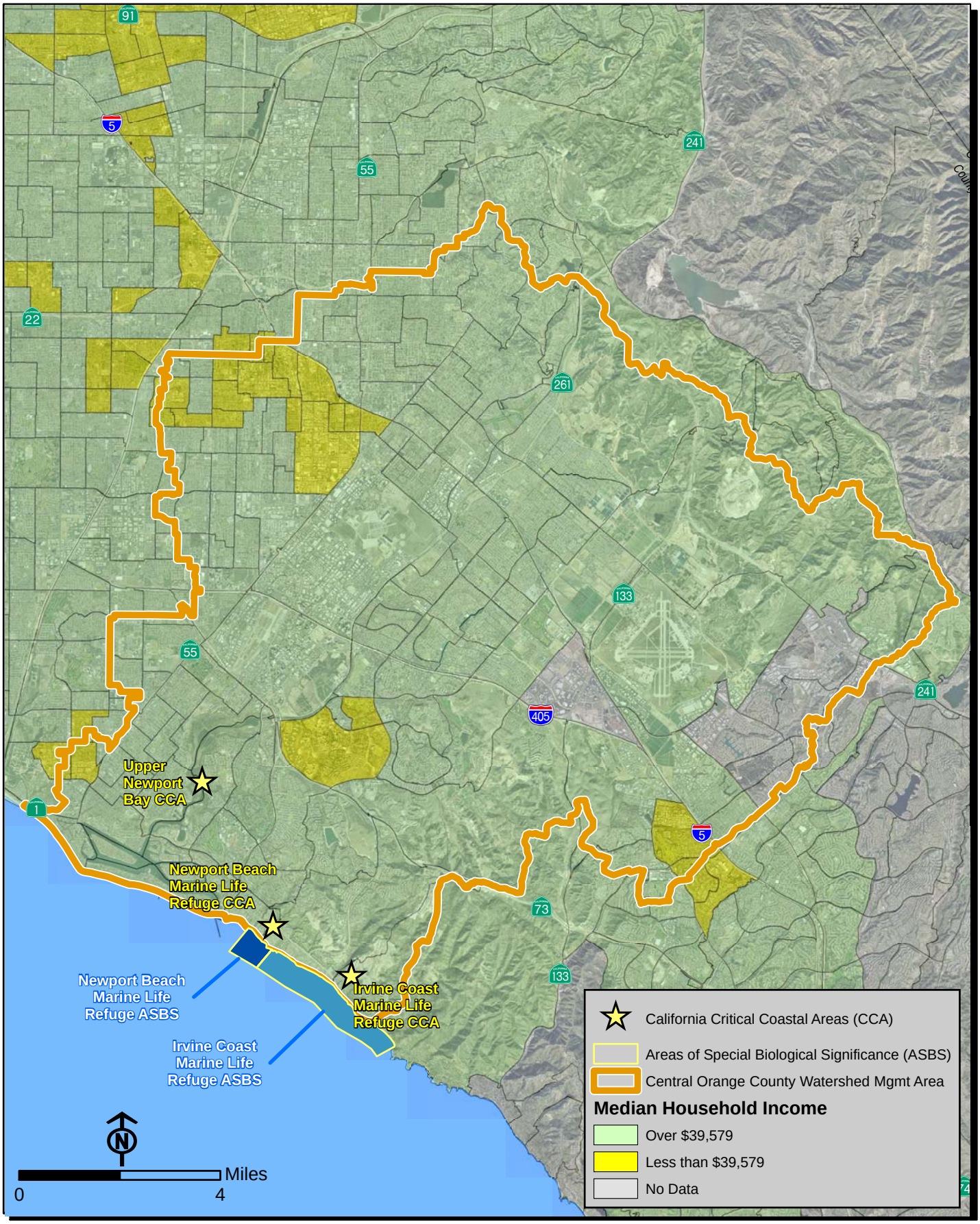
City	2000	2005	2010	2015	2020	2025	2030	Overall Increase
Entirely within IRCWM Region								
Irvine	143,965	169,600	192,186	195,740	198,689	201,491	203,965	60,000
Newport Beach	76,170	83,585	89,527	91,147	92,365	93,488	94,167	17,997
Tustin	68,032	76,164	82,470	84,774	86,580	88,270	88,788	20,756
Unincorporated Areas	25,469	25,629	25,789	25,949	26,109	26,269	26,429	26,589
Partially within IRCWM Region[1]								
Costa Mesa	109,402	113,874	117,492	121,166	124,070	126,802	129,098	19,696
Laguna Hills	32,275	33,516	34,150	34,734	35,200	35,637	35,833	3,558
Laguna Woods	17,842	18,534	18,782	19,046	19,261	19,470	19,590	1,748
Lake Forest	76,512	79,077	80,604	81,401	82,044	82,645	82,943	6,431
Orange	129,637	139,859	146,899	149,208	151,032	152,760	153,522	23,885
Santa Ana	337,997	350,625	359,823	364,049	368,026	370,196	370,130	32,133
TOTAL	1,017,301	1,090,463	1,147,722	1,167,214	1,183,376	1,197,028	1,204,465	212,793
Avg Annual Growth Rate		1.44%	1.05%	0.34%	0.28%	0.23%	0.12%	10%

Source: Southern California Association of Governments 2004 projections.

[1] Estimates reflect population for entire city.
The estimated population for the Central Orange County IRCWM region includes the entire population for the cities of Irvne, Newport Beach, Tustin, and the unincorporated area, plus portions of the cities partially within the IRCWM region.

2.4.2 Disadvantaged Communities

Within the Central Orange County region, there are several areas determined to be disadvantaged communities with median household incomes of less than $39,579 (see *Figure 2.9, Disadvantaged Communities*). These communities are within the Cities of Costa Mesa, Irvine, Santa Ana, Tustin, and Laguna Hills; per the 2000 U.S. Census, these communities have a combined population of 148,065 residents. With the exception of the student community in Irvine surrounding the University of California campus, these communities have a high percentage of Hispanic residents. These communities are served by the same water and wastewater systems as other areas within the region; however, recreational needs and facilities vary considerably by area. Residents within these communities use the regional parks, beaches, and other open space areas for recreation; impaired water quality in these areas significantly impacts the recreational opportunities available for their use.



Source: US Census 2000, RDMD 2007, AirPhoto USA 2006

Central Orange County Integrated Regional and Coastal Watershed Management Plan

Disadvantaged Communities

FIGURE 2.9

2.5 Watershed Ecological Processes

The region's watersheds include important ecological processes for both coastal and upper watershed areas. As discussed in *Chapter 1*, water quality is a critical issue for this region, and the IRCWM Plan provides a framework for regional cooperation on projects for water quality, ecosystem restoration, and water supply reliability. The IRCWM Plan also serves to increase the effectiveness with which the agencies cooperatively manage water and environmental resources within the region.

2.5.1 Newport Bay Watershed

Upper Newport Bay, approximately 1,000 acres in size, is approximately 2 miles long. The Upper Newport Bay State Ecological Reserve is one of only a few remaining estuaries in Southern California and is the home to numerous species of mammals, fish, invertebrates, and native plants, including several endangered species (Newport Bay Naturalists and Friends 2007). Additionally, Upper Newport Bay is an important stopover for migratory birds and is a key nature park for the community. The lower portion of Upper Newport Bay includes the Upper Newport Bay State Marine Park. Lower Newport Bay, approximately 752 acres in size, consists of Newport Harbor and recreational and navigational channels. Several Federally-listed endangered and threatened species, including the California brown pelican and the California least tern are possible inhabitants of Newport Harbor (ACOE 2007).

The primary tributary to Newport Bay is San Diego Creek. This sub-watershed covers approximately 122 square miles and includes numerous tributary drainages such as Peters Canyon Wash, Serrano Creek, Borrego Canyon Wash, Bee Canyon Wash, El Modena-Irvine Channel, and Sand Canyon Wash. The Santa Ana-Delhi Channel is the second major tributary, draining approximately 17 square miles of densely developed area within the city of Santa Ana.

Newport Bay Watershed History and Water Quality Issues

"The resources of Newport Bay have been long and extensively studied. Gilbert (in 1889) described the main channel of the Bay as muddy, soft in places—quote: '. . . but with many banks of native oysters, which reach a large size'. He also noted a small but constant flow of freshwater from springs at the head of the Bay. Another early contribution (MacGinitie, 1939) documented freshwater storm flows as causing high mortality among benthic organisms in Newport Bay. Historical changes in Bay ecology that reflect the shifting course of the Santa Ana River (and later the San Diego Creek) have also been documented (Stevenson and Emery, 1958; Macdonald, 1991).

After the eastward extension of Balboa Peninsula in the 1860s, the Upper Bay was protected from direct ocean waves providing a quiet environment subject only to tidal action and local runoff. The result was the accretion of silt over the previously sandy platform. By the 1950s, silt was 18 to 50 inches deep throughout the Bay (Stevenson and Emery, 1958).

As the Bay became shallower, marsh vegetation spread and further enhanced deposition. Major sources for the initial 18-50 inches of silt were the roughly 32 square miles of natural local drainage area surrounding Newport Bay and, until 1920 when the Santa Ana River was re-routed directly to the sea, fine sediments from floods could be brought into the Bay through that source. Sediment from the larger drainage of San Diego Creek was not a factor until that stream was gradually routed into Upper Newport Bay in this century.

San Diego Creek did not have integrated drainage nor regular drainage to the sea at the time of European settlement. Sediment-laden streams from both Loma Ridge and the San Joaquin Hills flowed through steep valleys to the Tustin plain where the slope suddenly decreased. The resulting decrease in stream velocity plus rapid infiltration of water caused the deposition of the coarser sediment creating alluvial fans at the base of the hills. The flow of water moved about on these fans causing them to spread laterally and coalesce along the foot of the hills.

The higher stormflows were ponded in an ephemeral lake located between Upper Newport Bay and the present site of the Santa Ana River. The ephemeral lake bed and the area to its north and east was usually swampy and marshy and was known as the "Swamp of the Frogs" (Cienega de las Ranas). The swamp extended to areas near the 100 feet elevation mark and included areas with slopes up to perhaps 1.5 percent.

To improve agricultural drainage for those areas on either side of Peters Canyon Wash, a channel was dug towards Upper Newport Bay and the ridge which had historically dammed water in the Tustin Basin was breached (1901 and 1915). However, the water was only being conducted to the 600 or so acres of peat and swampland lying one to three miles above the Bay, where it was simply allowed to spread into that wetland and make its way to the Bay the best it could (Trimble, 1998).

To contain increasing flood flows and sediment loads, and to protect a salt works, the Irvine Company in 1946 built a 3,000 acre-feet floodwater retention pond upstream of present University Avenue. Finally, the wide, efficient San Diego Creek channel was built in the 1960s so that peak floods and sediment could be efficiently routed to the Bay itself.

The uppermost portion of Upper Newport Bay contained salt evaporation ponds and was separated from the rest of the Bay by an earthen dike. Heavy storm runoff destroyed the salt ponds and breached the dike in 1969. Subsequent storm season sedimentation events in 1978

and 1980 caused shallowing of the Upper Bay; while intertidal saltmarsh vegetation became established and expanded rapidly (ACOE, 1993).

In 1985, 85 acres of the Upper Bay were dredged out to create the Unit I Sediment Control Basin (depths –3 to –7 feet MSL). A second dredging project in 1988 created the 37-acre Unit II Sediment Control Basin, just south of the Main Dike (depth –14 feet MSL). Both basins have worked well, collecting large volumes of coarser grained sediment from periodic flood runoff, principally down San Diego Creek. These then require extensive maintenance dredging, as is on-going at present.

Open water estuary/marine aquatic habitats still predominate in Newport Bay. The present shoreline includes scattered bare and disturbed areas, extensive intertidal saltmarsh with cordgrass, less common pickleweed, rare eelgrass, and small fringing areas of willow/mulefat scrub wetland. Algae and other forms of plankton are seasonally dominant.

Studies of physical conditions in Upper Newport Bay confirm a picture of significant tidal, seasonal, and annual variability. During peak storms the upper part of Upper Newport Bay was characterized by a well mixed, freshwater column. In lesser flows, salinity stratification is noted in the lower part of Upper Newport Bay, with freshwater overlying slightly diluted seawater." (California Coastal Conservancy, 1998)

Changes in land use from ranching and grazing to farmland resulted in the discharge of pesticides and nutrients into San Diego Creek and Upper Newport Bay. Since the 1960s, commercial, residential, and light industrial development has replaced open space and agricultural lands. Development and the related increase in impervious surfaces have increased runoff and altered drainage patterns. Several drainages were channelized for flood control as the amount of runoff necessitated increasing the size and number of channels that drain into San Diego Creek and Upper Newport Bay. As a result, basins were constructed to control sedimentation (ACOE 1999). Additional erosion control structures were installed in the channels. Channel erosion is most evident along Serrano Creek, where recent estimates of flow velocities are about 30 feet per second (Watershed and Coastal Resources Division 2007).

These changes in land use and the location of the former military bases within the San Diego Creek subwatershed have resulted in the discharge of toxic substances, including metals and pesticides, into San Diego Creek and Upper Newport Bay.

Lower Newport Bay, which includes Newport Harbor, has additional water quality issues associated with metals used in boat paints. Rhine Channel, located in the western end of Lower Newport Bay, has been surrounded by industrial uses such as canneries, metal plating companies, and shipyards since the 1920s (Anchor Environmental 2006). Rhine Channel is a

dead-end channel in which toxic pollutants have accumulated in the sediment. Sediment accumulation in the bay due to erosion from San Diego Creek and its tributaries has created adverse effects on habitat in the bay and on use of the Lower Newport Bay channels for navigation.

San Diego Creek, Peters Canyon Channel, Upper and Lower Newport Bay, and the Rhine Channel are listed on the EPA's 303(d) list (SWRCB, 2006) as impaired with fecal coliform, organochlorine pesticides, polychlorinated biphenyls (PCBs), metals, and sediment toxicity. The EPA and the Santa Ana RWQCB have implemented TMDLs for the San Diego Creek and Newport Bay for toxicity (including pesticides and metals), sediment, and nutrients. Additionally, a TMDL for fecal coliform has been established for Newport Bay. The TMDLs have been established to restore the beneficial uses of and improve water quality in the Newport Bay Watershed, including Upper Newport Bay State Ecological Reserve.

Surface Water

The two main tributaries to Newport Bay are San Diego Creek and the Santa Ana-Delhi Channel (*See Figure 2.1*). San Diego Creek accounts for approximately 80 percent of freshwater flows into Upper Newport Bay, and the Santa Ana-Delhi Channel accounts for approximately 15 percent of the freshwater flows (ACOE 2000). Newport Bay also receives flows from Santa Isabel Channel, Bonita Creek, Costa Mesa Channel, Big Canyon Wash and smaller storm drains (EPA 1998).

Two important tributaries to San Diego Creek are Serrano Creek and Borrego Wash. These tributaries have experienced significant erosion and have created a life and property hazard for nearby residents. Unfortunately, neither of these tributaries are gauged, so no historical flow data is available.

San Diego Creek extends approximately 14 miles from the Newport Bay to its headwaters and is differentiated into two reaches for the purpose of defining specific beneficial uses and corresponding water quality objectives. Reach 1 extends from the mouth of San Diego Creek at Upper Newport Bay to Jeffrey Road. Reach 2 is upstream of Reach 1 and extends from Jeffrey Road to the headwaters of San Diego Creek. Stream flow in Reach 2 is intermittent (Basin Plan).

Mean daily flow rates in Reach 1 of the San Diego Creek (at Campus Drive) from July 2003 to June 2004 varied from a low of 6.51 cubic feet per second (cfs) in July 2003 to a high of 167 cfs in February 2004 (County of Orange 2004). The average daily flow rates from San Diego Creek at Campus Drive are presented in *Table 2.3, Stream Flow for San Diego Creek Reach 1 – Mouth of San Diego Creek at Upper Newport Bay to Jeffrey Road*.

Stream-flow data for San Diego Creek at Campus Drive were also obtained from the U.S. Geological Survey for the years 1977 through 1984 (there is no data for October 1979 to September 1982). Average monthly flow rates for that time period are also presented in *Table 2.3*. Average monthly flow rates for San Diego Creek Reach 2 are presented in *Table 2.4, Stream Flow for San Diego Creek Reach 2 – Jeffrey Road to Headwaters*.

Table 2.3
Stream Flow for San Diego Creek Reach 1 –Mouth of San Diego Creek at Upper Newport Bay to Jeffrey Road(measured at Campus Drive)

AVG Q (cfs)	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June
2003-2004	6.51	8.76	7.45	7.52	14.4	29.0	13.7	167	27.1	19.7	7.47	7.37
1977-1984	26.5	27.5	32.1	31.9	53.9	57.1	110.7	106.9	184.5	45.5	28.2	26.6

Source: County of Orange, RDMD, Hydrologic Data Report, 2003-2004 Season, Station 226; USGS Water Resources Historical Data for San Diego Creek at Campus Drive.

AVG Q = Average Daily Flow Rate
cfs = cubic feet per second

Table 2.4
Stream Flow for San Diego Creek Reach 2 – At Culver Drive and Jeffrey Road to Headwaters
(measured at Lane Road)

AVG Q (cfs)	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June
2003-2004	2.4	1.3	1.1	1.4	2.3	10.8	4.3	76.0	12.8	5.3	1.0	0.8
1972-1977	15.3	15.5	13.3	12.3	20.3	17.7	32.4	30.9	31.2	19.7	12.5	13.3

Source: County of Orange, RDMD, Hydrologic Data Report, 2003-2004 Season, Station 231, USGS Water Resources.

AVG Q = Average Daily Flow Rate
cfs = cubic feet per second

The Santa Ana Delhi Channel contributes about 15 percent of the total flow into Newport Bay. During water year 2003-2004 the momentary peak flow from the channel was about 2,000 cfs with an average daily flow of about 5.1 cfs. Average daily flow rates for 2003-2004 are shown in *Table 2.5, Stream Flow for Santa Ana-Delhi Channel at Irvine Avenue*

Table 2.5
Stream Flow for Santa Ana Delhi Channel at Irvine Avenue

Avg Q (cfs)	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June
2003-2004	2.36	1.09	1.88	1.10	4.09	7.09	3.63	29.6	3.80	4.07	1.57	2.08

Source: County of Orange, RDMD, Hydrologic Data Report, 2003-2004 Season, Station 220

Avg Q = Average Daily Flow Rate
cfs = cubic feet per second

Peters Canyon Wash originates in Peters Canyon Regional Park and drains into San Diego Creek approximately 14 miles upstream from the Newport Bay. Average monthly flow rates for Peters Canyon Wash are presented in *Table 2.6, Stream Flow for Peters Canyon Wash.*

Table 2.6
Stream Flow for Peters Canyon Wash
(at Barranca Parkway)

AVG Q (cfs)	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June
2003-2004	7.54	5.22	4.44	3.36	3.78	7.94	4.79	64.0	8.83	6.66	4.20	3.98
1982-1985	17.8	17.0	20.5	22.0	33.6	27.5	26.0	33.1	59.0	24.1	17.9	18.2

Source: County of Orange, RDMD, Hydrologic Data Report, 2003-2004 Season, Station 230, USGS Water Resources.
AVG Q = Average Daily Flow Rate
cfs = cubic feet per second

Beneficial uses for surface waters have been designated within the Newport Bay Watershed by the Santa Ana RWQCB (see *Table 2.1*). At this time, native surface waters from the Newport Bay Watershed are not used as a potable water supply.

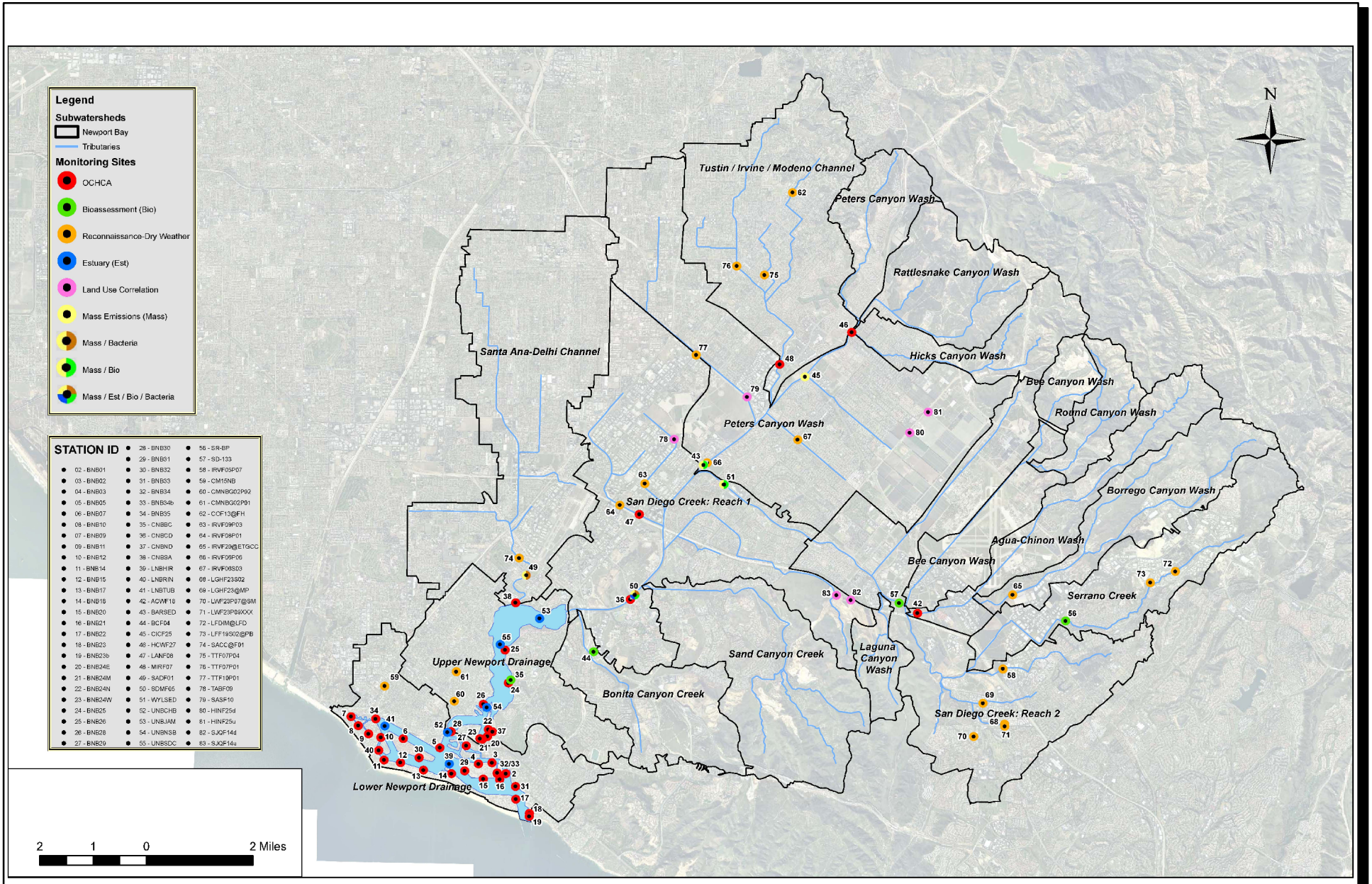
Surface Water Quality

San Diego Creek, Peters Canyon Channel, Upper and Lower Newport Bay, and the Rhine Channel are listed on the 303(d) list as impaired with fecal coliform, organochlorine pesticides, PCBs, metals, and sediment toxicity. The EPA and the Santa Ana RWQCB have implemented TMDLs for the San Diego Creek and Newport Bay for toxicity (including pesticides and metals), sediment, and nutrients. Additionally, a TMDL for fecal coliform has been established for Newport Bay. Monitoring locations are shown in *Figure 2.10, Newport Bay Monitoring Locations*.

Coliform

Bacterial contamination of the waters of Newport Bay can directly affect two designated beneficial uses: water-contact recreation and shellfish harvesting. The Orange County Health Care Agency (OCHCA) conducts routine bacteriological monitoring and more detailed sanitary surveys as necessary, and is responsible for closure of areas to recreational and shellfish harvesting uses if warranted by the results.

Because of consistently high levels of total coliform bacteria, the upper portion of Upper Newport Bay (Upper Bay) has been closed to these uses since 1974. In 1978, the shellfish harvesting prohibition area was expanded to include all of the Upper Bay, and the OCHCA



Source: Orange County 2003

Central Orange County Integrated Regional and Coastal Watershed Management Plan

Newport Bay Watershed Monitoring Locations

FIGURE 2.10

generally advises against the consumption of shellfish harvested anywhere in the Bay. Bacterial objectives established to protect shellfish harvesting activities are rarely met in the Bay. Certain areas in the lower parts of the Upper Bay and in Lower Newport Bay (Lower Bay) are also closed to water-contact recreation on a temporary basis, generally in response to storms. In these areas, there is generally good compliance with water-contact recreation bacterial objectives in the summer.

Data collected by the OCHCA demonstrate that tributary inflows, composed of urban and agricultural runoff, including stormwater, are the principal sources of coliform input to the Bay. As expected, there are more violations of bacterial standards in the Bay during wet weather, when tributary flows are higher, than in dry weather. There are few data on the exact sources of the coliform in this runoff. Coliform has diverse origins, including: manure fertilizers which may be applied to agricultural crops and to commercial and residential landscaping; the fecal wastes of humans, household pets and wildlife; and other sources.

Another source of bacterial input to the Bay is the discharge of vessel sanitary wastes. Newport Bay has been designated a no-discharge harbor for vessel sanitary wastes since 1976. Despite this prohibition, discharges of these wastes have continued to occur. Since these wastes are of human origin, they pose a potentially significant public health threat.

As noted, the fecal waste of wildlife, including waterfowl that inhabit the Bay and its environs, is a source of coliform input. The fecal coliform from these natural sources may contribute to the violations of water quality objectives and the loss of beneficial uses, but it is currently unknown to what extent these natural sources contribute to, or cause, the violations of bacterial quality objectives in Newport Bay.

Implementation of the TMDL is expected to address these bacterial quality problems and to assure attainment of water quality standards, that is, compliance with water quality objectives and protection of beneficial uses.

Sediment

Sediment control has been a key water quality issue for decades. Increased surface water flow due to urbanization and channelization has increased the quantity of sediment transported through the watershed to Upper Newport Bay. For example, an estimated 400,000 cubic yards of sediment were deposited in Upper Newport Bay during the 1969 storm season (ACOE 1998). Issues related to increased surface water flow and sedimentation are: increased stream erosion, which has threatened homes, utilities, and other structures; impacts to estuarine species and habitats in Upper Newport Bay; and loss of navigation channels in Newport Bay (ACOE 1998).

Stream erosion has recently been most notable in Serrano Creek, upstream of Serrano Creek Community Park. In Serrano Creek, stream erosion threatens to undercut homes, has damaged and threatened a Los Alisos Water District sewer line and a Southern California Edison utility pole, and has cut hundreds of thousands of cubic yards of channel banks in a storm season, which has resulted in the loss of riparian habitat (ACOE 1998). In addition, Borrego Wash has also shown severe erosion. Historically, there are other channels that have had erosion issues.

Sedimentation in Upper Newport Bay has altered the depth of the bay, which in turn has altered tidal exchange and the type and availability of aquatic and wildlife habitat (ACOE 1998). These conditions are of concern to natural resource groups and regulatory agencies as Upper Newport Bay is one of only a few remaining estuaries in Southern California, is one of the only remaining coastal Mediterranean habitats and is used as a stopover point on the Pacific flyway, and is the home to numerous species of mammals, fish, invertebrates, and native plants, including several endangered species (Newport Bay Naturalists and Friends 2007).

The implementation of BMPs (i.e. foothill retarding basins, in-channel and in-bay sediment trapping basins, etc.) and the TMDL have improved these conditions of concern; however, tens of thousands of tons of sediment are still being deposited in the bay each year, as shown in *Table 2.7, Sediment Discharge from San Diego Creek to Newport Bay*.

Table 2.7
Sediment Discharge from San Diego Creek to Newport Bay as Measured at the San Diego Creek at Campus Drive Station

Year	Annual Flow in Acre-Feet	Annual Sediment Discharge in Tons
1983	58,952	534,035
1984	29,425	64,455
1985	26,987	32,236
1986	29,746	37,760
1987	21,423	20,060
1988	22,089	34,186
1989	17,359	19,810
1990	19,154	24,855
1991	28,935	83,924
1992	37,186	173,212
1993	62,510	355,208
1994	20,000	33,027
1995	61,182	347,579
1996	23,501	49,438
1997	33,946	92,181
1998	92,345	618,006
1999	17,334	16,439
2000	17,780	28,864
2001	27,320	75,686
2002	10,610	5,640
2003	30,090	64,740

Table 2.7
Sediment Discharge from San Diego Creek to Newport Bay as Measured at the San Diego Creek at Campus Drive Station

Year	Annual Flow in Acre-Feet	Annual Sediment Discharge in Tons
2004	18,690	30,464
2005	75,860	165,810
2006	20,150	9,291

Source: URS 2003 and County of Orange, RDMD Upper Newport Bay/ San Diego Creek Watershed Sediment TMDL Annual Reports

The Sediment TMDL monitoring program includes a monitoring element for Newport Bay. The Newport Bay monitoring element includes bathymetric surveys, vegetation surveys, and sediment removal.

Nutrients

Changes in land use from ranching and grazing to farmland in the watershed resulted in the discharge of nutrients into San Diego Creek and Upper Newport Bay. Nutrients are also discharged from landscaped areas of residential and commercial developments. The increased nutrient loading to the San Diego Creek and Upper Newport Bay has resulted in algal growth. Algal blooms in Newport Bay have been responsible for aesthetic nuisances and interfered with recreational activities, and decomposing algae has resulted in fish kills due to the creation of anoxic conditions (EPA 1998). Additionally, the nutrient impairment has resulted in non-compliance with the narrative water quality objectives of the Santa Ana River Basin Plan regarding algae and dissolved oxygen (EPA 1998).

Nutrient loading from San Diego Creek to Upper Newport Bay peaked in the mid-1980s at 7 million pounds of nitrate in the 1985-1986 seasons (EPA 1998). Nutrient loading decreased in the 1990s due to increased controls and BMPs; however, total inorganic nitrogen (TIN) data continued to be greater than the water quality goals in the 1990s, and algal blooms continued in Upper Newport Bay (EPA 1998).

San Diego Creek and Newport Bay were placed on the EPA Section 303(d) list of impaired waters. Based on that listing, TMDLs of nutrients entering waters of the creek and bay were established. In accordance with the nutrient TMDL, a Regional Monitoring Program was initiated in 2000.

Data from the Quarterly Data Report, Newport Bay Watershed, Nutrient TMDL, October - December 2006 are presented in *Table 2.8, Summary of Second Quarter 2006-2007 Concentrations in San Diego Creek at Campus Drive* and *Table 2.9, Summary of Second Quarter 2006-2007, Concentrations in Santa Ana-Delhi Channel at Irvine Avenue*.

Table 2.8
Summary of Second Quarter 2006-2007
Concentrations in San Diego Creek at Campus Drive

	NH3	NO3 + NO2 as N	TKN	TIN	TP as PO4	TP	OrthoPO4 as P	TSS	VSS	TN
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Max	0.8	8.8	9.6	9.0	1.71	0.56	0.23	40	14	1776.82
Min	0.1	2.6	4.2	3.2	0.25	0.08	<0.02	14	2	89.57
Median	0.2	4.9	6.4	5.1	0.59	0.19	0.08	27	7	281.61
Mean	0.3	5.0	6.6	5.2	0.71	0.23	0.08	27	7	400.40
St Dev	0.2	1.6	1.4	1.6	0.37	0.12	0.07	8	3	390.10

Source: Quarterly Data Report, Newport Bay Watershed, Nutrient TMDL, October - December 2006

Table 2.9
Summary of Second Quarter 2006-2007
Concentrations in Santa Ana-Delhi Channel at Irvine Ave

	NH3	NO3 + NO2 as N	TKN	TN	TIN	TP as PO4	TP	OrthoPO4 as P	TSS	VSS
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Max	1.9	8.7	8.4	12.3	8.8	5.85	1.91	0.14	630	180
Min	<0.1	3.4	0.6	5.9	4.0	0.11	0.04	< 0.02	<5	< 1
Median	0.2	6.6	1.1	8.4	6.7	0.48	0.16	0.07	19	5
Mean	0.4	6.3	2.4	8.7	6.7	1.26	0.41	0.06	116	32
St Dev	0.5	1.9	2.8	2.0	1.6	1.76	0.58	0.04	204	56

Source: Quarterly Data Report, Newport Bay Watershed, Nutrient TMDL, October - December 2006

A Nitrogen and Selenium Management Program (NSMP) was created in 2005 in response to a general NPDES permit (Order No. R8-2004-0021) issued for the Newport Bay watershed. The NSMP is a collaborative effort of 18 stakeholders, including various State, county, and local agencies, water districts, and private entities with the goal of developing management strategies and treatment technologies for groundwater dewatering discharges of both selenium and nitrogen for the watershed. A work plan has been developed by the NSMP and approved by the Santa Ana Regional Water Quality Control Board. The work plan will focus on the development of treatment technologies, BMPs, and an offset, trading or mitigation program. Additionally, if necessary, the NSMP will develop and recommend a site specific objective for selenium. The County of Orange is the Chair of the NSMP, providing program leadership and ensuring implementation of the work plan and compliance with the terms of the permit.

The key elements of the work plan include, (1) collecting additional data to fill knowledge gaps regarding the movement and impacts and selenium and nitrogen in the watershed, (2) examining Best Management

Practices (BMPs) and treatment technologies that can reasonably and effectively be applied in the watershed, (3) developing an offset, trading, or mitigation program for both selenium and nitrogen, (4) using the increased knowledge and treatment opportunities developed in previous tasks to evaluate the Nutrient TMDL, and (5) if appropriate, develop a site specific objective for selenium.

Toxic Pollutants

Changes in land use from ranching, grazing, and farming to residential and industrial development result in the discharge of metals (cadmium, cooper, lead, selenium, and zinc) and organic compounds into San Diego Creek, Upper Newport Bay, and Lower Newport Bay. Historical farming, military bases, and urban development all introduce sources of toxic substances into the watersheds. Land use activities that cause erosion increase the delivery of toxic substances to the watersheds.

On June 14, 2002, the U.S. Environmental Protection Agency (EPA) established the Toxics TMDL for San Diego Creek/Newport Bay. The EPA promulgated TMDL covers 14 different constituents – chlorpyrifos and diazinon (organophosphate pesticides); chlordane, dieldrin, DDT, PCBs, and toxaphene (organochlorinated compounds); cadmium, copper, lead and zinc (metals); selenium; chromium and mercury (metals, specific to Rhine Channel only).

Table 2.10 Waterbodies and Pollutants below lists the pollutants and the geographical areas to which the TMDL applies within the San Diego Creek/Newport Bay watersheds:

Table 2.10
Waterbodies and Pollutants

Waterbody	Element/Metal	Organic Compounds						
San Diego Creek (freshwater)	Cd, Cu, Pb, Se, Zn	Chlorpyrifos	Diazinon	Chlordane	Dieldrin	DDT	PCBs	Toxaphene
Upper Newport Bay (saltwater)	Cd, Cu, Pb, Se, Zn	Chlorpyrifos		Chlordane		DDT	PCBs	
Lower Newport Bay (saltwater)	Cu, Pb, Se, Zn			Chlordane	Dieldrin	DDT	PCBs	
Rhine Channel (saltwater)	Cd, Cu, Pb, Se, Zn, Cr, Hg			Chlordane	Dieldrin	DDT	PCBs	

The Santa Ana Regional Water Quality Control Board is in the process of reviewing the EPA promulgated Toxics TMDL and has decided to break it down into five separate constituent and geographically specific TMDLs. The five resulting TMDLs include:

1. Organophosphate Pesticides (diazinon and chlorpyrifos);
2. Selenium;
3. Organochlorinated Compounds (chlordane, dieldrin, DDT, PCBs, toxaphene);
4. Metals (cadmium, copper, lead, zinc); and
5. Rhine Channel (copper, lead, selenium, zinc, chromium, mercury).

The organophosphate pesticides TMDL has been amended into the Basin Plan. The other individual TMDLs must proceed through the full State approval process before they are officially adopted.

An investigation of stormwater runoff in tributaries to Newport Bay in 1992 and 1993 demonstrated the existence of aquatic life toxicity. A toxicity identification evaluation (TIE) performed on several of the samples collected during the study, indicated that one or more pesticides were responsible for the observed toxicity, and that diazinon was likely one of these pesticides. Separate sampling programs, the Toxic Substances Monitoring Program (TSMP), and the State Mussel Watch (SMW), demonstrated that chlorpyrifos and diazinon were present in fish and mussel tissue. The TSMP and SMW were conducted in upper and lower Newport Bay as well as in the drainage channels in the Newport Bay watershed, with diazinon and chlorpyrifos data available from 1983 onwards.

As a result of these investigations, upper and lower Newport Bay and Reach 1 of San Diego Creek were included on California's 1998 Clean Water Act Section 303d list for pesticides. Reach 2 of San Diego Creek was listed for unknown toxicity. Supplemental studies to determine the sources of the toxicity observed during the 1992-93 investigation were carried out from 1996 to 2000. These studies further documented the occurrence of aquatic life toxicity in the Newport Bay watershed, and concluded that diazinon and chlorpyrifos were causing a large portion of the observed toxicity in San Diego Creek. An investigation of Upper Newport Bay indicated the presence of toxicity attributable to chlorpyrifos in stormwater runoff entering the upper bay from San Diego Creek. No samples were collected from lower Newport Bay. Based on these findings, TMDL development for diazinon and chlorpyrifos in San Diego Creek, and chlorpyrifos in upper Newport Bay was initiated (Santa Ana Regional Water Quality Control Board [SARWQCB] 2001). Diazinon and chlorpyrifos are widely used organophosphate pesticides, and are among the pesticides detected most frequently in urban waterways.

Selenium, a primary metal of concern in the watershed, is discharged into the San Diego Creek and eventually to Newport Bay through erosion, runoff, and discharges of shallow groundwater from dewatering activities and pump-and-treat groundwater remediation activities (EPA 2002).

Hibbs and Lee (2000) investigated sources of selenium in the Newport Bay/San Diego Creek watershed. The study presents convincing evidence that groundwater is a significant source of selenium to San Diego Creek and Newport Bay. At the watershed scale, the study shows that selenium concentrations exceed the numeric target in most of the surface and groundwater samples collected, and that they exhibit spatial heterogeneity. Concentrations in groundwater range from below 4 µg/L (method detection limit) to 478 µg/L. A statistical analysis shows that selenium concentrations in groundwater samples were generally found to be higher within the boundaries of a historical marsh ("Swamp of the Frogs" or "La Cienega de las Ranas") than in

other areas. Radioisotope analysis on the water samples suggest that high selenium concentrations in groundwater result from oxidation and leaching of subsurface soils in the saturated zone underlying the old marsh area. Monitoring of nursery discharge shows selenium concentrations in most runoff samples (6 out of 7) were below detection limits (*i.e.*, < 4 µg/L). One sample was detected at 7 µg/L from Bordiers Nursery. Surface water monitoring shows that discharges containing less than 10 µg/L selenium were mostly urban and agricultural runoff. Surface channels and drains with particularly high concentrations coincide with areas where high selenium groundwater samples were collected. Those channels include Como Channel (38 to 42 µg/L), Valencia Drain at Moffett Drive (25 to 40 µg/L), Warner Drain (24 to 33 µg/L), and the circular drains at Irvine Center Drive (141 to 162 µg/L) and at Barranca Parkway (107 µg/L). Channel inspection and chemical composition analysis indicate that those drainage channels collect considerable amounts of groundwater

An investigation of stormwater runoff in tributaries to Newport Bay in 1992 and 1993 demonstrated the existence of aquatic life toxicity. A toxicity identification evaluation (TIE) performed on several of the samples collected during the study, indicated that one or more pesticides were responsible for the observed toxicity, and that diazinon was likely one of these pesticides. Separate sampling programs, the Toxic Substances Monitoring Program (TSMP), and the State Mussel Watch (SMW), demonstrated that chlorpyrifos and diazinon were present in fish and mussel tissue. The TSMP and SMW were conducted in upper and lower Newport Bay as well as in the drainage channels in the Newport Bay watershed, with diazinon and chlorpyrifos data available from 1983 onwards.

As a result of these investigations, upper and lower Newport Bay and Reach 1 of San Diego Creek were included on California's 1998 Clean Water Act Section 303d list for pesticides. Reach 2 of San Diego Creek was listed for unknown toxicity. Supplemental studies to determine the sources of the toxicity observed during the 1992-93 investigation were carried out from 1996 to 2000. These studies further documented the occurrence of aquatic life toxicity in the Newport Bay watershed, and concluded that diazinon and chlorpyrifos were causing a large portion of the observed toxicity in San Diego Creek. An investigation of Upper Newport Bay indicated the presence of toxicity attributable to chlorpyrifos in stormwater runoff entering the upper bay from San Diego Creek. No samples were collected from lower Newport Bay. Based on these findings, TMDL development for diazinon and chlorpyrifos in San Diego Creek, and chlorpyrifos in upper Newport Bay was initiated (Santa Ana Regional Water Quality Control Board [SARWQCB] 2001). Diazinon and chlorpyrifos are widely used organophosphate pesticides, and are among the pesticides detected most frequently in urban waterways.

In November 2006, the Santa Ana RWQCB presented a staff report for TMDLs for organochlorine pesticides and PCBs. The RWQCB TMDLs report summarizes the information

presented in the EPA TMDL and presents some new information and modifications to reflect the 2006 proposed 303(d) list and revised loading information.

Lower Newport Bay has additional water quality issues associated with metals used in boat paints. Rhine Channel, located in the western end of Lower Newport Bay, has been surrounded by industrial uses, such as canneries, metal plating companies, and shipyards, since the 1920s (Anchor Environmental 2006). Rhine Channel is a dead-end channel in which toxic pollutants have accumulated in the sediment. Consequently, the Santa Ana Regional Board has designated Rhine Channel as toxic hotspot. The land use history in the area immediately adjacent to Rhine Channel suggests that local pollutant source may be significantly different from the pollutant sources that have discharged to the rest of the watershed. Given the different levels of sediment contamination observed in Rhine Channel as compared to other areas of Newport Bay and the likely association of toxic hotspots in Rhine Channel with local pollutant sources, EPA has determined that is appropriate to develop separate TMDLs for that specific reach of Lower Newport Bay.

Table 2.11, Toxic Pollutant TMDLs and Newport Bay Concentrations, presents the TMDLs and the concentrations of pesticides and metals contained in samples collected from San Diego Creek, Upper and Lower Newport Bay, and the Rhine Channel.

Table 2.11
Toxic Pollutant TMDLs and Newport Bay Watershed Concentrations

			Criteria			2002 Concentrations			
Pollutant	Type of Compound	Location	Status	Fresh-water (ug/l)	Saltwater (ug/l)	San Diego Creek (ug/l)	Upper Newport Bay (ug/l)	Lower Newport Bay (ug/l)	Rhine Channel (ug/l)
Diazinon	Organophosphate Pesticide	San Diego Creek	Chronic	0.05		0.2	0.202		
			Acute	0.08					
Chlorphyrifos	Organophosphate Pesticide	San Diego Creek	Chronic	0.014	0.009	0.111	0.0433		
			Acute	0.02	0.02				
Selenium	Metal	San Diego Creek	Chronic	5		22.1			
			Acute	20	71 (dissolved)				
Cadmium	Metal	San Diego Creek	Acute	8.9 to 19.1 for large flows to baseflows	42	0.13-0.27	0.095-0.22	-	-

Table 2.11
Toxic Pollutant TMDLs and Newport Bay Watershed Concentrations

			Criteria			2002 Concentrations			
Pollutant	Type of Compound	Location	Status	Fresh-water (ug/l)	Saltwater (ug/l)	San Diego Creek (ug/l)	Upper Newport Bay (ug/l)	Lower Newport Bay (ug/l)	Rhine Channel (ug/l)
			Chronic	4.2 to 6.2 for medium flows to baseflows	9.3				
Copper	Metal	San Diego Creek	Acute	25.5 to 50 for large flows to baseflows	4.8	2.4-5.5	3.4-29.0	8.2-26.3	-
			Chronic	18.7 to 29.3 for medium flows to baseflows	3.1				
Lead	Metal	San Diego Creek	Acute	134 to 281 for large flows to baseflows	210	0.05-0.35	0.023-0.96	0.03-0.89	-
			Chronic	6.3 to 10.9 for medium flows to baseflows	8.1				
Zinc	Metal	San Diego Creek	Acute	208 to 379 for large flows to baseflows	90	2.6-23.1	10-100	2.5-11.5	-
			Chronic	244 to 382 for medium flows to baseflows	81				
PCBs	Organochlorine Pesticides	San Diego Creek	Chronic	0.014		ND			ND
DDT	Organochlorine Pesticides	San Diego Creek	Acute	1.1		ND			ND
			Chronic	0.001					
Chlordane	Organochlorine Pesticides	San Diego Creek	Acute	2.4		ND			ND
			Chronic	0.0043					
Dieldrin	Organochlorine Pesticides	San Diego Creek	Acute	0.24		ND			ND
			Chronic	0.056					

Table 2.11
Toxic Pollutant TMDLs and Newport Bay Watershed Concentrations

			Criteria			2002 Concentrations			
Pollutant	Type of Compound	Location	Status	Fresh-water (ug/l)	Saltwater (ug/l)	San Diego Creek (ug/l)	Upper Newport Bay (ug/l)	Lower Newport Bay (ug/l)	Rhine Channel (ug/l)
Toxaphene	Organochlorine Pesticides	San Diego Creek	Acute	0.73		ND			ND
			Chronic	0.0002					

Notes
Source: EPA 2002;metal data from Newport Bay Toxics TMDL Part E.
NA – not analyzed, DNQ – detected but not quantified, ND – not detected

Water Quality Projects

Major efforts being conducted within the Newport Bay Watershed to reduce non-point source releases and improve water quality as identified in the June 2006 *State of the CCAs Report for Upper Newport Bay* are listed in *Table 2.12, Water Quality Projects Defined in the State of the CCAs Report.*

Table 2.12
Water Quality Projects Defined in the State of the CCAs Report

1	Serrano Creek Stabilization and Restoration Project	Restore about 1.2 miles of Serrano Creek in the City of Lake Forest through installation of several creek stabilization features coupled with riparian restoration; designed to balance flood management, habitat, and recreation objectives. http://www.willdan.com/Services_Flood.asp?ProjectID=41
2	Newport Bay Watershed Management Plan	Framework for how to achieve effective watershed management, leading to a sustainable urban environment; includes wetland protection, education, water conservation, regulation, ad stormwater management, economics. http://www.ocwatersheds.com/watersheds/pdfs/Newport_Bay_Watershed_Plan_04-12-15.pdf
3	Special Area Management Plan for San Diego Creek Watershed	Plan will describe an approach and set of actions to preserve, enhance, and restore aquatic resources, while allowing reasonable economic development and construction and maintenance of public infrastructure facilities. http://www.spl.usace.army.mil/samp/sandiegocreeksamp.htm
4	Selenium Removal Pilot Project	Tested an anoxic biofiltration process using laboratory cylinders and "mesocosms" to remove selenium from surface water in San Diego Creek; now constructing a full-scale in situ version to treat water from Peters Canyon Wash. http://www.irwd.com/
5	Upper Newport Bay Ecosystem Restoration Project	The project will deepen two sediment basins in the upper bay; includes an ongoing maintenance-dredging program and enhancements to several existing wetlands and tidal channels and the creation of a least tern nesting island.

Table 2.12
Water Quality Projects Defined in the State of the CCAs Report

		http://www.spl.usace.army.mil/newportbay/uppernewportbay.htm
6	Newport Bay Naturalists and Friends	Mission is to restore and preserve the native habitat of the bay and surroundings; educate the public about the ecological value of the bay; achieve good water quality, healthy native flora and fauna, and compatible public use. www.newportbay.org
7	Orange County CoastKeepers	Mission is to protect and preserve Orange County's marine habitats and watersheds through education, advocacy, restoration, and enforcement. www.coastkeeper.org
8	Dry Weather Diversions, Storm Drain Inlet Modifications, and Circulation Study	Clean Beaches Initiative grant study at Newport Bay to divert or treat urban runoff. http://www.city.newport-beach.ca.us/Pubworks/pwmain.htm
9	Divert Urban Runoff at Newport Bay Beaches an Newport Beach and Ocean Beach	Grant for storm drain to sewer diversions. http://www.city.newport-beach.ca.us/Pubworks/pwmain.htm
10	Working At the Watershed Level Science & Stewardship Program & ERF High School Clubs	Modules on understanding importance of a healthy watershed, urban refuse collection, data collection, source identification, and bioassessment. Program enhances the teachers' opportunity to involve students in science. http://earthresource.org/
11	Big Canyon Creek Restoration Project	Improving the water quality of Big Canyon Creek as it enters Upper Newport Bay; remove exotic species and replace with native, non-invasive species; create effective riparian, wetlands, coastal sage scrub, and other habitat. http://www.city.newport-beach.ca.us/Pubworks/pwmain.htm
12	Newport Bay Fecal Coliform Source Identification and Management Plan	Activities to determine extent that urban and natural sources of fecal coliform contribute to bacterial quality problems throughout the bay; and development of a source management plan to address source inputs. http://www.ocwatersheds.com/
13	Newport Bay Nutrient Total Maximum Daily Load (TMDL) Dissolved Oxygen and Algae Distribution Study	Two investigations of the Newport Bay Nutrient TMDL Regional Monitoring Program: (1) monitor dissolved oxygen levels continuously; and (2) collect remote sensing data of bay to document extent of algae growth. http://www.ocwatersheds.com/
14	Assessment of Food Web Transfer of Organochlorine Compounds and Metals in Fishes Newport Bay, California	Identify fish species that could be used as surrogates for assessing ambient water quality relative to wildlife protection and human health concerns; examine food-web interactions of DDTs, PCBs, and trace metals in fish. http://www.sccwrp.org/
15	Storm Drain Inlet Modifications and Implement Circulation Measures	Source abatement at Newport Bay. http://www.city.newport-beach.ca.us/Pubworks/pwmain.htm

Groundwater Supply

The Orange County Groundwater Basin (the Basin) is located throughout the majority of the San Diego Creek subwatershed (see *Figure 2.2*). Resolution No. R8-2004-0001, which was adopted by the Santa Ana RWQCB and amended the Water Quality Control Plan, contains several revisions that affect waters within the region. Specifically, the Irvine Forebay I, Irvine Forebay II, and Irvine Pressure groundwater basins were amalgamated into one groundwater management

zone called the Irvine Management Zone for groundwater quality purposes. Within OCWD's Groundwater Management Plan, the area is called the Irvine Subbasin.

The Irvine Subbasin is bounded by the San Joaquin Hills to the south and the foothills of the Santa Ana Mountains to the northeast (Wildermuth 2000). The boundary with the Main Basin is approximately aligned along Interstate Highway 55 and Newport Boulevard. The Irvine Subbasin and Main Basin, while hydraulically continuous, are distinct in that they have separate recharge zones; the thickness of the water-bearing alluvium increases substantially from Irvine to the central portion of the main basin; and the permeability of the water-bearing alluvium increases substantially from Irvine to the central portion of the main basin. The percentage of clay and silt is much higher in the Irvine Subbasin than in the main basin (USGS 2002).

Groundwater in the Irvine Subbasin flows westward from the forebay areas into the pressure area. The pressure area, in a general sense, is defined as the area where surface waters and near-surface groundwater are impeded from percolating in large quantities into the major productive aquifers by clay and silt layers at shallow depths (upper 50 feet). Most of the central and coastal portions of the basin fall within the pressure area (OCWD 2004). Groundwater flow direction can vary locally due to variations in climate and groundwater production patterns; however, the prevailing flow direction remains westward (Wildermuth 2000). The depth to groundwater in the basin is known to vary based on the permeability characteristics of the subsurface soils, irrigation, groundwater pumping, and groundwater recharge.

The Irvine Subbasin is divided into three groundwater aquifers referred to as the shallow, principal, and deep aquifers (OCWD 2004). The shallow aquifer is unconfined, is of poor quality, and is generally not used for municipal supply. Details regarding each of these aquifers are presented in *Table 2.13, Irvine Groundwater Aquifers*.

Table 2.13
Irvine Groundwater Aquifers

Aquifer	Description	Thickness
Shallow	System of unconfined semi-perched aquifers in Pleistocene marine terrace deposits that is generally not used for domestic or agricultural supply. Consists mostly of fine sands, silts, and clays. In the vicinity of the Upper Newport Bay, the shallow aquifer discharges to Upper Newport Bay.	1 to 180 feet
Principal	The principal aquifer is where the majority of the water is produced. It includes an alluvial sequence of interbedded sands and gravels with silts and clays.	400 to 1,000 feet
Deep	The deep aquifer consists of fine- to coarse-grained sands. It is rarely used for supply due to economical constraints and slight brownish tint. IRWD began pumping and treating approximately 7,400 acre-feet per year in 2002. Water in the deep aquifer contains fewer minerals than in other areas of the basin.	1,000 to 3,000 feet

Source: USGS 2005.

Table 2.12 is an overall generalization of a fairly complex aquifer system, and the depths of the three aquifer units described above vary based on location. For instance, the units thin and converge at the basin margins, and the principal aquifer is located at much shallower depths in these areas.

Based on the studies and modeling conducted by OCWD, the Orange County Groundwater Basin stores approximately 66 million acre-feet of water, although only a fraction can be removed without causing physical damage, such as seawater intrusion or land subsidence (OCWD 2004). The Basin is not operated on an annual safe-yield basis, and it has historically been overdrafted. OCWD has developed a hydrologic budget (with inflows and outflows balanced) to evaluate Basin production capacity and recharge requirements. The budget factors in recharge, groundwater production, and flows along the coast and across the Los Angeles/Orange County line. The budget shown in *Table 2.14, Representative Basin Water Budget,* is based on the following assumptions: (1) average precipitation; (2) accumulated overdraft (400,000 acre-feet from full); (3) recharge at Forebay facilities equal to current maximum capacity of 250,000 acre-feet per year; and (4) adjusted groundwater production to balance inflows and outflows (OCWD 2004).

Table 2.14
Representative Basin Water Budget

INFLOW	Acre Feet
Measured Recharge	
1. Forebay spreading facilities, current maximum, including imported water	250,000
2. Talbert Barrier injection, current maximum	12,000
3. Alamitos Barrier injection, Orange County only	2,500
Unmeasured Recharge (average precipitation)	
1. Inflow from La Habra Basin	3,000
2. Santa Ana Mountain recharge into Irvine subbasin	13,500
3. San Joaquin Hills recharge into Irvine subbasin	500
4. A real recharge from rainfall/irrigation (Forebay area)	13,000
5. A real recharge from rainfall/irrigation (Pressure area)	4,500
6. Chino Hills recharge into Yorba Linda subbasin	6,000
7. Subsurface inflow at Imperial Highway beneath SAR	4,000
8. SAR recharge between Imperial Highway and Rubber Dam	4,000
9. Subsurface inflow beneath Santiago Creek	10,000
10. Peralta Hills recharge into Anaheim/Orange	4,000
11. Tustin Hills recharge into City of Tustin	6,000
12. Seawater inflow through coastal gaps	2,000
Subtotal:	*70,500*
TOTAL INFLOW	335,000
OUTFLOW	
1. Groundwater Production	327,000
2. Flow across Orange/Los Angeles County line, est. at 400,000 acre-feet accumulated overdraft	8,000
TOTAL OUTFLOW	335,000
CHANGE IN STORAGE: 0	0

Note: The representative water budget has equal (balanced) total inflow and total outflow and does not represent data for any given year.
Source: OCWD 2004.

OCWD replenishes the Basin through the use of recharge basins located outside of the study area for this IRCWM Plan. In November 2007, the Groundwater Replenishment System will begin operating, which will use advance treated wastewater from OCSD's reclamation plant for groundwater recharge and seawater barrier. The first phase of the Groundwater Replenishment System will provide an estimated 70,000 acre-feet per year for recharge, with a maximum project size of 110,000 acre-feet year. One of the key factors for future phases is the availability of sufficient secondary treated wastewater flows from OCSD.

Recharge to the Irvine Subbasin occurs through infiltration of flow within the unlined stream channels, underflow from the saturated alluvium and fractures within the bordering bedrock, and from precipitation and irrigation (Wildermuth 2000). As groundwater production increases in the subbasin to where it exceeds recharge, groundwater will flow from the main basin into the subbasin. As noted in *Table 2.13*, unmeasured recharge to the Irvine Subbasin based on average precipitation is approximately 20,000 acre-feet per year.

There are approximately 500 active wells within OCWD's boundaries, with an estimated 300 wells producing less than 25 acre-feet per year (OCWD 2004). All large-capacity wells are metered, and individual well production is documented monthly. OCWD manages groundwater production from the groundwater basin through setting an annual basin pumping percentage (BPP) based on net water available for pumping divided by net total water demands from the previous year. The BPP is directly related to hydrologic conditions and recent groundwater production. Water available for future basin pumping is estimated at approximately 357,000 acre-feet in 2007-2008, increasing to 367,104 acre-feet in 2010-2011 (OCWD 2006). Producers pay a Replenishment Assessment for groundwater production up to the BPP; production that exceeds the BPP is assessed an additional higher-cost Basin Equity Assessment charge to cover the cost of replenishing that groundwater. Through this methodology, OCWD is able to manage the basin resources and provide financial incentive for producers to work cooperatively in reducing any overdraft.

Groundwater production has doubled since 1954, and increasing use is anticipated as agencies seek to reduce dependence on imported water. OCWD has developed a draft Long-Term Facilities Plan that identifies and evaluates projects that could increase the sustainable yield of the basin in a cost-effective manner to the highest possible amount. The Plan also identifies projects to protect and enhance groundwater quality and protect the coastal portion of the basin.

Groundwater Quality

The Orange County Groundwater Basin is currently recharged by streambed percolation, recycling programs, and imported water purchases. OCWD monitors the quality of the Groundwater Basin extensively, testing for over 190 constituents, including nitrate, salts,

selenium, trichloroethylene, volatile organic compounds, and radon to ensure potable quality. OCWD and OCSD are also implementing the new Groundwater Replenishment System, scheduled to be on-line in 2007, which will take highly treated wastewater from the OCSD Water Reclamation Plant and purify it using micro-filtration, reverse osmosis, and ultraviolet light and hydrogen peroxide before percolating it into the basin. Water produced by this system is expected to be so pure it will actually help to reduce the growing mineral content in the basin and will exceed all state and federal drinking water standards (OCWD 2005).

Individual water districts, such as IRWD, also test their domestic groundwater sources. IRWD, which serves the majority of the planning area, obtains domestic groundwater from two sources: the Irvine Subbasin, which is located within the Orange County Groundwater Basin, and Lake Forest, which does not overlie the Orange County Groundwater Basin. The Irvine Subbasin is mainly used for non-potable water, as the groundwater is high in TDS, nitrates, and has color. Additionally, the groundwater obtained from the six Lake Forest wells have poor quality and are used as non-potable water to supplement IRWD's recycled water production. Water quality for groundwater from these two areas is presented in *Table 2.15, Select Groundwater Concentrations in 2005*.

Table 2.15
Select Groundwater Concentrations in 2005

Analyte	Dyer Road Well Field (Irvine Subbasin)		Lake Forest Wells		
	Concentration Range	Average Concentration	Concentration Range	Average Concentration	Concentration Limit (MCL)
Nitrate and Nitrite as Nitrogen	ND-1.9 mg/l	<0.4 mg/l	ND-1.3 mg/l	0.6 mg/l	10 mg/l
Nitrate as Nitrate	ND-8.2 mg/l	<2 mg/l	ND-5.7 mg/l	2.6 mg/l	45 mg/l
Arsenic	ND-9.0 ug/l	<2 ug/l	3.3-5.7 ug/l	4.3 ug/l	0.004 ug/l
PCE	ND-0.9 ug/l	<0.5 ug/l	ND	<5 ug/l	5 ug/l
Color	ND-500	41	5-10	8	15
Iron	ND-172 ug/l	<100 ug/l	170-490 ug/l	300 ug/l	300 mg/l
Manganese	ND-22 ug/l	<20 ug/l	ND-75 ug/l	44 ug/l	50 ug/l
TDS	208-394 mg/l	263 mg/l	450-850 mg/l	670 mg/l	1,000 mg/l
Perchlorate	ND-6.1 ug/l	<4 ug/l	ND	<4 mg/l	N/A

Source: IRWD 2006 Water Quality Annual Report, Dyer Road Wellfield Data.

As shown in *Table 2.15*, color is a water quality issue in portions of the Groundwater Basin, including areas where groundwater is produced for the City of Costa Mesa. Colored water is generally a problem in the deeper aquifer.

High TDS in portions of the Irvine Subbasin present a water quality issue. High TDS in other areas of the Groundwater Basin are due to seawater intrusion.

Nitrogen concentrations in the study area groundwater, especially shallow groundwater, have been high. Several studies have indicated that the high nitrogen concentrations are a result of the historical agricultural practices in the area.

Selenium is an issue in shallow groundwater throughout the watershed High selenium concentrations are mainly found in the Peters Canyon Wash sub-watershed; however, high concentrations are also found in the vicinity of MCAS–Tustin. Selenium concentrations in groundwater sources in the main subbasins of the San Diego Creek Watershed from 1999-2005 are presented in *Table 2.16, Selenium Concentrations in Groundwater Sources*.

Table 2.16
Selenium Concentrations in Groundwater Sources

Sub-watershed	Range of Selenium Concentrations (ug/l)	Concentration Limits (ug/l)
San Diego Creek, Reach 1	3.15-187	2-5
San Diego Creek, Reach 2	1.87-12.8	2-5
Peters Canyon Wash	2.6-270	2-5
Santa Ana-Delhi Channel	7.69-106	2-5

Source: Sources and Loads and Identification of Data Gaps for Selenium – Nitrogen and Selenium Management Program.

OCWD and local water districts have implemented water quality projects in the study area to treat the groundwater. These projects include the Irvine desalter project to remove nitrates, TDS, and volatile organic compounds (VOCs); the Tustin desalter and nitrate projects to remove TDS and nitrates; the IRWD Deep Aquifer Treatment to remove color and organics; and the MCWD colored water program.

The Irvine desalter program focuses on groundwater in central Irvine, specifically in the vicinity of the former MCAS–El Toro facility. In addition to high TDS and nitrate concentrations, groundwater in this area was found to contain concentrations of VOCs due to former use and disposal of solvents related to aerospace use. A 1 mile-by-3 mile plume of VOC contamination extends off of the former MCAS–El Toro. The Tustin desalter program is a similar program located in the northern portion of Tustin.

2.5.2 Newport Coast Watershed

The Newport Coast Watershed is shared by several jurisdictions. Most of this watershed was annexed by the City of Newport Beach in 2002, although the southernmost portion, beginning at Morro Canyon, is within the County of Orange's jurisdiction. The northern portion of the watershed is within the Santa Ana RWQCB boundary, and the southern portion is within the San

Diego region. Only the portion of the watershed within the jurisdiction of the Santa Ana RWQCB is included in this IRCWM Plan.

Surface Water

Eight coastal canyon drainage areas, defined by their canyon creeks, are included in the Newport Coast Watershed for this IRCWM Plan, including:

- Buck Gully: Reaches 1, 2, and 3
- Morning Canyon: Reaches 1 and 2
- Pelican Point, Pelican Point Middle Creek, Pelican Point Waterfall Creek
- Los Trancos Creek (and Crystal Cove Creek)
- Muddy Creek
- Morro Creek.

Most of the canyon creeks in the upper portions of the drainage areas are steep natural channels. Several are developed in both the upper and lower portions and contain concrete storm drain outlets. Unpaved access roadways and hiking trails exist in several canyons but are generally not maintained. The lower portions of the steep canyon creek channels have been subject to erosion impacts caused by increased and longer sustained peak flows. These flows are a result of increased impervious surfaces, introduction of invasive/exotic species of vegetation, and greater number of channelized/piped flows into the canyons. Flow data from the Newport Coast Flow and Water Quality Assessment study completed in 2006 are shown in *Table 2.17, Wet Weather Flow Data,* and *Table 2.18, Dry Weather Flows Per Unit Area* (Weston 2006).

Table 2.17
Wet Weather Flow Data

Station ID	Unit Modeled Flow (cfs)
Buck Gully	
BG1	1.18
BG2	1.08
BG3	1.03
BG4	0.89
BG5	0.69
BG6	0.46
BG7	0.29
Morning Canyon	
MCD	0.36
Pelican Point	
PP1	0.02
PPM	0.22
PPW	0.13

Table 2.17
Wet Weather Flow Data

Station ID	Unit Modeled Flow (cfs)
Los Trancos Canyon	
LTD*	1.10
Muddy Canyon	
MCC	0.93
El Morro Canyon	
EMD*	2.00

*Dry weather flows are diverted at these sites

Table 2.18
Dry Weather Flows Per Unit Area

Station ID	Unit Modeled Flow (cfs)
Buck Gully	
BG1	0.43
BG2	0.39
BG3	0.37
BG4	0.32
BG5	0.25
BG6	0.17
BG7	0.10
Morning Canyon	
MCD	0.13
Pelican Point	
PP1	0.01
PPM	0.08
PPW	DRY
Los Trancos Canyon	
LTD*	
Muddy Canyon	
MCC*	
El Morro Canyon	
EMD	0.72

*Dry weather flows are diverted at these sites

Surface Water Quality

In recent years, the Newport Coast Watershed, like much of Orange County, has faced watershed problems involving streambed instability as exhibited by head-cutting and slope failures, the arrival of invasive plant species, and the loss of native wetland and riparian habitat. Seven of the canyon streams now flow year-round due to over-irrigation in the upstream developments. It is suspected that the dry-weather flows carry bacteria, fertilizer, and pesticides through the canyon

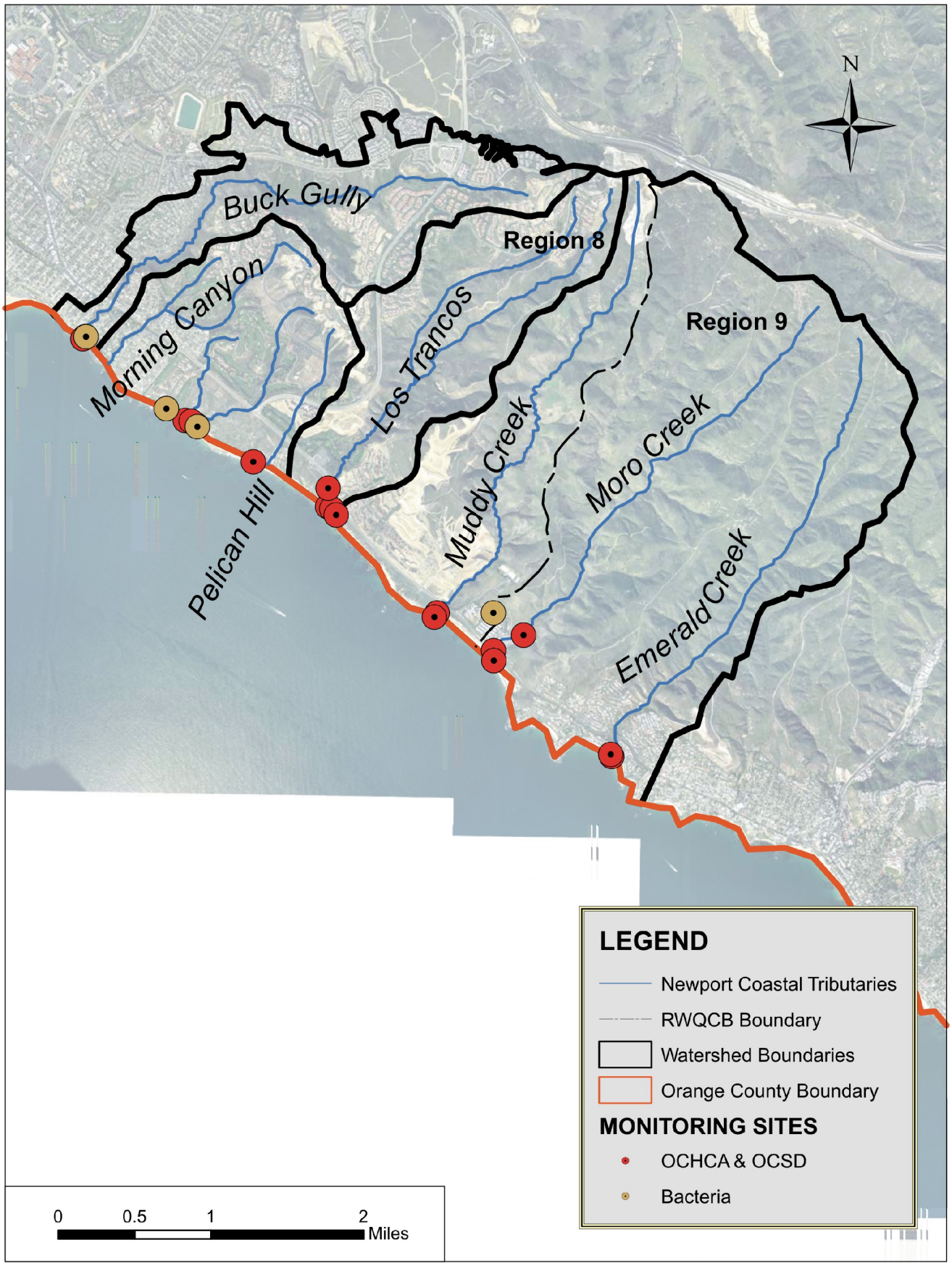
reaches and into the ocean. These problems have become progressively worse and pose a threat to residences, the two ASBSs, Crystal Cove State Park, and the ecological function of the riparian corridors within the watershed. A piecemeal approach to dealing with these problems has been ineffective due to the technical, jurisdictional, and financial hurdles that must be simultaneously addressed.

Over the past 40 years, the Orange County Health Care Agency has been testing the coastal waters in Orange County for bacteria. As of 1999, new requirements for frequent testing of surf zone waters and stringent criteria for beach water closures went into effect as part of Assembly Bill 411. Samples from the watershed are collected weekly by the Health Care Agency from 10 ocean, bay, and drainage locations (County of Orange 2003*)*. The Irvine Company, IRWD, Surfrider Foundation, and Orange County Coastkeeper have performed limited water quality sampling as well. The results of these sampling programs are currently being reviewed. Monitoring programs are specifically geared toward providing information that can be used to develop programs to protect the two ASBSs (Newport Coast Watershed Program 2004*)*. Monitoring locations are shown in *Figure 2.11, Newport Coastal Watershed Monitoring Stations*.

In accordance with the Clean Water Act, the Santa Ana Regional Board in 2006 placed Buck Gully Creek and Los Trancos Creek on the draft 303(d) list for total coliform and fecal coliform (see *Figure 2.1*). The Orange County coastline, which runs along over 5 miles of the Newport Coast Watershed, is also listed on the draft 303(d) list for trash.

A confluence of separate investigations and projects are being carried out in the Newport Coast Watershed by the City of Newport Beach, the Irvine Company, the County of Orange, IRWD, Orange County Coastkeeper, and the Surfrider Foundation. In order to address the destabilization and degradation of the watershed's coastal canyons in a systematic and effective manner, the City of Newport Beach is developing a watershed program for the Newport Coast as an organizing tool for future activities in the watershed.

As part of this program, a flow and water quality assessment has been performed for the watershed to assess the extent and magnitude of the current or potential problems in the eight Newport Coast canyons and the two ASBSs where these creeks flow into. The most frequently exceeded and widely detected exceedances of the water quality objectives were observed for bacteriological indicators, followed by dissolved cadmium. Specific finding include:



Source: Orange County 2003

Central Orange County Integrated Regional and Coastal Watershed Management Plan

Newport Coastal Watershed Monitoring Stations

FIGURE 2.11

- The exceedances for fecal indicator bacteria were observed for all coastal canyons for multiple storm events (see *Exhibit 2.E*). Comparison of the observed Enterococcus and total coliform concentrations to water quality objectives for ocean samples for indicate exceedances in the mixing zone samples at Buck Gully and El Morro (Enterococcus only).

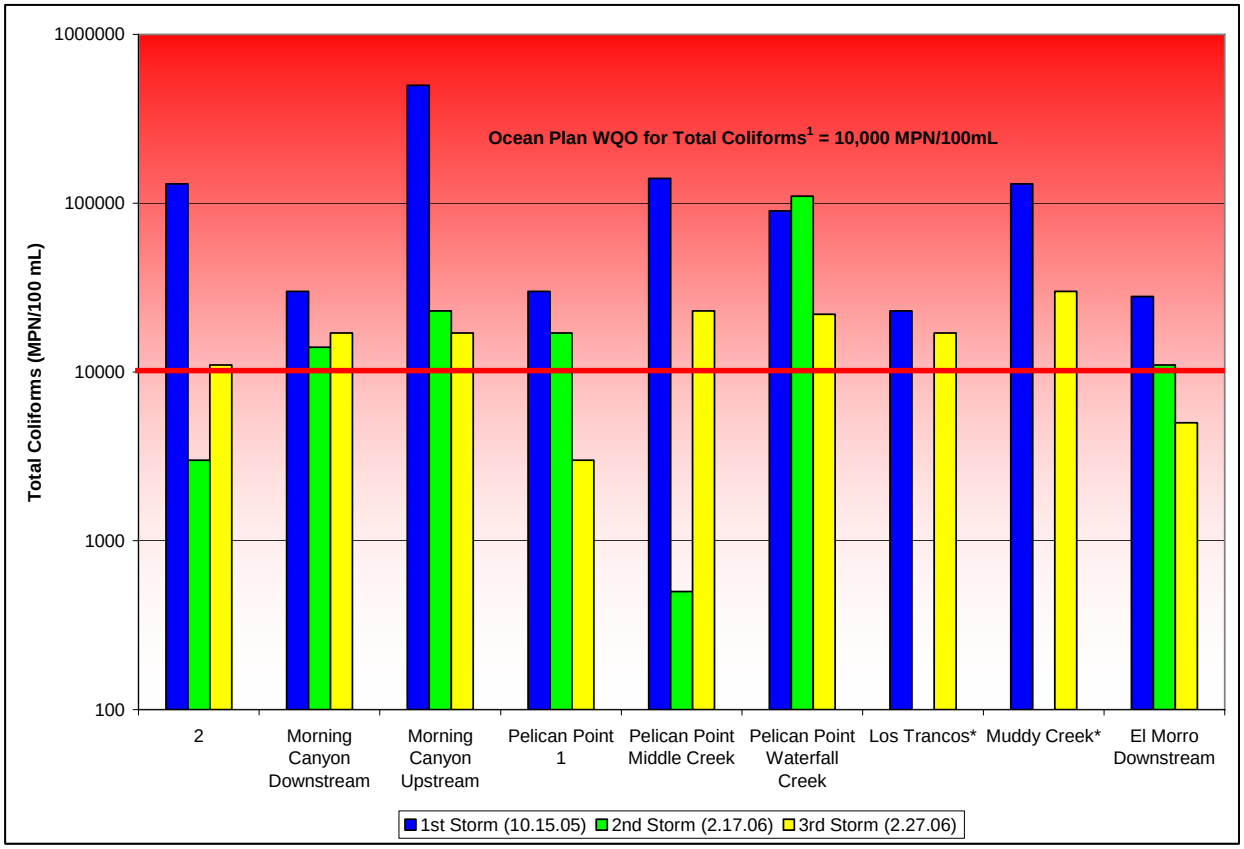
- Exceedances of water quality objectives for fecal coliform bacteria concentrations were limited to dry weather samples to Pelican Point, Upper Los Trancos and Muddy Creek. Of these, Los Trancos and Muddy Creek are diverted to the sewer system during weather.

- The findings from the development of load duration curves for Buck Gully indicate that predicted exceedances of the fecal indicator bacteria load allocation for Buck Gully would occur during wet weather events in the absence of measures to reduce the overall current loads. Dry weather flows would not exceed the load allocation.

- In addition to bacteriological indicators, dissolved cadmium concentrations exceeded water quality objectives in wet and dry weather flows in Pelican Point Middle Creek and Morning Canyon Downstream (see *Table 2.19*). The highest concentrations for wet weather events were Pelican Point Waterfall Creek and Morning Canyon (see *Exhibit 2.F*), and for dry weather samples at Pelican Point Middle Creek, which was an order of magnitude greater than the concentration detected at Buck Gully. An evaluation of total loads for dissolved cadmium using modeled annual flows showed the highest annual loads from Morning Canyon and Pelican Point Middle Creek, even though these are much smaller watersheds.

- Exceedances of dissolved copper concentrations were found in two canyons during storm flows (see *Exhibit 2.G*)

Exhibit 2.E
Total Coliform Results during Wet Weather



* Los Trancos and Muddy Creek sites were not sampled during the second wet weather event. The data from the third storm event was collected by the Irvine Company.

[1] The Ocean Plan WQO is applicable to ocean samples only and is presented as a reference.

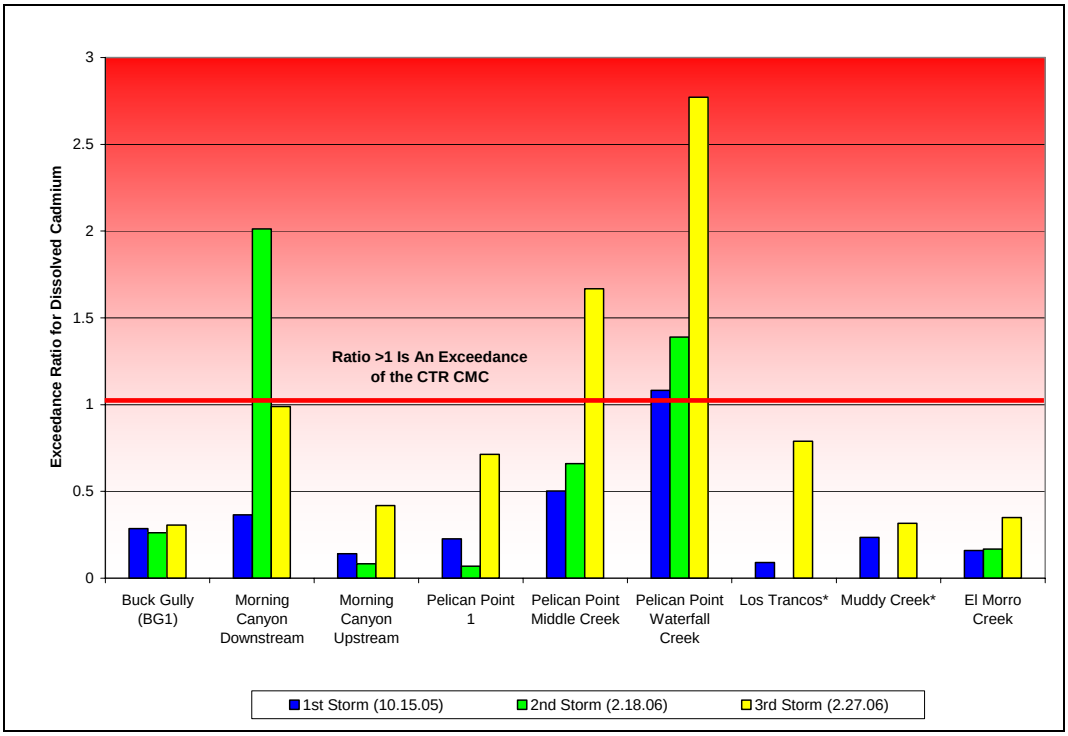
The relative urban runoff contribution to the problems in the eight coastal canyons and the ASBSs are assessed as follows.

1. Dry weather flows deliver the preponderance heavy metal loads to the ocean that exceed water quality objectives.
2. An opposite conclusion was found for dissolved metals where the largest loadings are due to storm flows.
3. The results of the analysis of contributions to the total estimated annual load for bacteriological indicators found that wet weather flows contribute the greatest portion of total load.
4. The bacterial load contribution from wet weather flows was an order of magnitude higher than those from the dry weather flows for both fecal coliform and Enterococcus.
5. Substantial nitrate and phosphate concentrations found in the canyon watershed.

Based on the Groundwater Seepage Study prepared by Todd Engineers (2006), the use of imported water for irrigation has resulted in a groundwater mound in the Buck Gully, Morning Canyon and Pelican Point watersheds. The Groundwater Seepage Study also suggested that the quality of the dry weather flows is significantly influenced by the quality of the infiltration waters and the groundwater seeps. Analysis of groundwater seeps by Todd Engineers for chloride and sulfate indicated higher concentrations of these constituents downgradient of potential sources compared to upstream samples. The Draft Groundwater Seepage Report indicated that the golf course at Pelican Point may increase concentrations of these constituents through the use of soil amendments and provide a migration pathway through irrigation.

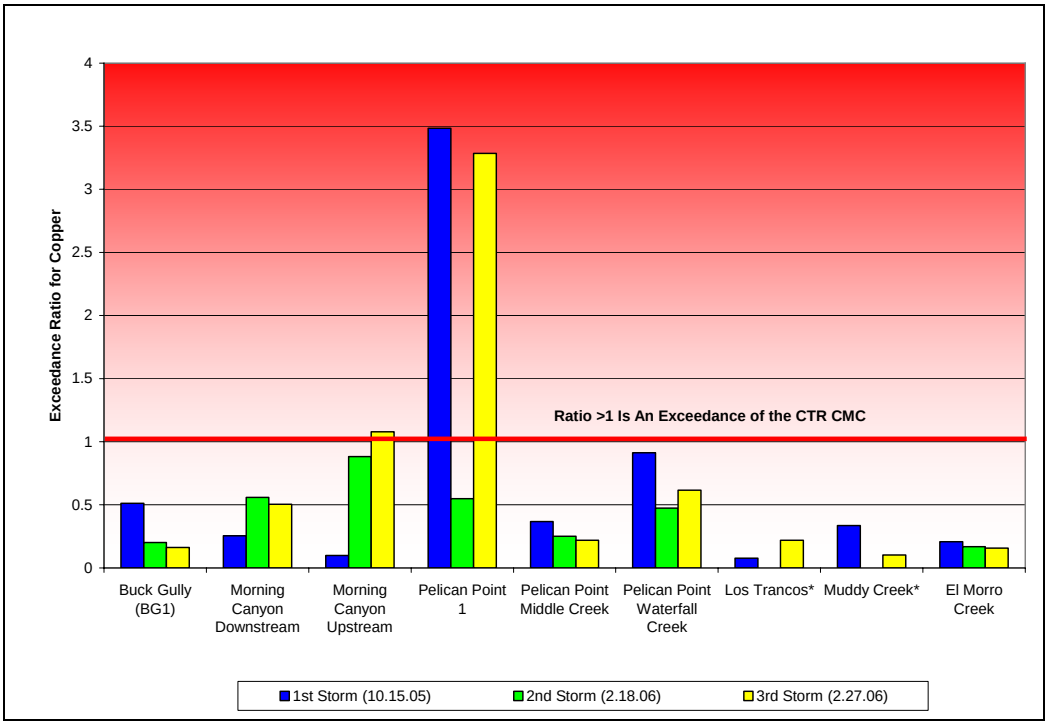
Exhibit 2.F

Exceedance Ratio for Wet Weather Dissolved Cadmium Results



* Los Trancos and Muddy Creek sites were not sampled during the second wet weather event. The data from the third storm event was collected by the Irvine Company.

Exhibit 2.G
Exceedance Ratio for Wet Weather Dissolved Copper Results



* Los Trancos and Muddy Creek sites were not sampled during the second wet weather event. The data from the third storm event was collected by the Irvine Company.

Table 2.19
Newport Coast Dry Weather Exceedances

Constituent		Copper			Cadmium			Total Coliforms	Fecal Coliforms	Enterococcus
		Dissolved	Total		Dissolved	Total				
Units		µg/L	µg/L		µg/L	µg/L		MPN/100mL	MPN/100mL	MPN/100mL
WQO		**29.28**	**12**	**30.5**	**6.22**	**4**	**7.31**	**10,000**	**400**	**105**
WQO Source		CTR CCC[1] (Hardness > 400)	Ocean Plan Daily Max	CTR CCC[1] (Hardness > 400)	CTR CCC[1] (Hardness>400)	Ocean Plan Daily Max	CTR CCC[1] (Hardness>400)	Ocean Plan[2]	Ocean Plan[2]/ Basin Plan[3]	Ocean Plan[2]
BGO	**(9.27.05)**	0.754	2.85		<0.005	**4.58**		300	<20	**228**
BG1	**(9.27.05)**	9.06	1.09		1.12	3.36		3000	230	213
	(2.13.06)	11.1	11		**6.39**	**9.01**		170	40	121
EMO	**(9.27.05)**	0.475	1.54		<0.005	0.045		<20	<20	<10
EMD	**(9.27.05)**	5.26	0.199		0.87	1.48		500	300	<10
	(2.13.06)	6.08	5.64		2.67	3.34		500	40	30
BG2	**(9.27.05)**	8.91	9.52		2.07	3.58		5000	210	327
BG3	**(9.27.05)**	8.5	9.48		2.13	3.92		1700	220	121
	(2.13.06)	11	11.4		**6.23**	**7.96**		500	40	52
BG4	**(9.27.05)**	7.75	7.47		2.52	5.47		800	130	52
	(2.13.06)	9.4	10.5		4.85	**8.01**		220	20	20
BG5	**(9.27.05)**	3.97	5.69		0.95	0.96		500	40	20
BG6	**(9.27.05)**	2.09	3.41		0.48	0.34		1700	300	63
BG7	**(9.27.05)**	2.9	3.62		0.51	0.61		800	130	84
	(2.13.06)	5.14	3.59		3.04	3.35		170	70	63
MCD	**(9.27.05)**	15	17.2		**26.2**	**36.7**		2300	40	480
MCU	**(9.27.05)**	6.7	7.6		2.26	2.44		1700	300	279
PP1	**(9.27.05)**	6.55	9.58		2.82	3.75		30000	**1400**	798
PPM	**(9.27.05)**	**35.1**	12.8		**100**	**105**		270	<20	73
LTU	**(9.27.05)**	10.3	11.8		3.51	**12.3**		3000	**2300**	613
MCC	**(9.27.05)**	7.16	5.88		1.11	1.34		5000	**800**	132

[1] CTR CCC = The California Toxic's Rule Criterion Continuous Concentration (chronic criterion) defined as a four-day average concentration limit (EPA 65 FR 31682).

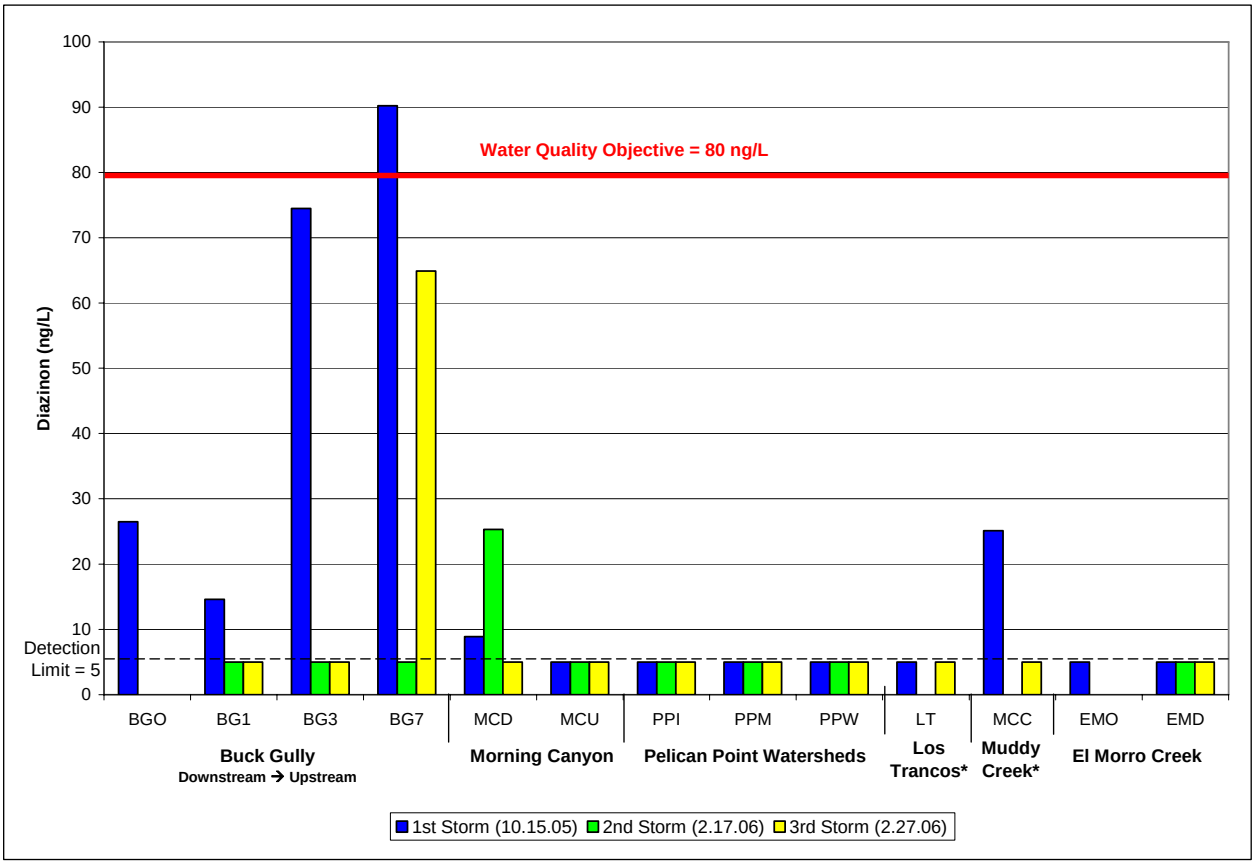
[2] The Ocean Plan WQOs for total coliforms, fecal coliforms, and Enterococcus are single sample objectives for samples collected in the ocean and do not apply to freshwater samples.

[3] The Basin Plan WQO for fecal coliforms states, "the log mean [must be] less than 200MPN/100mL based on five or more samples/30 day period, and not more than 10% of the samples exceed 400 MPN/100mL for any 30-day period." Therefore, as a conservative approach, the WQO presented here assumes that one samples would equal 10% of the monthly samples, and a result greater than 400MPN/100mL would exceed the WQO.

A monitoring program will specify biological indicators and metrics to assess and monitor ecosystem health relative to watershed function. Examples of applicable indicators include biomass of native riparian wetland vegetation, habitat use by declining or sensitive species, attached fresh-water algae, aquatic macro-invertebrate diversity and distribution, and the health and diversity of intertidal and subtidal communities in the marine life refuges. Additional indicators will be selected in consultation with the Santa Ana RWQCB and the County of Orange. In addition, the watershed program will include a program for mapping the areas of *Arundo* and instituting a removal program.

Diazinon was found in several stormwater samples in Buck Gully and Morning Canyon (see *Exhibit 2.H*).

Exhibit 2.H
Diazinon Results During Wet Weather Events



* Los Trancos and Muddy Creek sites were not sampled during the second wet weather event. The data from the third storm event was collected by The Irvine Company.

Six objectives have been put forth by the Newport Coast Watershed Program (Newport Coast Watershed Program 2004), several of which are already being implemented:

- Complete the technical studies and prepare the watershed assessment report for the watershed management area (this has been completed);
- Implement a monitoring program for baseline data and ongoing monitoring to track changes in the watershed (in process);
- Prepare a Watershed Management Plan that provides specific restoration recommendations for each of the coastal streams with attendant ecological benefits for the intertidal and subtidal communities in the ASBSs (an internal draft has been prepared);
- Implement specific stabilization and restoration projects in Buck Gully and Morning Canyon within the framework of the Watershed Management Plan;
- Provide educational opportunities for city staff, community members, and stakeholders in watershed science and management skills and enlist community support in monitoring and restoring the health of the watersheds and marine life refuges (in process); and
- Expand the scope of the watershed management program, including researching funding opportunities for subsequent restoration projects as outlined by the Watershed Management Plan.

Major efforts being conducted within the watershed to reduce non-point source releases and improve water quality as identified in the June 2006 *State of the CCAs Report for Upper Newport Bay* include:

1	**Working At the Watershed Level Science & Stewardship Program & Earth Resources Foundation High School Clubs**	Modules on understanding importance of a healthy watershed, urban refuse collection, data collection, source identification, and bioassessment. Program enhances the teachers' opportunity to involve students in science. http://earthresource.org/
2	**Newport Coast Watershed Program: Assessment, Management and Restoration**	Complete watershed assessments (survey, hydrologic/hydraulic, biological/ecological, water quality, and sedimentation), prepare restoration recommendations, and implement stabilization and restoration projects. http://www.city.newport-beach.ca.us/Pubworks/pwmain.htm
3	**Orange County CoastKeeper**	Mission is to protect and preserve Orange County's marine habitats and watersheds through education, advocacy, restoration, and enforcement. www.coastkeeper.org

Streamflow and surface water quality data are lacking due to limited dry weather flows in the past. A program has been developed by the City of Newport Beach to monitor dry weather flows and water quality in Buck Gully (City of Newport Beach 2007). Additionally, a program is being developed by the City of Newport Beach to evaluate pollutant loads in the drainages in the Newport Coast Watershed.

Groundwater

While a groundwater basin has not been identified in the Santa Ana RWQCB Basin Plan for the Newport Coast Watershed, groundwater is present in the watershed (City of Newport Beach 2007). According to the City of Newport Beach, groundwater seepage occurs in Buck Gully and Crystal Cove State Park, located at the exit of Los Trancos Creek at the Pacific Ocean. A pumping experiment in Buck Gully in 1999 indicated that groundwater exfiltration provides a significant amount of water to dry-weather flows in the canyon. A groundwater seepage study is now underway to begin to identify sources, quantities, and quality.

2.6 Imported Water

Approximately 34 percent of Central Orange County's current potable water needs are met by imported water delivered through the State Water Project and Colorado River Aqueduct. The majority of imported potable water is supplied from a single source; the MWD Diemer Filtration Plant (DFP) located north of Yorba Linda. Typically, the DFP receives a blend of Colorado River water from Lake Matthews through the MWD lower feeder and State Water Project (SWP) water through the Yorba Linda feeder.

The two major transmission pipelines that deliver DFP water to the service areas are the Allen-McColloch Pipeline (AMP) and East Orange County Feeder No. 2 (EOCF #2). In addition to DFP imported water, potable water is also received from the Weymouth Filtration Plant via the Orange County feeder. As shown in *Figure 2.3,* this system is shared regionally with other water agencies in south Orange County and north Orange County. The agencies understand the critical condition of water supplies throughout the state and western United States and are actively working to enhance local water supplies and decrease reliance on imported supply.

Untreated water is also delivered from the MWD system. Within the region, untreated imported water is used primarily to meet agricultural demands and supplement landscape irrigation demands. Agricultural demands within IRWD are expected to decline in future years as development occurs, and landscape irrigation demands will be partially met with an increased supply of recycled water. The Irvine Lake Pipeline conveys MWD untreated water and local runoff from Irvine Lake to the Lambert Reservoir (Irvine Company owned). Connections along the Irvine Lake Pipeline serve The Irvine Company irrigation system and the IRWD recycled water distribution system. The Baker Aqueduct also delivers MWD untreated water to central and south Orange County. Utilization of the Baker Pipeline has declined due to the use of AMP and decline of area agriculture.

Imported Water Quality

As stated in MWD's Regional Urban Water Management Plan and Integrated Resources Plan, MWD's planning efforts have acknowledged the importance of water quality and have set specific targets for imported water. Each of MWD's sources has specific quality issues or concerns, and, to date, MWD has not identified any water quality risk that cannot be mitigated. The only potential effect of water quality on the level of imported water supplies available could be increases in the salinity of water sources. If diminished water quality caused a need for membrane treatment, MWD could experience water losses of up to 15 percent of the water processed. However, MWD would only process a small portion of the affected water and reduce salinity by blending processed water with the remaining unprocessed water. Thus, MWD

anticipates no significant reductions in water supply availability due to water quality concerns (Metropolitan 2005).

2.7 Recycled Water

The Central Orange County region benefits from an extensive wastewater treatment and recycled water delivery system, such that recycled water is a reliable source of supply in large portions of the region. Recycled water is provided by IRWD and the OCWD's Green Acres Project.

IRWD has an extensive dual distribution system, which delivers recycled water from the MWRP and the Los Alisos Water Reclamation Plant. The recycled water system currently serves agricultural and nonagricultural irrigation demands and other non-potable uses. The quality of wastewater effluent used for landscape irrigation and agriculture complies with Title 22, Division 4, of the California Administrative Code, Department of Health Services. The MWRP has permitted treatment capacity of 18 mgd, and Los Alisos Water Reclamation Plant has permitted capacity of 7.5 mgd for secondary treatment and 5.5 mgd for recycled water production.

Approximately 35 percent of all wastewater collected within IRWD's service area does not go to the MWRP or the Los Alisos Water Reclamation Plant but is currently served by OCSD, Santa Margarita Water District or ETWD. There are future plans to divert some of these other area flows to IRWD's treatment facilities. *Table 2.20, IRWD Wastewater Collected and Recycled Water Production,* summarizes current and projected wastewater collected by IRWD, treated to recycled water standards and disposal.

Table 2.20
Wastewater Collected and Recycled Water Production (mgd)

	2000	2005	2010	2015	2020	2025	2030
IRWD							
Wastewater Collected	16.71	18.64	22.33	23.63	24.91	26.11	26.37
Wastewater Treated to recycled standard	14.81	13.97	16.75	17.73	18.68	19.58	19.78
Wastewater collected and treated by others							
OCSD	9.5	11.3	12.8	13.6	14.5	14.8	14.9
Santa Margarita WD or El Toro WD	.9	1.1	.5	.5	.5	.5	.5

Source: IRWD Urban Water Management Plan, 2005.

The OCWD's Green Acres Project is a recycled water supply project that delivers irrigation and industrial process water. Most of the water is used for irrigation of golf courses, greenbelts, cemeteries, and nurseries. The project was initiated in 1991 and produces approximately 7,700

acre-feet per year from clarified, secondary wastewater effluent from the OCSD and further treated by OCWD.

2.8 Desalted Water

Groundwater within certain areas of the Irvine Management Zone (Irvine Subbasin) has high nitrate and TDS concentrations, and two projects are being operated to improve groundwater quality. The Irvine Desalter Project is a joint groundwater quality restoration project by IRWD and OCWD, with financial participation by the U.S. Navy and MWD. In 1985, portions of the basin beneath the former MCAS–El Toro and the central area of Irvine were found to contain VOCs. A plume of contamination extends off the base and is currently moving toward the main basin. The Irvine Desalter Project consists of two water purification plants with separate wells and pipeline systems. One treatment plant removes TDS and VOCs from contaminated groundwater; the treated water is used for irrigation and recycled water purposes. A second purification plant treats water from outside the plume of contamination to remove TDS and nitrates; treated water is used for potable water supply (OCWD 2004). The Irvine Desalter Project will yield approximately 7,700 acre-feet per year of potable drinking water and 3,900 acre-feet per year of non-potable water, which will supplement IRWD's non-potable system (IRWD 2005).

The Tustin Seventeenth Street Desalter has been in operation since 1996 and reduces high nitrate and TDS concentration from the groundwater produced by Tustin's Seventeenth Street Wells Nos. 2 and 4 and Tustin's Newport well. During fiscal year 2001-2002, 354,000 pounds of nitrate per year were removed at this treatment facility (OCWD 2004). The facility yields approximately 2,100 acre-feet per year.

A number of sites in Southern California are currently being considered for ocean water desalination facilities. The Central Orange County region could someday receive potable water produced by one or more of these facilities. Most recently, an ocean water desalination facility is being proposed at a site in Huntington Beach. The proposed project consists of the construction and operation of a 50 million gallon per day ocean water desalination facility within the City of Huntington Beach. Currently, as proposed, the water agencies within the Central Orange County region would not be receiving any potential supplies from this plant to meet future water demands. MWD addresses seawater desalination on a regional basis in its 2005 Regional Urban Water Management Plan, and it is included in MWD's Integrated Resources Plan Update targets under local water production.

2.9 Balancing Water Supply and Demand

As noted above in *Section 2.4.1,* significant growth in population is expected within the Central Orange County region over the next 25 years. Water supply reliability is of paramount importance to the water agencies, and they participate in long-term planning efforts to develop diverse sources of supply, address infrastructure needs, and evaluate and test new groundwater treatment technologies. *Table 2.21, Retail Agency Water Sources Fiscal Year 2005,* summarizes reported water sources by water providers within the Central Orange County region for fiscal year 2005. Groundwater is the primary source of water supply for the region; this is expected to continue, with the percentages shifting even more toward groundwater and recycled water as agencies seek to decrease their dependence on imported water supplies

Table 2.21
Retail Agency Water Sources Fiscal Year 2005

Agency	Imported	Ground-water	Surface[1]	Recycled/Non-potable
El Toro Water District	95%			5%
Mesa Consolidated WD	52%	44%		4%
East Orange County WD, Retail	37%	63%		
Golden State Water Company	36%	64%		
Newport Beach, City of	33%	67%		
Santa Ana, City of*	33%	67%		
Orange, City of	32%	66%	2%	
Irvine Ranch Water District	21%	41%	8%	30%
Tustin, City of	16%	84%		

Source: Orange County Water Agencies Water Rates Study (2005).

[1] Surface water supplies are obtained from Irvine Lake, which is outside the San Diego Creek watershed boundary.

Water demand and supply projections for the water agencies within the Central Orange County IRCWM region are shown below in *Table 2.22, Central Orange County Water Demand Projections,* and *Table 2.23, Central Orange County Water Supply Projections.*

Table 2.22
Central Orange County Water Demand Projections

Water Agency	Water Demand Projections (acre-feet per year)					
	2005	2010	2015	2020	2025	2030
East Orange County Water District (Retail only)	1,026	1,110	1,130	1,140	1,150	1,170
El Toro WD	11,536	11,559	11,728	11,898	12,068	12,220
Irvine Ranch Water District	86,602	116,710	123,119	130,063	135,208	136,560
Mesa Consolidated Water District	21,849	21,982	22,083	22,193	22,303	22,401
City of Newport Beach	18,648	19,791	21,555	21,640	21,716	21,716

Table 2.22
Central Orange County Water Demand Projections

Water Agency	Water Demand Projections (acre-feet per year)					
	2005	2010	2015	2020	2025	2030
City of Orange	35,081	36,588	37,244	37,244	37,244	37,244
City of Santa Ana	44,944	52,700	55,840	58,770	62,240	62,520
Golden State Water Company	30,214	31,431	32,371	33,367	32,920	33,101
Total	249,900	291,871	305,070	316,315	324,849	326,932

Source: 2005 UWMPs for Agencies and MWDOC.

Note: Some service areas extend beyond the Central Orange County IRCWM region; estimates include water demand for the agency's entire service area.

Table 2.23
Central Orange County Water Supply Projections

Water Agency	Water Supply Projections (acre-feet per year)					
	2005	2010	2015	2020	2025	2030
By Agency						
East Orange County Water District	384	290	300	300	300	310
El Toro WD	11,446	11,559	11,728	11,898	12,068	12,220
Irvine Ranch Water District	86,602	116,710	123,119	130,063	135,208	136,560
Mesa Consolidated Water District	21,848	21,982	22,083	22,193	22,303	22,401
City of Newport Beach	18,648	19,792	21,556	21,640	21,716	21,716
City of Orange	77,354	91,421	91,421	91,420	91,420	91,421
City of Santa Ana	48,722	54,810	57,410	61,560	63,800	62,750
City of Tustin	11,450	12,870	12,850	12,890	12,850	12,810
Golden State Water Company	3,287	3,281	3,302	3,327	3,352	3,375
Total	279,741	332,715	343,769	355,291	363,017	363,563
By Supply Type						
Imported Water	95,954	100,066	107,402	114,079	115,764	115,519
Treated Groundwater Production	66,290	67,030	69,120	71,070	73,390	73,570
Clear Groundwater Production	9,598	31,208	33,286	35,526	37,679	37,973
Recycled Water	17,193	28,603	28,534	30,413	31,696	31,988
Orange County Groundwater Basin	42,097	56,238	56,238	56,238	56,238	56,238
Surface Diversions - SWD	1,000	1,000	1,000	1,000	1,000	1,000
Purchased MWD untreated	5,304	6,303	4,556	3,434	3,225	3,225
Native (surface water)	7,251	4,000	4,000	4,000	4,000	4,000
Non-potable Groundwater	2,285	3,898	3,898	3,898	3,898	3,898
Supplier produced (with CWTF)	19,281	19,298	19,312	19,328	19,585	19,617
OCWD (Lower Santa Ana Basin)	11,927	13,590	14,921	14,778	14,990	14,960
Water Supplies from EOCWD	1,561	1,481	1,502	1,527	1,552	1,575

Table 2.23
Central Orange County Water Supply Projections

Water Agency	Water Supply Projections (acre-feet per year)					
	2005	2010	2015	2020	2025	2030
Total	279,741	332,715	343,769	355,291	363,017	363,563

Source: 2005 UWMPs for Agencies and MWDOC

Note: Some service areas extend beyond the Central Orange County IRCWM region; estimates include water demand for the agency's entire service area

Water Supply Diversification

MWD and MWDOC have developed complementary strategies to incentivize the development of local resources and ensure the continued delivery of high-quality supplemental imported water. Water remains a valuable resource, and it is imperative that Southern California continues to develop and implement alternative strategies to meet the demands of a growing population. The IRCWM Plan is consistent with the strategies of these regional water agencies, and, like them, it emphasizes a diversification of supplies.

- Water use efficiency practices focus on the 14 BMPs for urban water use efficiency in California and include home water surveys, low-flow showerhead and toilet retrofits, metering with commodity rates, landscape irrigation budgets, education, public information, conservation-based rate structures, water waste prohibitions, and industrial process water improvements. These BMPs offer cost-effective opportunities to moderate the amount of imported and local water supplies required by municipal and industrial users. These programs are offered both regionally by MWDOC and locally by individual water agencies.
- Water recycling already occurs at a significant level in Central Orange County, but efforts can be extended to satisfy additional needs, particularly non-domestic demands for irrigation uses. Local water recycling systems require upgrades and expansions to continue to maximize and increase supplies.
- Surface water capture and treatment for non-potable supply, groundwater basin recharge, and improved riparian habitats are also considered a critical aspect of local water supply, and efforts to improve surface water quality are progressing through implementation of the TMDLs and the use of BMPs.
- Groundwater is the primary local water source for potable demand. Maximizing the benefit of this water resource requires treatment for nitrates, TDS, toxic plumes, and colored water.

Water Supply for Ecosystem Restoration

Additional water supply needed to support the restoration of ecological processes in areas such as the Agua Chinon Wash and Borrego Canyon Wash will be provided through drainage system improvements and NTSs that restore the beneficial uses of surface water. Currently, water supplies within these areas are intermittent and primarily consist of urban runoff and groundwater exfiltration. Along the Newport Coast, there is a concern that too much fresh water is entering the tidal zone, affecting habitat and wildlife. In those areas, a reduction in water supply over current conditions would be considered beneficial.

2.9.1 Regional Infrastructure

Water Supply

Central Orange County has an extensive regional infrastructure system for treatment, delivery, and storage of potable and non-potable water supplies. The MWD is the regional wholesaler of imported water, bringing in supplies from the Colorado River through the Colorado River Aqueduct and from northern California through the California Aqueduct. As shown in *Figure 2.3,* Central Orange County's imported water supply is treated at the DFP in Yorba Linda, and transported through two major pipelines to the southern portion of the county; the East Orange County Feeder No. 2 and the Allen McColloch Pipeline. Local delivery is then facilitated primarily through the Aufdenkamp Transmission Main and the Joint Transmission Main into each local water supplier's infrastructure, including distribution mains, pump stations, reservoirs, wells, and other system components.

Wastewater System

The regional wastewater system within the Central Orange County region is discussed in *Section 2.3* and *2.7*. The infrastructure includes local collection systems, larger mains for transmission of wastewater to treatment facilities, treatment plants, a recycled water system to deliver treated water back to the region for non-potable use, and an ocean outfall in the northern portion of Orange County. Both IRWD and the OCSD provide wastewater treatment. IRWD operates the MWRP and Los Alisos Water Reclamation Plant with a combined treatment capacity of 25.5 mgd; OCSD has regional treatment plants in Fountain Valley and Huntington Beach and treats approximately 250 million gallons of wastewater per day. *Figure 2.4* shows the respective wastewater service systems for IRWD and OCSD within the Central Orange County region and the major wastewater system facilities.

2.10 Social and Cultural Attributes of the Region

2.10.1 Social and Cultural Attributes

The Central Orange County region benefits from a diverse population in terms of race, age, education, and household income. These attributes are summarized in *Tables 2.24* through *2.27*.

Table 2.24
Population by Race

Race	White	Hispanic/Latino	Asian/Pacific Islander	Black/African American	All Others
Total Region	44%	40%	12%	2%	2%

Source: 2000 U.S. Census.

Ninety percent of the region's Hispanic and Latino populations live in Santa Ana, Costa Mesa, and Tustin. Approximately 70 percent of the region's Asian and Pacific Islander population resides in Irvine and Santa Ana.

Table 2.25
Population by Age

Age Group	0-19 yrs	20-44 yrs	45-64 yrs	65 and older
Total Region	30%	41%	19%	10%

Source: 2000 U.S. Census.

Median age by city ranges from 26 in Santa Ana to 78 in Laguna Woods, where there is a significant senior population.

Table 2.26
Educational Attainment

	High School Graduate or Higher	Bachelor's Degree or Higher
Total Region	71%	63%

Source: 2000 U.S. Census.

The highest educational attainment levels are in Irvine and Newport Beach; the lowest levels are reported in Santa Ana, where only 43.2 percent of the population over age 25 have a high school degree or higher, and only 9.2 percent have a bachelor's degree or higher.

Table 2.27
Household Annual Income

	To $49,999	$50,000 to $99,999	Over $100,000	Median Income
Total Region	44%	32%	24%	$57,264

Source: 2000 U.S. Census.

Household median income ranges from a low of $43,412 in Santa Ana to a high of $96,230 in the unincorporated area of North Tustin.

While environmental resources are valued differently by the various groups, depending on awareness, economics and the level of benefit derived and recreational values differ based on culture, population density, and the quality and availability of community recreational facilities, UCI annual survey finds that Orange County residents consistently rank good water quality as a top priority. Over 8 million people per year visit the coastal areas along Newport Beach. The region's regular and frequent visitors to the beach areas come from across Southern California. The same ethnic mix of people that populate Southern California also populates the beach areas in Newport Beach. Significant quantities of beachgoers include families, classes from school programs, and local residents using the beach for exercise. Socially and culturally, the region's residents (which include surfers, ocean swimmers, boaters, kayakers, and beach users who rarely enter the water) regularly express that ocean water quality is a top concern (UCI annual survey). They share a respect and desire for clean ocean waters – in large part because of the added recreational opportunities that it brings to their lives. Property values are in part dependent upon good ratings of local beaches, so there is an economic interest in protecting water quality. Like other coastal areas in California, many of the residents consider themselves conservative on some measures (fiscal issues, some social issues) yet are strongly supportive of clean water protections and regulations that might be expected from more liberal philosophies. The level of environmental awareness plays a key role in how educational programs are planned and implemented. All of these considerations are factored in to the decision making process for setting regional objectives and allocating resources.

2.10.2 Disadvantaged Communities

As shown in *Figure 2.9* Central Orange County includes several areas where the average median household income is less than 80 percent of the statewide annual median household income. Newport Bay, Corona del Mar State Beach, Crystal Cove State Park, and other area beaches and regional parks are important recreation areas for these communities and are used heavily year-round. These recreational areas are accessible via public transit and often do not charge an entrance fee for walk-in visitors, making these sites an ideal option for inexpensive quality

recreational, educational, and cultural experiences for both local residents and disadvantaged communities.

2.11 Economic Trends

Central Orange County benefits from a relatively healthy economy, and the long-term economic outlook is generally positive based on a diverse business community, land values, and low unemployment rates. However, there are some concerns regarding the housing market and its impact on other sectors. Housing affordability is a significant issue and is seen as the top barrier to business in Orange County. The high cost of labor and state and local taxes are identified as the second and third barriers. Forecasts predict a cooling economy with job growth of 1.0 percent for 2007, slightly lower than the previous year (Chapman University 2007a).

Most of the job growth in Orange County has been in the construction and construction-related financial sectors. However expansion opportunities within Orange County are not as significant as in the past, and these sectors are expected to slow down. Orange County has had a disproportionately high level of construction activity, and the anticipated weakening in the construction sector will have a relatively greater impact across a number of sectors in the county (Chapman University 2007b).

Securing adequate funding for public services and programs will remain challenging, as there will be increasing competition for the use of public funds. With the passage of Proposition 13 in 1978, ad valorem property taxes are limited to 1 percent of assessed value, and agencies must use other means to collect revenue for programs and services, such as user fees, property-related fees, regulatory fees, and development impact fees. Several of these require voter approval for initiation and increase, making their adoption uncertain.

The costs to achieve sustained water quality improvements, protect coastal resources, and improve local water supply reliability are escalating. In some cases, there is no dedicated funding source available to implement projects and programs where there is no nexus with the provision of direct services. The agencies within the Central Orange County region are progressive in their approach to this challenge, using tiered rate structures to encourage water conservation, building capital funding needs into their rate structures, and pursuing grant funding where available.

Implementation of this IRCWM Plan requires a significant investment of public funds. The Central Orange County region has the economic base to support this level of investment. The agencies are financially stable and have planned for these projects and others through their capital improvement programs. The IRCWM Plan provides additional value in that agencies are

able to leverage their financial resources through project integration to achieve a higher level of benefit for this region.

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3.0 IRCWM OBJECTIVES

Integrated resource planning leverages the full range of public and private resources committed to planning and implementation, along with project outcomes and benefits, to achieve a greater result. The success of the IRCWM Plan will be measured by cost effectiveness, project performance, and, most importantly, measurable progress toward achieving regional goals. As discussed in *Chapter 1*, the IRCWM Plan builds off the extensive planning efforts that are complete or in process for the Newport Bay and Newport Coast Watersheds, establishing a framework for effective collaboration and providing a greater opportunity to leverage regional resources. The focus is on achieving regional goals for water quality improvements, ecosystem restoration, and enhancing local water supplies. With these overarching goals in mind, the objectives of the Central Orange County IRCWM Plan directly respond to the regional conditions and challenges discussed in *Chapters 1* and *2*. They reflect the regional priorities as established in adopted plans for land use and water resource management within this region, as well as regulatory orders and the recommendations of technical studies conducted in the watersheds.

As noted in *Chapter 2*, watershed management issues for the Central Orange County region are related to water quality impacts on the CCAs and ASBSs, flood control and loss of habitat, compliance with water quality regulations, enhancing local water supplies, and impacts on sensitive coastal habitats due to heavy recreational use. To address these issues, the seven objectives of the Central Orange County IRCWM Plan are listed below and detailed in *Section 3.2*:

Central Orange County IRCWM Plan Objectives

1. Improve water quality in streams and channels, particularly those that are listed as impaired, and those discharging to Upper and Lower Newport Bay, Newport Beach Marine Life Refuge, and Irvine Coast Marine Life Refuge in order to reduce impacts on these CCAs and ASBSs.
2. Provide for implementation of restoration projects, BMPs, and other control measures to support beneficial uses of creeks, streams, bays and estuaries, and to facilitate attainment of TMDL targets, receiving water quality objectives, the Santa Ana RWQCB's Watershed Management Initiative, and NPDES permit requirements.
3. Provide a comprehensive, regional, watershed-wide approach to address runoff and its related impacts from existing and future land uses, in accordance with the Non-point Source Pollution Plan.
4. Protect, restore, enhance, and connect wetland and wildlife habitats and support ecosystem processes in the coastal zone and upper watershed, while maintaining flood protection.

5. Enhance quantity and quality of local water supplies, including groundwater, to reduce reliance on imported water.
6. Provide a safe, reliable drinking water supply and recreational opportunities for disadvantaged communities within the region, consistent with other areas of the region.
7. Provide a framework for efficient intra-regional cooperation, planning, and implementation of this and other plans that have been developed for the region, which encourages integrated implementation of watershed improvement projects with multiple benefits.

3.1 Methodology to Determine Objectives

To ensure the IRCWM Plan's value as a local and regional planning tool, the objectives were developed to specifically address conflicts within the region and provide for progress toward achieving regional goals. In that regard, they are consistent with the goals of adopted plans of the agencies for land use, resource conservation, and water management. Furthermore, the objectives and strategies of the IRCWM Plan support the goals and objectives of the watershed management and ecosystem restoration plans that have been developed for the Newport Bay and Newport Coast Watersheds. The objectives also support the continued development of science-based studies to analyze impacts on coastal ecosystems and related pilot programs designed to address those issues. Lastly, the objectives represent advancement toward achieving the stated priorities of the Santa Ana RWQCB, as well as IRWM program preferences. Specifically, a major priority is to improve water quality in the CCAs and ASBSs.

As noted in *Chapter 1*, the IRCWM Plan provides a bridge between numerous planning efforts, both completed and ongoing, that have collectively established a common set of goals or priorities for the region. The objectives of the IRCWM Plan are derived from these planning efforts with stated regional priorities for water quality improvements, ecosystem restoration, sustainability, and water supply reliability. Each of those efforts incorporated a stakeholder process in which the goals and objectives for the Plan were developed through stakeholder input and reviewed through both informal and formal public review. The objectives of the IRCWM Plan support the stakeholders' long-term goals for this region, and provide an efficient means to implement the recommendations included in the plans.

3.2 Objectives and Rationale

1. **Improve water quality in streams and channels, particularly those that are listed as impaired, and those discharging to Upper and Lower Newport Bay, Newport Beach Marine Life Refuge, and Irvine Coast Marine Life Refuge in order to reduce impacts on these CCAs and ASBSs.**

The Upper Newport Bay CCA (No. 69) receives freshwater drainages from the entire San Diego Creek Watershed, which contains a diverse mix of land uses. Non-point source problems are caused by urban development, and pollutants include nutrients, bacteria, sediment, and toxics, such as pesticides and metals. Land use contributes to dry weather runoff and increased stormwater runoff and erosion. Identified water quality impacts include possible threats to human health and wildlife, contamination in fish populations (both sport fish and forage fish), impaired recreational activities, and increased sedimentation in the estuary (CCC 2006).

The Newport Beach CCA (No. 70) watershed flows into the Newport Beach Marine Life Refuge (ASBS No. 32). This area has heavy recreational use with the adjacent Corona del Mar State Beach. *Exhibit 3.A* shows a severe loss of rockweed and mussel coverage in the tidepool areas over the past 40 years. Three natural streams flow into the ASBS. Recreational uses are adversely affected by 18 direct discharges and urban runoff from the Corona del Mar area of Newport Beach (see *Exhibit 3.B*). Urban runoff may be contributing toxic pollutants, such as pesticides and other organics. Some impacts are a result of hydromodification in the upstream portions of Buck Gully (CCC 2006).

Exhibit 3.A
Tidepool Degradation at Little Corona Beach at Buck Gully

1956 **1999**

Exhibit 3.B
Dry Weather Flows in Buck Gully Carrying Pollutants

The Irvine Coast CCA (No. 71) watershed flows into the Irvine Coast Marine Life Refuge (ASBS No. 33). Sixteen natural gullies or streams that mostly drain urban areas discharge directly to the ocean. Increasing human impacts threaten to adversely impact native marine habitats.

Current efforts seek to establish baseline data, study pollutant loading over time, characterize the loading, analyze pollutant impacts, identify and quantify those environmental impacts having the most deleterious effects on the ASBSs (public use, dry weather flows, storm flows, or cross contamination from Newport Bay) and prepare a plan to mitigate these deleterious effects. Initial findings show that public use can be a significant, and potentially dominant, impact at certain ASBS beach areas (see *Exhibit 3.C*). In addition, current studies are evaluating the fate and transport of pollutants from Newport Bay to the adjacent ASBSs. Newport Beach ASBS No. 32 lies only 0.25 miles south of the point where Newport Bay, including its harbor area, discharges to the ocean.

Exhibit 3.C
Public Trampling and Scavenging

Improving water quality in the streams and channels discharging to Newport Bay and the ASBSs requires regional planning, with participation from agencies with land use authority as well as those responsible for flood control, water quality, and water supply programs. The IRCWM Plan provides the framework for understanding and prioritizing land use actions and water management actions in the context of achieving water quality improvements within specific areas. Possible mitigations are community training, water conservation measures, flood management and contaminant source control. One extremely important part of a potential mitigation plan is an intertidal ecosystem restoration component to identify actions that can be taken to stimulate the marine life area renovation through the introduction of key species. The first step to restoration of the rocky intertidal areas is currently underway where California State University, Fullerton is leading a pilot study to reintroduce rockweek back into the Little Corona Beach tide pools where Buck Gully drains to the ocean.

2. **Provide for implementation of restoration projects, BMPs, and other control measures to support beneficial uses of creeks, streams, bays and estuaries, and to facilitate attainment of TMDL targets, receiving water quality objectives, the Santa Ana RWQCB's Watershed Management Initiative, and NPDES permit requirements.**

San Diego Creek, Upper Newport Bay, Lower Newport Bay, Buck Gully Creek, and Los Trancos Creek have been declared as water quality limited with a number of pollutants of concern. Accordingly, TMDLs have been established for San Diego Creek and Upper Newport Bay; additional TMDLs are pending. TMDLs for Upper Newport Bay have been adopted by the Santa Ana RWQCB for sediment (RWQCB 1998a), nutrients (nitrogen and phosphorus) (RWQCB 1998b), and pathogens (fecal coliform indicators) (RWQCB 1999). The EPA and Santa Ana RWQCB have established TMDLs for toxic pollutants in San Diego Creek and Newport Bay, including TMDLs for pesticides, selenium, and heavy metals (EPA 2002).

The Santa Ana RWQCB issued Order No. R8-2002-0010/NPDES No. CAS618030 (RWQCB 2002), which is the NPDES permit that regulates the discharges from the Municipal Separate Storm Sewer System (MS4) for Central Orange County and Northern Orange County areas. The permit includes provisions for contributing to the compliance with TMDLs as well as for meeting the overall requirement of the Clean Water Act for such permits to reduce pollutants to the "maximum extent practicable." This NPDES Permit specifically states, "The Regional Board recognizes the importance of an integrated watershed management approach … and recognizes that a watershed management program should integrate all related programs, including the storm water program and TMDL processes." The Clean Water Act also requires that existing structural flood control devices be evaluated to determine if retrofitting the device to provide additional pollutant removal from stormwater is feasible. This requirement is derived from regulations implementing the Clean Water Act. See 40 C.F.R. § 122.26(d)(2)(iv)(4).

The Santa Ana RWQCB NPDES permit recognizes these considerations in the following policies and requirements:

> "Encourage the use of water quality wetlands, biofiltration swales, watershed-scale retrofits, etc. where such measures are likely to be effective and technically and economically feasible" (p. 28).
>
> "By July 1, 2003, the permittees shall complete an assessment of their flood control facilities to evaluate opportunities to configure and/or reconfigure channel segments to function as pollution control devices and to optimize beneficial uses" (p. 33).

Consistent with adopted TMDL requirements and Santa Ana RWQCB MS4 policies, the IRCWM Plan is intended to contribute to implementation strategies directed toward attainment of TMDLs for San Diego Creek and Newport Bay, as well as to contribute to compliance with the NPDES permit. The watershed management approach of the IRCWM Plan uses flood control facilities to enhance and improve water quality.

Implementation of the TMDLs, the Santa Ana RWQCB's Watershed Management Initiative, and the NPDES permit requires regional planning, with participation from agencies with land use authority, as well as those responsible for flood control, water quality, and water supply programs. The IRCWM Plan provides the framework for collaboration, leveraging the financial resources of the agencies through shared projects and programs to achieve cost-effective, timely implementation of studies, control measures and BMPs that reduce pollutant loadings to improve water quality, and achieve compliance with various TMDL targets, water quality objectives and NPDES Permit requirements.

3. Provide a comprehensive, regional, watershed-wide approach to address runoff and its related impacts from existing and future land uses, in accordance with the California Non-point Source Pollution Plan.

There is a regional need to address runoff water quality from both existing and future land uses using a comprehensive watershed-wide approach. In July 2000, the EPA approved the State of California Non-Point Source Program Strategy and Implementation Plan 1998-2013 (NPS Plan). The State NPS Plan uses a three-tiered system of BMPs as a means of implementing non-point source water quality management measures and strategies identified in the NPS Plan, beginning with voluntary measures under Tier 1 and extending to enforcement orders under Tier 3. One of the policy directives set forth in the State NPS Plan is to:

> "Manage NPS pollution, where feasible at the watershed level – including pristine areas and watersheds that contain water bodies on the Clean Water Act (CWA) Section 303(d) list – where local stewardship and site-specific MPs [Management Practices] can be implemented through comprehensive watershed protection or restoration plans" (NPS 2000, p. 1).

In furtherance of the above policy, the State NPS Plan contains an implementation measure, Management Measure 3.1A – Watershed Protection, that emphasizes a watershed approach to water quality management and includes a reference to Clean Water Act Section 402 (the section governing NPDES stormwater programs) as a primary statutory element of the management measure. Equally significant, the State NPS Plan contains management measures that place an emphasis on the use of natural treatment systems to address non-point source pollution (Management Measures 6B and 6C).

Consistent with and in furtherance of the above policies of the State NPS Plan, the Santa Ana RWQCB's issued order for the MS4 NPDES stormwater program strongly encourages watershed approaches to water quality management, as reflected in the following sections of the NPDES permit (RWQCB 2002):

> "…the Regional Board recognizes the importance of an integrated watershed management approach…[and] also recognizes that a watershed management program should integrate all related programs, including the stormwater program and TMDL processes" (p. 10).
>
> "The Regional Board and the permittees recognize the importance of watershed management initiatives and regional planning and coordination in the development and implementation of programs and policies related to water quality protection" (p. 13).

> "Pollution prevention techniques, appropriate planning processes and early identification of potential stormwater impacts and mitigation measures can significantly reduce stormwater pollution problems. The permittees already require a Water Quality Management Plan, which addresses permanent post-construction BMPs, in addition to the Stormwater Pollution Prevention Plan, which is required by the statewide general permit for construction activity. The permittees are encouraged to propose and participate in watershed wide and/or regional water quality management programs" (pp. 10-11).
>
> "By March 1, 2003, the permittees shall review their existing BMPs…and submit for review and approval…a revised Water Quality Management Plan (WQMP) for urban runoff…The permittees are encouraged to include in the WQMP the development and implementation of regional and/or watershed management programs that address runoff from new development and significant re-development…The goal of the WQMP is to develop and implement practicable programs and policies to minimize the effects of urbanization on site hydrology, urban runoff flow rates or velocities and pollutant loads. This goal may be achieved through watershed-based structural treatment controls, in combination with site-specific BMPs" (pp. 29-30).
>
> "By July 1, 2004, the permittees shall review their watershed protection principles and policies in their General Plan or related documents" (p. 28).

The emphasis on an "integrated watershed management approach" pursuant to the State NPS Plan and the Santa Ana RWQCB NPDES permit is clear from the above policy statements and directives. Consistent with the State NPS emphasis on voluntary initiatives under Tier 1, the IRCWM Plan has been developed at the watershed level through a collective, multi-jurisdictional approach. In the context of the Newport Bay and Newport Coast Watersheds, such an approach is particularly important because a large portion of the watershed area is already urbanized, and a major "retrofit" approach can be realistically undertaken comprehensively only at a watershed level. Likewise, retrofit facilities addressing existing urbanization must be coordinated with future treatment facilities that will be constructed in conjunction with new development, again requiring a coordination effort that requires a watershed approach.

4. Protect, restore, enhance and connect wetland and wildlife habitats and support ecosystem processes in the coastal zone and upper watershed, while maintaining flood protection.

A number of studies have been undertaken for the Newport Bay Watershed, including the ACOE's Newport Bay/San Diego Creek Watershed Management Study 905b Reconnaissance

Report; the Serrano Creek Corridor Ecosystem Restoration Project 905b Reconnaissance Report; the Upper Newport Bay Ecosystem Restoration Feasibility Study; and the draft SAMP for the San Diego Creek Watershed. The SAMP includes a planning-level delineation of aquatic resources and a landscape-level functional assessment to characterize the functional integrity of the watershed ecosystem. Other plans include the Serrano Creek Collaborative Use Plan, Draft (Willdan 1998), the Irvine Wildlife Corridor Plan, Draft (CBA 2003), and the Orange County Great Park Plan (City of Irvine 2002). In addition, the Central/Coastal NCCP/HCP, which incorporates area within the region, includes a 37,378-acre reserve system, special linkages, and existing use areas to enhance biological connectivity within the reserve system and subregion. For the Newport Coast Watershed, a watershed assessment has been prepared, including physical, hydrologic, and biological resources. These studies provide a framework for evaluating and implementing projects to achieve this objective.

On a regional scale, the Central Orange County region lies between the Cleveland National Forest to the northeast and coastal wilderness areas to the south, and linkages through the region are important for wildlife movement. Upper Newport Bay, a State Ecological Reserve, is one of only a few remaining estuaries in Southern California and is one of the only remaining coastal Mediterranean habitats. It is used as a stopover point on the Pacific flyway, and is the home to numerous species of mammals, fish, invertebrates, and native plants, including several endangered species. Urbanization, water quality issues, and the need for increased flood control capacity have impacted habitat areas; however they are critical to the health of the ecosystem and their condition is fundamental to the desired state of the watershed that will be developed in the second phase of this Plan.

5. Enhance quantity and quality of local water supplies, including groundwater, to reduce reliance on imported water.

Imported water currently comprises approximately 34 percent of the overall regional water supply. The agencies responsible for water service recognize that developing local water supplies is imperative given the water supply conditions within the western United States and the potential for drought. The agencies are providing regional leadership in developing local water supplies to reduce dependence on imported supplies. This includes groundwater management programs, recycled water, and water conservation.

Groundwater Protection and Management

The Orange County Groundwater Basin is the largest local water supply source for the region; therefore, collaborating with OCWD on addressing groundwater quality issues and actively managing groundwater production are essential to achieving this objective. Within the Irvine Subbasin of the Orange County Groundwater Basin (see *Figure 2.2*), there are a number of water

quality issues that require treatment and management in order to maximize the potential for the basin as a source of water supply. As noted in *Chapter 2*, these issues include underground storage tanks, VOCs, colored water, high TDS, and nitrates. OCWD and IRWD are implementing the Irvine Desalter Project, in which groundwater contaminated with VOCs is treated and used for irrigation and other non-drinking water uses. Groundwater that does not contain VOCs but has high dissolved solids concentrations is treated and used for potable uses. The City of Tustin is operating the Seventeenth Street Desalter to remove high nitrate and TDS concentrations from groundwater produced by three wells and the Main Street Treatment Plant to remove nitrates from two wells.

There are emerging chemicals of concern composed of consumer and health-related products, commonly referred to as pharmaceuticals and personal care products (PPCPs). Another class of emerging chemicals of concern include compounds that may affect the endocrine system. These compounds, commonly referred to as endocrine disrupting compounds (EDCs), may originate from the wide range of over-the-counter pharmaceuticals (e.g., cold remedies, diet supplements), pesticides, or other industrial compounds. Water quality concerns arise from the widespread use of PPCPs and EDCs. Due to the potential impact of EDCs on future water reclamation projects, it is imperative that the agencies with wastewater treatment and groundwater management responsibilities prioritize and track public awareness of these chemicals with regulatory agencies. Monitoring activities will be tailored, with guidance by California Department of Health Services, to meet the informational needs required for future reclamation projects.

The occurrence and significance of colored groundwater in the Basin is an important consideration for groundwater use. Mesa Consolidated Water District (MCWD) and IRWD both are actively involved in developing treatment facilities for use of colored water. MCWD completed construction and began operation of its Colored Water Treatment Facility in 2001. MCWD incorporated additional treatment for bromate control in late 2003. IRWD's Deep Aquifer Treatment System removes color from deep aquifer groundwater, producing at a rate of 7.4 million gallons of potable water per day. Additional colored groundwater utilization facilities could be developed at two sites in the Central Orange County region.

Future land use and development, even in a highly urbanized setting, provide opportunities at the planning and permitting stage to consider potential impacts to the region's water resources and to require pollution prevention in land use permit conditions, zoning, subdivision design, and related development components. These may include coordinating with local agencies having oversight responsibilities on the handling, use, storage of hazardous materials; underground tank permitting; well abandonment programs; septic tank upgrades; and drainage issues.

Recycled Water

Since 1967, IRWD has provided wastewater collection and tertiary treatment services with a defined purpose of delivering recycled water for non-potable uses. The District began serving recycled water to agricultural users and expanded to include landscape irrigation and eventually to front-yard and backyard irrigation for large estate-sized residential lots, toilet flushing for large commercial buildings, and other industrial processes. Master-planned communities within the IRWD service area are required to plan and design for recycled water use. Additionally, IRWD actively pursues existing opportunities for recycled water conversions wherever non-potable water can be used in lieu of potable water. The District continues to work closely with the state and county health departments on permitting for expanded uses of recycled water.

IRWD has identified several actions that result in increased use of recycled water. As shown in *Table 3.1, Methods to Encourage Recycled Water Use*, the greatest response is due to grants and low interest loans. Given the water supply conditions in the western United States and the long-term outlook, the potential use could be higher than estimated.

Table 3.1
Methods to Encourage Recycled Water Use
(acre-feet of use projected to result from the action)

Actions	2010	2015	2020	2025	2030
Rate discounts	5	5	5	5	5
Prohibit specific potable use	5	5	5	5	5
Grants/low interest loans	30	50	50	50	50
Dual plumbing standards	10	10	10	10	10
Total	50	70	70	70	70

Source: IRWD 2005 Urban Water Management Plan

IRWD's recycled system demands are expected to nearly double by 2025 due to expansion of the system into new areas and "infill" and retrofit demands in areas currently served. To meet increased demand, IRWD is considering increasing the Michelson Water Reclamation Plant (MWRP) treatment capacity. This would require sufficient influent wastewater flow into the plant and assurance that the expansion is economically, technologically, and environmentally feasible.

In 2003, IRWD completed a Wastewater Treatment Master Plan, which includes plans to add the Harvard Avenue Trunk Sewer wastewater flows to MWRP that are currently going to the Orange County Sanitation District (OCSD). These flows are expected to be 7.9 mgd at build-out. This diversion would greatly benefit the recycled water program to meet future demands; however it would require an increase in the MWRP treatment capacity.

Other potential recycled water supplies include recycled water produced by treatment of sewage flows originating in the former Los Alisos Water District service area (IRWD) and the El Toro Water District service area located adjacent to IRWD along the southeast border. There may also be an opportunity in the future for IRWD to receive recycled water from the El Toro Wastewater Treatment Plant, which could serve portions of IRWD's service area. Additionally, IRWD plans to continue to use degraded groundwater to augment supply to the non-potable water system.

One important component for the expansion of recycled water use is increased storage capacity. IRWD is planning to convert a reservoir from its current non-potable water storage use to recycled water storage. This reservoir is adjacent to an area where significant development will occur over the next 10 years.

In the northwest portion of the IRCWM planning area, recycled water is provided through OCWD's Green Acres Project, which delivers recycled water to major irrigation users within MCWD's service area, reducing potable water demand. The Green Acres Project accepts secondary-treated effluent from OCSD, treats it to a level approved by the State Department of Health Services, and then pumps it to MCWD's service area for resale. Most of the water is irrigation water for use on golf courses, greenbelts, cemeteries, and nurseries. The project was initiated in 1991 and produces approximately 7 mgd of recycled water. Currently there are 24 recycled water service connections within the MCWD service area, with customers including the City of Costa Mesa, County of Orange, Caltrans, Costa Mesa Country Club, and Orange Coast College. MCWD and OCWD have identified additional recycled water customers with an additional 840 irrigated acres should more recycled water become available in that portion of the planning area.

As noted in *Chapter 2*, the Groundwater Replenishment System is expected to begin operating in November 2007. This will take advance-treated wastewater from OCSD's treatment facility and use it for groundwater replenishment in the main Orange County Groundwater Basin. The first phase will provide approximately 70,000 acre-feet per year, with future capacity of 110,000 acre-feet per year. The limiting factor is the availability of sufficient secondary-treated wastewater flows from OCSD.

Demand Management/Water Use Efficiency

Demand management consists of water conservation programs and demand curtailment. It is a long-term means to extend the availability and reliability of existing water supply. Curtailment or rationing is a viable option for short-term supply shortages, which may include limiting potable landscape meters during emergencies. However, the more important issue for long-term regional water supply is water use efficiency.

As signatories to the Memorandum of Understanding containing 14 BMPs for urban water conservation in California, the Central Orange County water agencies are voluntarily committed to the implementation of all cost-effective BMPs. Examples of BMPs include home water surveys, low-flow showerhead and toilet retrofits, clothes washer retrofits, landscape irrigation budgets, education, public information, industrial process water improvements, and water waste prohibitions.

Water agencies throughout the county have provided incentives for the installation of more than 350,000 ultra-low-flush toilets, which are saving more than 11,700 acre-feet of water per year. In addition, more than 75 percent of the showerheads have been replaced with low-flow heads. As a result of these BMP implementation efforts, indoor residential water-saving opportunities are nearly exhausted. Public information, school education, conservation pricing, and metering with commodity rates are considered ongoing water use efficiency efforts but are non-quantifiable in terms of water savings. Outdoor landscape irrigation water savings and plumbing fixture retrofits in local businesses are the region's next major areas of focus to achieve quantifiable water savings. These savings will be achieved through incentives to install weather-based irrigation timers, irrigation system distribution uniformity improvements, and design changes, including plant palettes.

Orange County's Residential Runoff Reduction Study documented significant water savings, runoff reduction, and pollution prevention benefits from the installation of self-adjusting weather-based irrigation timers in single-family homes and commercial landscapes. This study was the basis for the first regional implementation program in the state offering rebate incentives to customers to install up to 5,000 weather-based irrigation timers.

6. Provide a safe, reliable drinking water supply and recreational opportunities for disadvantaged communities within the region, consistent with other areas of the region.

As shown in *Figure 2.9,* there are a number of communities within the Central Orange County region designated as disadvantaged, according to the definition provided by the State of California. One of the fundamental tenets of integrated resource planning is to include disadvantaged communities in the planning process so that these communities are afforded the same benefits as other areas within the region. Within the Central Orange County region, these communities receive water through the same systems as adjacent areas and their interests in reliable, safe water supply are represented through agency coordination for groundwater production, as well as for imported and recycled water, discussed under Objective No. 5.

Disadvantaged communities also have an interest in the quality and availability of recreational resources. Upper Newport Bay, Newport Harbor, Corona del Mar State Beach, and Crystal Cove State Park have important social value as recreational amenities within this region. Portions of

these areas have been determined to have REC-1 and REC-2 beneficial uses.[1] One of the objectives of the IRCWM Plan is to protect the water and habitat quality of these areas to ensure their continued recreational value. Corona del Mar State Beach and the nearby rocky tide pools receive heavy recreational use, which has impacted the quality of those habitats. The IRCWM Plan provides a means for regional participation in developing appropriate protection programs that support recreational use while providing for the long-term quality of these inter-tidal areas.

7. Provide a framework for efficient intra-regional cooperation, planning, and implementation of this and other plans that have been developed for the region, which encourages integrated implementation of watershed improvement projects with multiple benefits.

Essential to the success of the IRCWM Plan is a framework that provides for intra-regional cooperation, collaboration, information sharing, project and program planning, and implementation. As noted in *Chapter 1*, the IRCWM Group has broad representation that is further supported by the Newport Bay Watershed Executive Committee and the Newport Bay Watershed Stakeholders Group. This will be further enhanced with the formation of the Newport Bay Watershed Management Committee through a formal MOU with the agencies participating in the IRCWM Plan. The local agencies, resource agencies, environmental groups, and public members have demonstrated their support for this approach through their collaborative work on numerous initiatives, studies, programs, and projects completed thus far. This objective enhances this effort to address the critical regional planning and water management needs of this region. This includes identifying and refining planning and implementation priorities, providing for efficient and effective use of financial resources, and ensuring that an adaptive management approach is used for planning.

[1] Water Contact Recreation (**REC-1**) waters are used for recreational activities involving body contact with water where ingestion of water is reasonably possible. These uses may include, but are not limited to, swimming, wading, water-skiing, skin and SCUBA diving, surfing, whitewater activities, fishing, and use of natural hot springs.

Non-contact Water Recreation (**REC-2**) waters are used for recreational activities involving proximity to water but not normally involving body contact with water where ingestion of water would be reasonably possible. These uses may include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tide pool and marine life study, hunting, sightseeing, and aesthetic enjoyment in conjunction with the above activities.

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4.0 WATER MANAGEMENT STRATEGIES AND INTEGRATION

The Central Orange County IRCWM Plan incorporates a broad range of water management strategies that can be used to achieve the objectives for reduction in impacts to CCAs and ASBSs, water quality improvements, ecosystem restoration, and improved local water supply reliability. The IRCWM Plan fully incorporates the 11 water management strategies that are required to be considered per California Water Code §79562.5 and §79564 and includes all 20 of the water management strategies identified in the IRWM Guidelines.

4.1 Selection of Appropriate Strategies

Strategies were evaluated to determine whether they are appropriate for inclusion in the Plan based on the following criteria:

- Is the strategy already incorporated into adopted plans for land use and water resource management by agencies within the Central Orange County region?
- Does the strategy provide a regionally appropriate means to resolve watershed management issues?
- Can the strategy be implemented through an integrated effort involving more than one agency or more than one project?

The strategies were carefully considered with respect to watershed management challenges and opportunities, agency experience, and a given strategy's appropriateness for the region. Each strategy was further identified as a potential means to achieve each of the objectives.

Based on this evaluation process, each of the 20 strategies identified in the IRWM Guidelines was determined to be appropriate for the Central Orange County region, and no strategies were excluded. Future updates to the IRCWM Plan will expand the list of strategies to address all of the resource management strategies identified in the California Water Plan.

4.2 Integration of Strategies to Achieve Objectives

The IRCWM Plan's approach to integration includes the use of several strategies for implementing the projects in a manner that supports synergistic watershed management. Full integration of strategies is achieved through well-planned implementation of the various projects. Though the projects must incorporate at least one of the strategies, the majority incorporate several complementary strategies, often to achieve multiple objectives. For example, projects that incorporate the water conservation strategy by nature incorporate other strategies, including the following: water quality by reducing wastewater and runoff; water supply reliability and imported water by offsetting imported water supply needs; watershed planning through implementation of conservation measures throughout the watershed to enhance water use

efficiency; environmental and habitat protection and improvement by utilizing recycled water supplies; and land use planning by effectively addressing water issues and ways to incorporate water conservation measures in proposed development. The method for achieving full synergy is through identifying an appropriate mix of projects where the majority incorporate several complementary strategies and are able to achieve multiple objectives. Strategies and projects that address multiple objectives are typically the most cost-effective and resource-efficient and are, for the most part, given higher priority in the IRCWM Plan.

*Table 4.1, Integration of Strategies to Achieve Objectives***,** summarizes the integration of strategies to achieve the IRCWM Plan objectives. In many cases, a certain strategy or combination of strategies will be more important than others to achieving an objective given the conditions within the watershed. The table below reflects this by the size of the circle; the larger circles indicate higher importance for that particular objective. The strategies are also identified in *Chapter 5*, which discusses regional priorities and the proposed projects.

Table 4.1
Integration of Strategies to Achieve Objectives

(Note: The size of the circle shows the relative significance within the watershed)

Strategy / Objective	(1) Improve Water Quality to reduce impacts on CCAs, ASBSs	(2) Implement restoration projects, BMPs, & control measures to support beneficial uses, attain TMDL targets, NPDES permit reqmts	(3) Watershed-wide approach to address runoff and related impacts	(4) Protect, restore, enhance & connect wetland and wildlife habitats; support ecosystem processes	(5) Enhance quantity and quality of local water supplies	(6) Provide safe water supply, recreational opportunities to disadvantaged communities	(7) Intra-regional cooperation, planning and implementation
Ecosystem Restoration	●	●	●	●			●
Habitat Protection	●	●	●	●			●
Water Supply Reliability		·			●	·	●
Flood Management	●	●	●	●		·	●
Groundwater Management		·			●	·	●
Recreation/Public Access	●			·		●	·

Table 4.1
Integration of Strategies to Achieve Objectives

(Note: The size of the circle shows the relative significance within the watershed)

Strategy / Objective	(1) Improve Water Quality to reduce impacts on CCAs, ASBSs	(2) Implement restoration projects, BMPs, & control measures to support beneficial uses, attain TMDL targets, NPDES permit reqmts	(3) Watershed-wide approach to address runoff and related impacts	(4) Protect, restore, enhance & connect wetland and wildlife habitats; support ecosystem processes	(5) Enhance quantity and quality of local water supplies	(6) Provide safe water supply, recreational opportunities to disadvantaged communities	(7) Intra-regional cooperation, planning and implementation
Stormwater Management	●	●	●	●			●
Water Conservation	●	●	●		●	●	●
Water Quality Protection	●	●	●	●	●	●	●
Water Recycling					●	●	●
Wetlands Enhancement/Creation	●	●	●	●			●
Conjunctive Use					●	●	●
Desalination					●	●	●
Imported Water					●	●	●
Land Use Planning	●	●	●	●	●	●	●
Non-Point Source Pollution Control	●	●	●				●
Surface Storage					●	●	●
Watershed Planning	●	●	●	●	●	●	●
Water/Wastewater Treatment					●	●	●
Water Transfers					●	●	●

4.3 Strategies to Meet Objectives

Each of the objectives identified in *Chapter 3* is best achieved through the use of multiple complementary strategies. This approach is consistent with integrated resource planning and provides the highest level of benefit from project implementation The strategies are discussed below as they apply to each objective.

1. **Improve water quality in streams and channels, particularly those that are listed as impaired, and those discharging to Upper and Lower Newport Bay, Newport Beach Marine Life Refuge, and Irvine Coast Marine Life Refuge in order to reduce impacts on these CCAs and ASBSs.**

Strategies to be used:

- Ecosystem Restoration
- Habitat Protection
- Flood Management
- Stormwater Management
- Water Conservation
- Water Quality Protection
- Wetlands Enhancement/Creation
- Land Use Planning
- Non-point Source Pollution Control
- Watershed Planning

Achieving this objective will require the use of a range of interrelated strategies related to land use and water quality programs and projects. Currently, the CCAs and ASBSs are impacted by the quality of the water that is discharging from the upper watershed areas. Watershed planning efforts, coupled with strategic projects that address pollution sources, are essential. Ecosystem restoration that incorporates habitat enhancement, flood protection, and stormwater management will strengthen the ecosystem processes in the watershed so that natural protections occur. Water conservation programs, particularly for landscape, will reduce runoff, complementing non-point source pollution control efforts.

Progress toward achieving this objective will be assessed on a number of levels, including the following:

- Reduction in pollutant loads assessed through water sampling within the CCAs and ASBSs
- Improvements in the health and variety of flora and fauna species in the CCAs and ASBSs over baseline conditions documented in current studies
- Improvements in ecosystem functions determined through visual assessments.

Although any single strategy could provide improvements in support of this objective, the improvement could easily be negated by other actions in the watershed if the planning and implementation effort is not integrated.

2. Provide for implementation of restoration projects, BMPs, and other control measures to support beneficial uses of creeks, streams, bays and estuaries, and to facilitate attainment of TMDL targets, receiving water quality objectives, the Santa Ana RWQCB's Watershed Management Initiative, and NPDES permit requirements.

Strategies to be used:

- Ecosystem Restoration
- Habitat Protection
- Flood Management
- Stormwater Management
- Water Conservation
- Groundwater Management
- Water Quality Protection
- Wetlands Enhancement/Creation
- Land Use Planning
- Non-point Source Pollution Control
- Watershed Planning
- Water Supply Reliability

Similar to Objective No. 1, the most effective means to achieve this objective is through the use of multiple strategies. The majority of the Newport Bay Watershed area is developed, and the remaining developable area, such as Tustin Legacy and the Great Park, will be developed over the next 10 to 15 years. A range of programs and projects can be integrated to achieve this objective, depending on developed conditions and the opportunities that exist. Some source issues have been identified, such as sedimentation occurring through erosion in Serrano Creek and toxics increasing due to boat maintenance in Newport Harbor.

Progress toward achieving this objective will be assessed on a number of levels, including the following:

- Reduction in pollutant loads assessed through water sampling in accordance with the permit requirements and TMDLs
- Completion of projects that address pollutant sources
- Geographic scope and level of participation in public education programs.

Multiple complementary strategies are required to successfully achieve this objective in a cost-effective manner with long-term, sustained results. Although any single strategy could provide improvements in support of this objective, the improvement would likely be negated by other actions in the watershed if the planning and implementation effort for projects and programs is not integrated.

3. Provide a comprehensive, regional, watershed-wide approach to address runoff and its related impacts from existing and future land uses, in accordance with the California Non-point Source Pollution Plan.

Strategies to be used:

- Ecosystem Restoration
- Habitat Protection
- Flood Management
- Stormwater Management
- Water Conservation
- Water Quality Protection
- Wetlands Enhancement/Creation
- Land Use Planning
- Non-point Source Pollution Control
- Watershed Planning

Similar to the other water quality objectives, efforts to achieve this objective will be most effective if several interrelated strategies are used. This objective specifically addresses current developed conditions and future planned development. Extensive studies have been completed within this region to identify effective strategies to address non-point source pollution. In particular, IRWD's Natural Treatment Systems (NTS) Master Plan identifies 31 areas throughout the watershed where this technology would be appropriate; the benefits of a treatment wetlands is enhanced by related projects and programs to minimize the pollutant load in the water to be treated. An NTS program provides additional benefits for wetlands enhancement, ecosystem restoration, and water quality protection. A watershed-wide approach will only achieve its intended benefits if done as part of an integrated approach.

Progress toward achieving this objective will be assessed in the following ways:

- Reduction in pollutant loads assessed through water sampling
- Number of treatment wetlands installed and volume of water treated
- Range (geographic and type) and number of projects implemented within the region that specifically address reduction of non-point source pollution
- Public education programs and percent of watershed covered.

Individual water management strategies would provide improvements in support of this objective; however, the improvement could easily be negated by other actions in the watershed if the planning and implementation effort is not integrated.

4. Protect, restore, enhance and connect wetland and wildlife habitats and support ecosystem processes in the coastal zone and upper watershed, while maintaining flood protection.

Strategies to be used:

- Ecosystem Restoration
- Habitat Protection
- Flood Management
- Stormwater Management
- Water Conservation
- Water Quality Protection
- Wetlands Enhancement/Creation
- Land Use Planning
- Recreation/Public Access
- Watershed Planning

An objective that seeks ecosystem restoration and habitat protection, coupled with maintaining adequate flood control capacity, requires an integrated approach. Often times, habitat protection and flood protection are considered mutually exclusive. This region has an extensive drainage system, ranging from natural washes to fully channelized flood control facilities. One of the goals of the watershed studies conducted by the ACOE for this region has been to resolve this conflict and restore ecosystem processes where feasible. Development within the watersheds has resulted in increased area covered by impervious surface with a greater volume of stormwater runoff. The drainages are further impacted by dry weather runoff related to landscape irrigation and other urban activities. Erosion in the soft-bottom drainages causes loss of habitat, impacts water quality, and, in certain areas, threatens life and property. Integrated resource planning and use of multiple management strategies can resolve these conflicts. Watershed planning and land use planning can ensure that drainage areas that have been impacted by development are not further impacted by future development. Flood control can be accomplished through a variety of design approaches, some of which enhance recreational opportunities, such as trails.

Progress toward achieving this objective will be assessed on a number of levels, including the following:

- Length of drainage areas restored from past erosion and type of habitat re-established
- Scale of habitat connectivity created through projects
- Improvements in ecosystem functions determined through visual assessments
- Range of drainage solutions used with new development to avoid impacts to existing soft-bottom drainages.

In order to achieve the benefits of this objective, the use of multiple strategies is required. Projects will require the integration of two perspectives: flood control and habitat protection

and/or restoration. Any single strategy would not yield the level of benefit expected for projects implemented under this objective.

5. Enhance quantity and quality of local water supplies, including groundwater, to reduce reliance on imported water.

Strategies to be used:

- Water Supply Reliability
- Groundwater Management
- Water Conservation
- Water Quality Protection
- Water Recycling
- Water/Wastewater Treatment
- Conjunctive Use
- Desalination
- Imported Water
- Land Use Planning
- Surface Storage
- Watershed Planning
- Water Transfers

The Central Orange County region benefits from a diverse mix of water supplies due to the foresight and major commitment of the water agencies early on to develop local supplies. Today, the region has a reliable source of supply from groundwater, recycled water, and imported water. A broad array of effective demand management measures are in place, including water use efficiency programs and tiered rate structures that send a direct price signal for overuse. The water system infrastructure is in place, and future capital needs are incorporated into the agencies' respective capital and financial plans.

However, given the water supply conditions across the western United States, there is still a critical need to further enhance local water supplies and decrease dependence on imported water. To be cost-effective and sustainable over the long-term, multiple strategies must be used. IRWD is at the forefront of water resource planning, using progressive water conservation programs, water banking, and water transfers to maximize resources. Conjunctive use has been employed for a number of years to recharge the Orange County Groundwater Basin. Agencies have adopted new technologies to treat significant groundwater issues to ensure that this remains a reliable source of supply.

Progress toward achieving this objective will be assessed on a number of levels, including the following:

- Reduction in deliveries of imported water for potable and non-potable uses due to reduced demand and reliability of local supplies
- Increased production of recycled water and areas of availability
- Volume of impaired groundwater treated and used for beneficial purposes.

Water supply development is expensive, and single-purpose projects will not achieve the level of benefit available through an integrated resource management approach. Success in achieving this objective requires cooperation between agencies with land use and water resource management authority to ensure that groundwater resources are protected and recycled water is used to the maximum extent feasible.

6. Provide a safe, reliable drinking water supply and recreational opportunities for disadvantaged communities within the region, consistent with other areas of the region.

Strategies to be used:

- Water Supply Reliability
- Groundwater Management
- Water Conservation
- Water Quality Protection
- Water Recycling
- Water/Wastewater Treatment
- Conjunctive Use
- Recreation and Public Access
- Desalination
- Imported Water
- Land Use Planning
- Surface Storage
- Watershed Planning
- Water Transfers
- Flood Management

The strategies used to achieve this objective are similar to those discussed above with respect to enhancing local water supplies. Integrated resource planning is an effective tool to ensure environmental justice issues are avoided to the greatest extent possible and the benefits of projects and programs are shared equally throughout the region. The disadvantaged communities receive services from the same systems as adjacent areas within the region; no projects have been included that would result in environmental justice issues.

Recreational facilities with free public access provide important social value to this region. The type and location of these facilities can be expanded through the use of multiple strategies, such as incorporating trails into habitat restoration and flood control projects or using synthetic turf on a sports field as a water conservation project, thereby expanding the capacity of the field for use.

Progress toward achieving this objective will be assessed on a number of levels, including the following:

- Reduction in deliveries of imported water for potable and non-potable uses due to reduced demand and reliability of local supplies
- Increased production of recycled water and areas of availability

- Volume of impaired groundwater treated and used for beneficial purposes
- Range (geographic and type) of recreational facilities added with open public access
- Reduction in number of days (over current year baseline) in which existing recreational facilities/areas are closed due to water quality issues.

Providing equal benefit to disadvantaged communities is an essential component of the IRCWM Plan. The cost-effectiveness of project implementation is an important consideration to avoid increases in water rates and other public service charges that would negatively impact those in lower income brackets. The most effective way to accomplish this is through the use of complementary strategies with a specific focus on achieving multiple benefits through projects and programs and leveraging agency resources. With competing demands for public funds, the greatest gain in improved public services and facilities, including recreation, is through broad project integration rather than single-purpose projects.

7. Provide a framework for efficient intra-regional cooperation, planning, and implementation of this and other plans that have been developed for the region, which encourages integrated implementation of watershed improvement projects with multiple benefits.

Strategies to be used:

- Ecosystem Restoration
- Habitat Protection
- Flood Management
- Stormwater Management
- Water Conservation
- Water Supply Reliability
- Groundwater Management
- Water Recycling
- Water/Wastewater Treatment
- Water Transfers
- Water Quality Protection
- Wetlands Enhancement/Creation
- Land Use Planning
- Non-point Source Pollution Control
- Watershed Planning
- Desalination
- Imported Water
- Surface Storage
- Conjunctive Use
- Recreation and Public Access

This last objective will be achieved through the broad integration of multiple water management strategies. The strategy mix will change according to the scope of the planning effort, project, or program being considered. The long-term commitment of the stakeholders within this region, including public agencies, environmental groups, and private entities, is to work collaboratively toward achieving regional goals for improved water quality, ecosystem restoration, and a reliable local water supply. A number of studies have been conducted for the Newport Bay and Newport Coast Watershed, such that the stakeholders have determined shared goals and objectives. Moving into specific implementation measures, whether capital projects or programs, requires

continued collaboration and cooperation to re-affirm priorities, resolve conflicts, and garner broad public support.

Progress toward achieving this objective will be assessed through the following:

- Number of stakeholders cooperating on individual projects and programs
- Adherence to implementation schedules
- Funding and other support for projects and programs received from other agencies and groups.

This objective is fundamental to the long-term success of the IRCWM Plan. Individual strategies will not accomplish the level of benefit expected from a regional integrated planning effort. The stakeholders are committed to the integrated planning approach, and the IRCWM Plan is structured to leverage the financial and physical resources within the region to achieve the regional goals as cost-effectively and efficiently as possible.

4.4 Benefits of Integration to Meet Objectives

The value of integrated regional planning is a direct result of the extent to which water management strategies are determined to be complementary within a given region and then further identified as a means to achieve regional objectives. The objectives of this IRCWM Plan for water quality, habitat and ecosystem restoration, and enhanced local water supplies present a number of opportunities to combine strategies for greater benefits and improved cost-efficiency. *Table 4.2, Water Management Strategy Integration,* presents a matrix of strategy combinations appropriate for the Central Orange County region and the specific objectives of this plan. The areas marked with a "●" indicate a nexus between the two strategies for accomplishing objectives within this region. Those areas that are shaded indicate that the combination of strategies has been incorporated into the priority projects identified in *Chapter 5*. As reflected in the table, there are a multitude of strategy combinations that could be used; this Plan incorporates a number of them and there are still a wide range of possibilities to be used as projects evolve or conditions change in the watershed.

Table 4.2
Water Management Strategy Integration

	Ecosystem Restoration	Habitat Protection	Water Supply Reliability	Flood Management	Groundwater Management	Recreation/Public Access	Stormwater Management	Water Conservation	Water Quality Protection	Water Recycling	Wetlands Enhancement/	Conjunctive Use	Desalination	Imported Water	Land Use Planning	Non-point Source Pollution Control	Surface Storage	Watershed Planning	Water/Wastewater Tmt	Water Transfers
Ecosystem Restoration		●	●	●	●	●	●	●	●	●	●				●	●	●	●		
Habitat Protection	●		●	●	●	●	●	●	●		●				●	●	●	●		
Water Supply Reliability	●	●		●	●	●	●	●	●	●		●	●	●	●	●	●	●	●	●
Flood Management	●	●	●		●	●	●		●		●	●			●	●		●		
Groundwater Management	●	●	●	●			●	●	●	●		●	●	●	●	●	●	●	●	●
Recreation/ Public Access	●	●	●	●			●	●	●		●				●	●	●	●		
Stormwater Management	●	●	●	●	●	●		●	●	●	●	●			●	●	●	●		
Water Conservation	●	●	●		●	●	●		●	●		●	●	●	●	●		●	●	●
Water Quality Protection	●	●	●	●	●	●	●	●		●	●	●	●		●	●		●		
Water Recycling	●		●		●		●	●	●			●	●	●	●	●	●	●	●	
Wetlands Enhancement	●	●		●		●	●	●	●						●	●		●		
Conjunctive Use	●	●	●	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●
Desalination			●		●			●	●	●		●		●	●			●	●	
Imported Water			●		●			●	●	●		●			●		●	●	●	●
Land Use Planning	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●	●	●	
Non-point Source Pollution Control	●	●	●	●	●	●	●	●	●	●	●	●			●			●		
Surface Storage	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●			●	●	
Watershed Planning	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●
Water/ Wastewater Treatment			●		●		●	●	●	●	●		●	●	●		●	●		
Water Transfers			●		●		●					●		●				●		
Total – Priority Projects	3	7	8	2	4	6	8	4	10	4	4					8		2		

The use of multiple complementary strategies is necessary to achieve the objectives of the Plan, as outlined below.

Water Quality Objectives: One of the major watershed management issues in the Central Orange County region is that land use and other urban activities in the upper watershed areas impact water quality in the coastal ecosystem, particularly the CCAs and ASBSs. Projects and programs to address this issue must be implemented both in the upper watershed areas as well as the coastal areas. Sustained water quality improvements can be obtained through land use planning, flood control, non-point source pollution control, strategically placed treatment wetlands, and water conservation. Any single strategy will not result in the same level of benefit due to limited scope and other activities in the watershed. Given the level of urbanization in the region and magnitude of the issue, single strategies would not result in sustained water quality improvements to the extent possible if multiple strategies were used.

Habitat and Ecosystem Restoration with Flood Control Objective: The level of urbanization within the Central Orange County region makes habitat and ecosystem restoration particularly challenging, due to competing needs for flood control, recreation, and other urban land uses. This region has important ecosystems in the coastal area as well as the upper watershed. Measurable progress toward achieving regional goals for habitat and ecosystem restoration is dependent on the use of multiple strategies. Some drainages within the region can serve dual purposes for flood control and habitat when designed and managed with that purpose in mind. Achieving this balance further requires water quality strategies so that erosion and sedimentation do not impact receiving waters. To be effective, these dual-purpose drainage systems often require greater levels of stormwater management within developments to minimize the impact on the natural drainages during storm events. These strategies are integrally linked, and any stand-alone alternative would not fully achieve the objective or provide long-term regional benefit.

Enhanced Local Water Supply Objectives: Developing local water supplies to a level that results in a long-term reduction in imported water demands is costly. Use of single strategies may ultimately increase the cost of water supply as the projects may not leverage other resources to maximize the range of potential benefits. For example, expanding the capacity of a recycled water system may not achieve its full level of benefit unless it integrates land use planning, wastewater treatment, water conservation, and a variety of other strategies. When the project is planned with full regional integration, conflicts are minimized and benefits extend beyond the planning area. An increased supply of recycled water, available in areas where it can be fully used, reduces demand for imported water, reduces wastewater discharge into the ocean, and conserves water resources in the Bay-Delta and Colorado River.

References Cited

California Water Code §79562.5 and §79564.

Department of Water Resources. 2005. California Water Plan.

EPA and the National Oceanic and Atmospheric Administration. 2000. Non-point Source Pollution Plan.

State Water Resources Control Board and Department of Water Resources. 2005. IRWM Guidelines.

5.0 REGIONAL PRIORITIES AND IMPLEMENTATION

The objectives of this IRCWM Plan and the appropriate mix of strategies to achieve those objectives (see *Chapters 3* and *4*) directly respond to the critical watershed management issues listed below that have been identified for the Central Orange County region given current watershed conditions (*see Chapter 2*):

- Water quality impacts on the CCAs and ASBSs
- Flood control and loss of habitat
- Compliance with water quality regulations
- Enhancing local water supplies
- Impacts on sensitive coastal habitats due to heavy recreational use.

Based on the stated objectives and mix of appropriate water management strategies, this chapter sets forth the regional priorities and plan for implementation, including measuring performance and data management. A broad range of capital improvement projects and programs are prioritized using short-term and long-term planning horizons. In accordance with the IRWM Program Preferences, emphasis was placed on projects that eliminate or significantly reduce pollution in impaired waters and sensitive habitat areas, including ASBSs.

Projects have been considered and prioritized based on a set of criteria further described below. They are grouped into two categories: Priority A projects have higher priority, a shorter time frame for implementation, and offer the greatest benefit due to measurable project outcomes, cost matching, and environmental impacts; Priority B projects are also important to the region but have a longer planning horizon, and, in most cases, the project plan has not been fully developed and matching funds have not been identified yet.

Project identification and prioritization were developed by the IRCWM Group and reviewed by the Newport Bay Watershed Stakeholders Group (see *Section 1.5.1*). The projects are summarized in *Table 5.1, Priority A Projects* and *Table 5.2, Priority B Projects.* Priority A projects are detailed in *Appendix D, Project Descriptions.* The descriptions illustrate clear linkages of Priority A projects with other projects and include discussion on the scientific basis where supporting data/studies are identified. It should be noted that the IRCWM Plan is a programmatic planning document and that analyses pursuant to the California Environmental Quality Act will be conducted separately for each of the proposed projects.

Each of the seven objectives of the IRCWM Plan regarding water quality/pollution reduction, habitat and ecosystem restoration, and local water supply enhancement requires regional solutions. In certain cases, "Regional Action Projects" have been identified where appropriate to implement a common set of strategies across the entire region that would involve a group of participants on a phased, as-needed funding basis; these projects are noted on the project tables.

The 14 projects of highest priority are shown in *Figures 5.1* and *5.2* within the cities and special districts of the region, respectively.

5.1 Priority A Projects and Programs

For purposes of this Plan, the highest priority is given to capital improvement projects that were collectively determined by the IRCWM Group to most strongly support the multipurpose objectives of the IRCWM Plan. High-priority projects were determined based on the following criteria:

- Importance of the project to reducing impacts to CCA Nos. 69, 70 and 71 and ASBS Nos. 32 and 33
- Importance of the project to reducing threat of property loss (with linkage to sediment issues downstream)
- Importance of the project to progress on regional objectives
- Availability of matching funds
- Readiness to proceed: Environmental clearance under CEQA and state and federal environmental and permitting requirements is already achieved, in progress, or readily achievable for the project; project implementation will begin by 2008-2010.
- Equitable geographic distribution and level and diversity of participation by agencies and stakeholders within the watershed.

The highest-ranking Priority A projects and programs are listed in *Table 5.1* in order of priority. The table includes information on the project, estimated capital costs, and timeframe for implementation. The IRCWM Group will continue to evaluate regional priorities and modify the projects list as part of the Plan update process.

The Priority A project group includes the 26 projects with the highest implementation priority using this Plan's ranking criteria. These projects used a total of 13 out of the 20 strategies identified in the IRWM Guidelines by the State, and each project combines between 2 and 5 strategies.

Table 5.1
Priority A Projects and Programs

Priority	Water Management Strategy	Implementing Agency	Project Title	Project Description	Total Project Cost	Construction		Operation / Monitoring Efforts		NOTES
						Start	End	Start	Finish	
A01A/B	Water Quality Protection/Imp. Water Conservation	Irvine Ranch Water District/ City of Newport Beach	Newport Coast Runoff Reduction Program (CCA #69, ASBS #32 and #33)	Incentive Program for residential weather based (ET) controllers to reduce irrigation runoff into CCA #69 and ASBS #32 and #33	$2,070,000	Spring 08	Spring 08	Apr-08	Continuous	CEQA/NEPA: not req'd Leverages and coordinates with MWD and MWDOC programs
A02	Water Quality Protection/Imp. Environmental / Habitat Prot.	County of Orange/City of Lake Forest/ Irvine Ranch Water District	Serrano Creek Reach 2 Bank Stabilization and Sediment /Pollution Reduction to CCA #69 and ASBS #32	Stabilize 1.2 miles of Serrano Creek bank to reduce erosion and sediment reaching CCA #69 and pollutants to ASBS #32; prevent loss of property and life.	$7,500,000	Nov-09	Jul-10	Jul-10	Continuous	CEQA/NEPA: initiate Jul 08
A03	Water Quality Protection/Imp. Ecosystem Restoration Environmental / Habitat Prot. Recreation / Public Access	City of Newport Beach	Restoration of ASBS #32 and Ecosystem Impact Metric	Remove invasive brown algae in rocky inter-tidal zone, re-establish native algae, restore eelgrass; ASBS Impact Metric Assessment; develop information management tools for ASBS restoration	$400,000	Spring 08	Spring 09	Spring 09	Continuous	CEQA/NEPA: Initiate 2007 (MND expected)
A04	Water Quality Protection/Imp. Ecosystem Restoration Environmental / Habitat Prot. Recreation / Public Access	City of Newport Beach	Low Impact Design BMP projects: Reducing Sediment, Metals and Bacteria Load – Treatment Train with Solids Removal, Fine Sediment Removal and Bio-retention	Implement Pilot BMPs for dry weather and low wet weather flows with treatment train approach to benefit ASBS #32 and #33 and CCA #69, #70 and #71	$875,000	Fall 08	Spring 10	Spring10	Continuous	CEQA/NEPA: Initiate 2008 (Categorical Exemption or Negative Declaration anticipated) Links to Priority A01 project for irrigation controllers, runoff reduction
A05	Water Quality Protection/Imp. Ecosystem Restoration Environmental / Habitat Prot. Recreation / Public Access	City of Newport Beach	Copper Reduction Program for CCA #69, ASBS #32 and ASBS #33	Implement boat paint management program to reduce presence of toxics in CCA #69, ASBS #32 and ASBS #33	$150,000	Spring 08	Spring 09	Spring 09	Continuous	CEQA/NEPA: not req'd
A06	Water Quality Protection/Imp. Ecosystem Restoration Environmental / Habitat Prot. Recreation / Public Access	City of Newport Beach	Buck Gully and Morning Canyon: Canyon and Creek Bank Erosion Control BMPs and Riparian and Freshwater Wetland Restoration Project (ASBS #32)	Erosion control and bank stabilization to reduce sediment loads; riparian corridor restoration; construction of natural treatment system at Poppy Lane and Buck Gully to reduce nutrient sediment and bacterial loads entering ASBS # 32	$1,500,000	Spring 09	Fall 09	Fall 09	Continuous	CEQA/NEPA: start 2008 (EIR anticipated)

Table 5.1
Priority A Projects and Programs

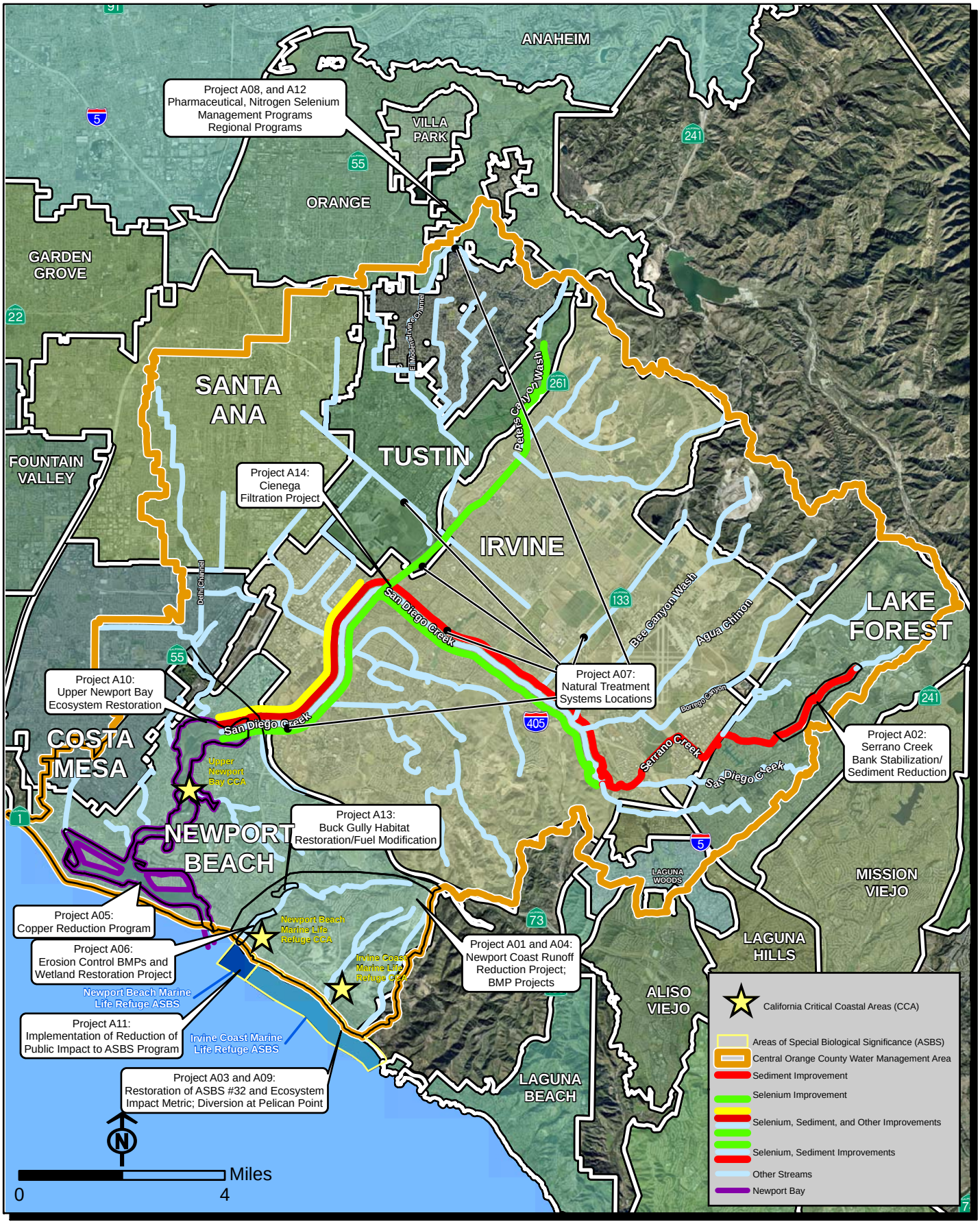
Priority	Water Management Strategy	Implementing Agency	Project Title	Project Description	Total Project Cost	Construction		Operation / Monitoring Efforts		NOTES
						Start	End	Start	Finish	
A07	Water Quality Protection/Imp. NPS Pollution Control Environmental/Habitat Prot. Wetlands Enhancement	Irvine Ranch Water District	Newport Bay Watershed Natural Treatment Systems (CCA#69, ASBS #32, ASBS #33)	Construct several regional water quality wetlands for removal of nitrogen, pathogens, phosphorus and other regulated pollutants to benefit CCA #69, ASBS #32, ASBS #33	$9,300,000	Jul-07	Jul-09	Jul-07	Continuous	CEQA/NEPA: NTS EIR certified April 2004 multiple sites Coordinates with existing NTS program and facilities
A08	Water Quality Protection/Imp. Water Supply Reliability Water/Wastewater Treatment	City of Newport Beach/Orange County Sanitation District	Pharmaceutical Disposal Program/ "No Drugs Down the Drain" Pharmaceutical Education Outreach Tool Box (CCA #69, ASBS #32, ASBS #33)	Establish collection sites for unused pharmaceuticals; develop tool box for public education program to reduce disposal into sewer system	$390,000	Jul-08	Dec-08	Dec-08	Continuous	REGIONAL ACTION PROJECT CEQA/NEPA: not req'd
A09	Water Quality Protection/Imp. Ecosystem Restoration Environmental / Habitat Prot. Recreation / Public Access	City of Newport Beach	Stormwater Diversion at Pelican Point (ASBS #33)	Construct diversion at Pelican Point to reduce storm drain runoff to ASBS #33	$400,000	Jun-08	Nov-08	Nov-08	Continuous	CEQA/NEPA: Negative Declaration – in process Majority of project funded by developer fees
A10	Water Quality Protection/Imp. Ecosystem Restoration Environmental / Habitat Prot. Recreation / Public Access	County of Orange	Upper Newport Bay Ecosystem Restoration (CCA #69)	Restore storage capacity of existing in-bay sediment detention basins (CCA#69)	$41,000,000	Sep-07	Jul-09	Aug-09	Continuous	CEQA/NEPA: complete Additional phase for current project
A11	Water Quality Protection/Imp. Ecosystem Restoration Environmental / Habitat Prot. Recreation / Public Access	City of Newport Beach	Public Impact Reduction Program for CCA #69, ASBS #32	Implement pilot "Exclusion Zone" modeled from State Park Programs to re-establish vegetation along CCA trails; expand docent program to further limit public impact on CCA and ASBSs and implement cooperation program with education groups/Institute to use touch tanks, rotation of study areas and docent coordination.	$200,000	Spring 08	Spring 09	Spring-09	Continuous	CEQA/NEPA: not req'd
A12	Water Quality Protection/Imp. Watershed Planning	County of Orange	Nitrogen and Selenium Management Pilot Program (CCA #69, ASBS #32, ASBS #33)	Implement pilot BMPs for management of nitrogen and selenium	$2,000,000	Jan-09	Dec-09	Spring-09	Continuous	REGIONAL ACTION PROJECT CEQA/NEPA: not req'd

Table 5.1
Priority A Projects and Programs

Priority	Water Management Strategy	Implementing Agency	Project Title	Project Description	Total Project Cost	Construction		Operation / Monitoring Efforts		NOTES
						Start	End	Start	Finish	
A13	Water Quality Protection/Imp. Ecosystem Restoration Environmental / Habitat Prot. Recreation / Public Access	City of Newport Beach	Buck Gully Habitat Restoration and Fire Prevention (CCA #70, ASBS #32)	Buck Gully fuel modification program and residential incentive program; restore native coastal scrub habitat	$400,000	Spring 08	Spring 09	Spring 09	Continuous	CEQA/NEPA: not req'd Links to Priority A01 and A04
A14	Water Quality Protection/Imp. NPS Pollution Control Environmental /Habitat Prot.	Irvine Ranch Water District	Cienega Filtration Project (CCA #69, ASBS #32)	Construct biofilter to remove selenium from surface water in Peters Canyon Channel tributary of San Diego Creek	$26,500,000	Spring 08	Dec-09	Fall-09	Continuous	CEQA/NEPA: NTS EIR certified April 2004 Links to Priority A07
A15	Water Quality Protection/Imp. Watershed Planning	County of Orange	Nitrogen and Selenium Management Program (CCA #69, ASBS #32 and #33)	Implement BMPs to manage nitrogen and selenium	$20,000,000	Jan-11	Dec-11	Fall-11	Continuous	REGIONAL ACTION PROJECT CEQA/NEPA: not req'd Links to Priority A12
A16	Wetlands Enhancement Stormwater Capture/Mgmt Water Quality Protection/Imp. Recreation/Public Access NPS Pollution Control	Irvine Ranch Water District	South San Joaquin Marsh NTS (CCA #69, ASBS #32)	Construct 10-acre wetland for urban runoff treatment serving entire San Diego Creek Subwatershed	$2,300,000	Mar-08	Sep-08	Sep-08	Continuous	CEQA/NEPA: Links to Priority A10
A17	Flood Management Watershed Planning	Irvine Ranch Water District	San Diego Creek Levee System FEMA Certification Study (CCA #69, ASBS #32)	Study to determine improvements needed for FEMA Certification of San Diego Creek levee system to protect Michelson Water Reclamation Plant	$145,000	Sep-07	Apr-08	Apr-08	Continuous	CEQA/NEPA: not req'd
A18	Flood Management Water Supply Reliability	Irvine Ranch Water District	Michelson Water Reclamation Plant Permanent Flood Wall (CCA #69, ASBS #32)	Construct flood wall adjacent to San Diego Creek to prevent inundation of MWRP from 200-year flood	$7,623,000	Jan-08	Aug-08	Sep-08	Continuous	CEQA/NEPA: to be determined Links to Priority A17
A19	Water Quality Protection/Imp. Ecosystem Restoration Environmental / Habitat Prot. Recreation / Public Access	City of Newport Beach	Study of Nutrient Load in Bay and Algae Blooms – Cross Contamination Study to CCA #69, ASBS #32	Assess cause of algae blooms and correlation to high nutrient load into the Bay; conduct cross-contamination model to evaluate migration of nutrient to ASBSs	$450,000	Fall 08	Mar-10	Mar-10	Continuous	CEQA/NEPA: not req'd
A20	Water Supply Reliability	Irvine Ranch Water District	Baker Pipeline Regional Water Treatment Plant	Construct 25 mgd microfiltration plant to treat raw water from Santiago Lateral and/or Irvine Lake	$48,700,000	Jul-08	Feb-00	May-09	Continuous	CEQA/NEPA: initiate Jan 08

Table 5.1
Priority A Projects and Programs

Priority	Water Management Strategy	Implementing Agency	Project Title	Project Description	Total Project Cost	Construction		Operation / Monitoring Efforts		NOTES
						Start	End	Start	Finish	
A21	Water Recycling Water Supply Reliability Water Conservation	Irvine Ranch Water District	Lake Forest Recycled Water Expansion Project	Expand IRWD recycled water system into Lake Forest	$6,820,000	Jul-09	Aug-10	Sep-10	Continuous	CEQA/NEPA: initiate Jan 08
A22	Water Recycling Water Supply Reliability Water Conservation	Irvine Ranch Water District	District-Wide Recycled Water Expansion Project	Design / Construct expanded recycled water distribution system	$6,820,000	Aug-09	Aug-10	Sep-10	Continuous	CEQA/NEPA: initiate Jan 09
A23	Water Recycling Water Supply Reliability Stormwater Capture/Mgmt	Irvine Ranch Water District	Siphon Reservoir Conversion to Recycled Water Storage	Acquire and convert imported water storage from agricultural use to recycled water storage for agricultural use	$7,000,000	Apr-09	Apr-10	Apr-10	Continuous	CEQA/NEPA: initiate May 08
A24	Water Recycling Water Quality Protection/Imp. Water Supply Reliability Stormwater Capture/Mgmt	Irvine Ranch Water District	Peters Canyon Reservoir Conversion to Recycled Water Storage	Acquire and convert imported water storage for agricultural use to recycled water storage for agricultural use.	$14,000,000	Jan-09	Dec-09	Jan-10	Continuous	CEQA/NEPA: initiate May 08
A25	Environmental/Habitat Prot. Stormwater Capture/Mgmt NPS Pollution Control Groundwater Mgmt Water Supply Reliability	Orange County Great Park Corporation	Irvine Wildlife Corridor	Create a wildlife corridor for migration between natural habitats located in and adjacent to City of Irvine	$13,500,000	Jan-10	Dec-10	Jan-11	Continuous	CEQA/NEPA: Completed
A26	Recreation/Public Access Stormwater Capture/Mgmt Water Supply Reliability Water Recycling	Orange County Great Park Corporation	The Great Park	Convert approximately 2,300 acres of former El Toro Marine Corp Air Station into a regional park that will promote sustainability and cultural experiences	$903,000,000	Mar-08	Feb-09	Feb-09	Continuous	CEQA/NEPA: Completed
				Total Priority A Projects	$220,043,000					

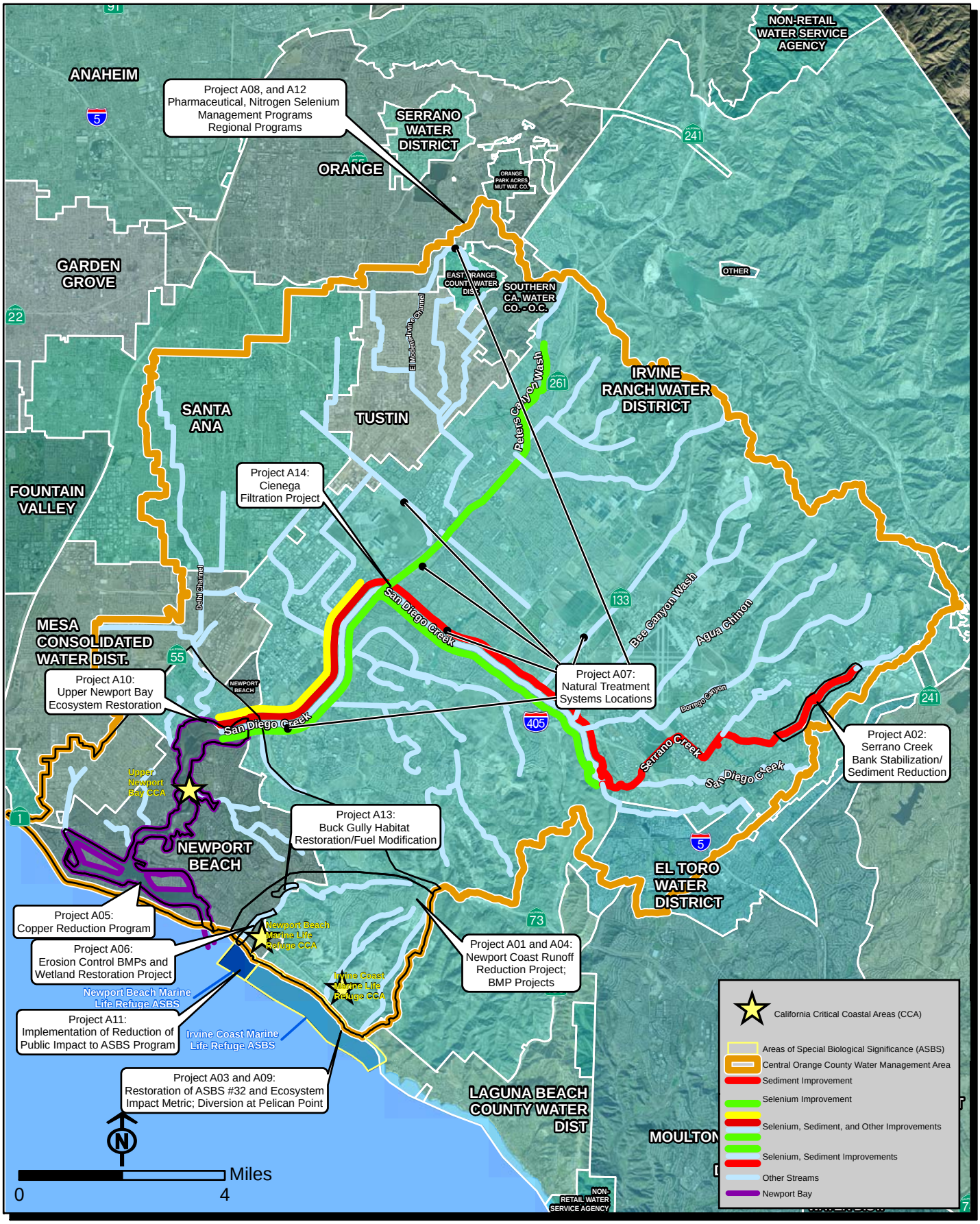


Source: IRWD 2007, RDMD 2007, AirPhoto USA 2006

Central Orange County Integrated Regional and Coastal Watershed Management Plan

FIGURE 5.1

IRCWM Cities and Proposed Projects/Programs



Source: IRWD 2007, RDMD 2007, AirPhoto USA 2006

Central Orange County Integrated Regional and Coastal Watershed Management Plan

IRCWM Districts and Proposed Projects/Programs

FIGURE 5.2

5.2 Priority B Projects and Programs

Priority B projects and programs were determined based on the following criteria:

- Future phases of certain Priority A projects or programs that are anticipated to extend beyond the short-term
- Planning and feasibility projects that have not yet produced a defined capital improvement goal but will contribute toward meeting objectives within the 20-year planning horizon
- Project implementation anticipated not later than 2030
- Ongoing educational, management, or non-structural projects and programs that contribute to the implementation of strategies in order to meet Plan objectives.

Priority B projects and programs are listed and prioritized in *Table 5.2*. The table also shows the project timeframe for implementation.

Table 5.2
Priority B Projects and Programs

					Preconstruction Activity		Construction		Operation or Monitoring Efforts		
Priority A/B	Water Management Strategy, per Prop 50 Guidelines	Implementing Agency	Project Title	Project Description	Planning Study and EIR	Design Phase	Start	End	Start	Finish	Notes
B01	Water Quality Protection and Improvement	County of Orange	Toxicity Management Program	Planning and implementation for management of organochlorinated compounds in anticipation of TMDL	Aug-07	Jun-08	Jan-09	Dec-09	Jan-10	Continuous	REGIONAL ACTION PROJECT
B02	Water Quality Protection / Water Conservation	City of Tustin	Jamboree Road Irrigation System Replacement	Replace median irrigation with WICK irrigation system to eliminate runoff	Jan-08	Mar-08	Jul-08	Jul-09	Jul-09	Continuous	CEQA/NEPA: Complete
B03	Water Supply Reliability / Groundwater Management	City of Tustin	Main Street RO/IE Facility Improvements	Design and construct process control equipment to increase efficiency	Feb-07	Aug-07	Aug-08	Dec-08	Dec-08	Continuous	CEQA/NEPA: Complete
B04	Water Quality Protection	City of Irvine	Jeffrey Road/RR Grade Separation	Water quality control (selenium) for Jeffrey Road undercrossing	NR	NR	NR	NR	NR	NR	CEQA/NEPA: Complete
B05	Water Quality Protection	City of Irvine	Sand Canyon/RR Grade Separation	Water quality control for Sand Canyon Avenue undercrossing	NR	NR	NR	NR	NR	NR	CEQA/NEPA: Complete
B06	Water Quality Protection and Improvement	City of Irvine	Peters Canyon Wash Channel Improvements	Improvements to westerly embankment of Peters Canyon Wash between Harvard Avenue and railroad	NR	NR	NR	NR	NR	NR	CEQA/NEPA: Complete
B07	Water Quality Protection	City of Irvine	University Widening (Campus to SR 73)	Water quality treatment controls for widening of University Drive between Campus Drive and SR 73	NR	NR	NR	NR	NR	NR	CEQA/NEPA: TBD
B08	Water Quality Protection and Improvement / Wetlands Construction and Enhancement	City of Irvine	Como Wetland Project	Construct wetland to reduce levels of nitrogen and selenium discharged at roadway undercrossings	NR	NR	NR	NR	NR	NR	CEQA/NEPA: TBD
B09	Water Quality Protection and Improvement / Environmental and Habitat Protection and Improvement/ Recreation and Public Access	To Be Determined	Borrego Canyon Wash	Bank stabilization to reduce sediment into Upper Newport Bay and prevent loss of property and life.	NR	NR	NR	NR	Jan-00	Jan-00	
B10	Water Quality Protection and Improvement / Environmental and Habitat Protection and Improvement/ Recreation and Public Access	To Be Determined	Serrano Corridor	Create corridor between Upland NCCP area and Coastal NCCP area	NR	NR	NR	NR	NR	NR	
B11	Water Quality Protection and Improvement / Environmental and Habitat Protection and Improvement/ Recreation and Public Access	To Be Determined	Serrano 2 – Transportation Corridor to Upstream of Bake Parkway	Remove non-native plants, expand riparian habitat corridor, convert vacant land for wetland habitat flow diversions, restore diverse native riparian plant community, restore natural steam geomorphology, and modify stream crossings to create better habitat connectivity.	NR	NR	NR	NR	NR	NR	

5.3 Contribution to State Agency Priorities

The Central Orange County IRCWM Plan is consistent with the program preferences for IRWM planning identified in the California Water Code and implementing legislation for Proposition 50, Chapter 8. It is also consistent with the Santa Ana RWQCB priorities outlined in the 2004 Watershed Management Initiative Chapter and assists in implementing the TMDLs that have been adopted and are pending for this region. It further supports implementation of the SWRCB California Ocean Plan and the California Non-point Source Program Five-Year Implementation Plan (2003-2008). The program preferences and Watershed Management Initiative priorities are listed below.

California Water Code IRWM Program Preferences

- Include integrated projects with multiple benefits;
- Support and improve local and regional water supply reliability;
- Contribute expeditiously and measurably to the long-term attainment and maintenance of water quality standards;
- Eliminate or significantly reduce pollution in impaired waters and sensitive habitat areas, including ASBSs; or
- Include safe drinking water and water quality projects that serve disadvantaged communities.

Santa Ana RWQCB Watershed Management Initiative Chapter (November 2004) - Priorities for Grant Projects

1. Projects that implement approved TMDLs, including studies called for in TMDL implementation plans
2. Projects that support development of scheduled TMDLs
3. Projects that address pollutant loadings in urban runoff discharges
4. Projects that protect and improve the quality of local groundwater resources
5. Removal and prevention of invasive, exotic aquatic and riparian vegetation to enhance and protect water quality standards, including habitat and recreation beneficial uses
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, or endangered species
7. Projects that support watershed management planning efforts, especially those that build local capacity in watershed management through citizen involvement and public education

8. Projects that provide tools for managing and/or enhancing access to regional water resources data, water quality data, and watershed data.

Preferences:

9. Projects that include opportunities to build or expand organizational capacity to implement watershed management
10. Projects that lead to water quality improvements within the CCAs of the region
11. Projects that utilize partnerships among diverse stakeholders and that integrate Regional Board priorities with those established by other watershed stakeholders.

The following discussion demonstrates how this Plan, its strategies, and the integrated, multi-beneficial projects support these priorities.

IRCWM Plan Contribution

Implementation of the IRCWM Plan represents progress toward achieving the stated priorities of the Santa Ana RWQCB, as well as IRWM program preferences. Specifically, a major focus of the Plan is to improve water quality in the CCAs and ASBSs. Priority A projects incorporate a number of strategies to achieve results, as shown in the following examples: (1) water conservation programs to reduce runoff within the coastal zone; (2) bank stabilization in Serrano Creek to reduce sediment entering Upper Newport Bay and the pollutant load contained in the sediment; (3) restoration of ASBSs with removal of invasive brown algae; (4) use of low-impact design BMPs incorporating a treatment train approach; and (5) a boat maintenance program to reduce the presence of toxics in Newport Harbor.

As discussed in *Chapter 1*, the watershed stakeholder groups within the Central Orange County region represent a diverse group, including municipalities, state agencies, environmental organizations, academia, and the general public. The stakeholders have a long history of collaboration on projects and studies and have participated in each of the planning efforts that have been conducted for the Newport Bay and Newport Coast Watersheds. Through their involvement, they have established regional priorities for water quality, habitat restoration, and ecosystem enhancement, as well as local water supply reliability. This IRCWM Plan builds off those previous efforts, providing a structure for implementation that supports the use of multiple strategies and leveraging resources to increase the level of benefit. The goals of the stakeholders for this region and the objectives of this Plan are consistent with state IRWM program preferences and the priorities of the Santa Ana RWQCB.

Significant effort to improve water quality conditions has occurred in the region for many years, and it continually advances as new technologies and resources become available. The County of Orange's Drainage Area Management Plan (DAMP) includes watershed action plans for each watershed, which were prepared in cooperation with the NPDES stormwater permittees. Samples of activities within the Newport Bay Watershed that support the priorities identified by the Santa Ana RWQCB are shown in *Table 5.3, Newport Bay Watershed Actions.*

Table 5.3
Newport Bay Watershed Actions

Project	Location	Constituent of Concern
Sediment Trapping Basins	Hicks Canyon, East Hicks Canyon, Round Canyon, Agua Chinon, Bee Canyon, Marshburn, Orchard Estates	Sediment
In-Channel Sediment Basins	San Diego Creek; Jamboree Road – Michelson Drive	Sediment
In-Bay Sediment Basins	Upper Newport Bay	Sediment
Serrano Creek Rehabilitation	Lake Forest	Sediment
San Joaquin Marsh	San Diego Creek; near IRWD WTP	Nutrients – primary
Sewer Diversion Projects	Newport Dunes	Bacteria – primary
Santa Ana Delhi Channel Trash Boom	At Mesa Drive In Newport Beach	Trash
El Modena-Irvine Channel Trash Booms	Near ETC	Trash
San Diego Creek Trash Boom	Near IRWD treatment plant facility	Trash

Similar to the efforts to improve water quality described above, the water agencies within the region have worked collaboratively over the past two decades to ensure water supply reliability and enhance local water supplies to meet the water demands of the significant growth that has occurred within this region. This includes groundwater management and treatment programs, regional infrastructure improvements, indoor and outdoor water conservation programs, and an extensive recycled water system. A number of water recycling projects are included in the Plan to expand the regional system and provide for additional storage. Water conservation programs are included, along with a water quality program, to address pharmaceutical disposal impacting wastewater. The objectives and projects of the IRCWM Plan support IRWM preferences for integrated regional planning to improve local and regional water supply reliability and ensure safe drinking water supplies for disadvantaged communities.

The objectives of the Central Orange County IRCWM Plan are consistent with these priorities and preferences, and the proposed projects will provide measurable contributions toward their attainment. As noted in *Section 1.2, Purpose and Need for the IRCWM Plan*, the Plan is intended to be used as a regional and local planning tool. To ensure that it remains an effective tool for project planning and funding, a basic tenet of the Plan is to support the State's goals for integrated regional water management planning.

5.4 Modification of Regional Priorities in Response to Regional Changes

This IRCWM Plan is a living document, intended to reflect the dynamic watershed planning environment. Therefore, this plan is adaptable to changing conditions within the region, due to new issues or project completions, or other factors that may affect objectives, strategies, and project priorities. It is also structured such that new technical information from studies being conducted in the watershed or other coastal areas can be incorporated as the data become available. As discussed in *Chapter 1*, this region is at the forefront in developing and conducting science-based studies to analyze coastal water quality impacts and identify effective solutions. Information from these studies will be used to adjust water management strategies, identify additional project linkages, and evaluate regional priorities in future Plan updates.

The agencies and stakeholders in Central Orange County regularly collaborate on regional issues. Therefore, by coordinating responses to regional concerns, this IRCWM Plan can be modified, as needed. In addition to the Newport Bay Watershed Management Committee coordination format discussed in *Section 1.6, Governance of the IRCWM Plan*, member agencies also interact at watershed stakeholder meetings and various related task forces and workgroups for the TMDLs, Nitrogen and Selenium Management Program, Orange County Stormwater Program and others. Through these established and intersecting networks, members of the IRCWM Group have extensive access to information and to one another, solidifying their ability to collectively respond to local watershed needs.

The IRCWM Group members bring issues, concerns, changes, and activities to scheduled Newport Bay Watershed Management Committee meetings as well as Stakeholder Group meetings. Each meeting includes an agenda item specifically for the discussion and opportunity to collectively hear, understand, and respond to points of concern, issues, and amendments. This will allow the effective refinement of regional priorities, as needed, for the benefit of the region and its individual stakeholders. In this manner, all stakeholders to the IRCWM Plan will be afforded the opportunity for input to amend the Plan.

As discussed in *Section 1.2.4*, this IRCWM Plan is the first phase of a watershed planning effort for this region. In 2006, the City of Newport Beach was awarded funding through Proposition 50, Chapter 8 for preparation of a consensus watershed management master plan. This effort will incorporate the Central Orange County IRCWM Plan, further enhancing the Plan by applying additional watershed management principles based on a collaborative definition of the desired state of the watershed that balances and integrates the many competing needs and priorities within the system. Modifications to the regional priorities identified through this planning effort will be incorporated into the Plan.

5.5 Technical Analysis and Evaluation of Plan Performance

5.5.1 Technical Data Used for Plan Development

The IRCWM Plan builds off the extensive planning and technical studies that have been conducted for the Newport Bay and Newport Coast Watersheds. Those studies are identified in *Section 1.2* and *Table 6.1,* as well as *Appendix A* (these lists are not exhaustive). Applicable studies are further identified with individual projects in *Appendix D*.

Planning Studies

The planning studies identify opportunities and constraints for watershed projects, including habitat protection and restoration, restoration of ecosystem processes, creek restoration for flood control and water quality, stormwater programs to protect water quality, use of water quality treatment wetlands, runoff reduction through landscape conservation programs, and an array of other studies related to habitat, water quality, and water supply. The studies conducted by the ACOE include a reconnaissance report that documents baseline conditions. Preparation of the draft SAMP included a planning-level wetland delineation and geospatial characterization and assessment of riparian ecosystem integrity in the San Diego Creek Watershed.

Science-Based Technical Studies

The technical studies are scientifically based and measure dry and wet weather flows, constituents of concern, effectiveness of BMPs for water quality, bioaccumulation, sources and contribution to water quality degradation, effects of hydromodification in creek channels, toxicity, and others. In addition, annual monitoring reports are prepared for each of the four TMDLs, containing water quality measurements as specified in the TMDL. A monitoring report is also prepared annually for the County's NPDES permit, and the Orange County Health Care Agency performs weekly water quality monitoring within the watersheds. Each of these studies and regular reports has been used in the development of the Plan as they identify where specific actions are needed and offer scientifically-based recommendations for strategies.

Engineering Studies

The Plan also incorporates the agencies' adopted master plans for water, wastewater, and recycled water systems, each of which includes a detailed engineering analysis of current system conditions, future service demands, and system improvements.

This extensive knowledge base incorporating planning studies, science-based technical studies, and engineering studies has enabled the Plan to be developed through an informed stakeholder process. Because of this valuable resource, watershed management issues and conflicts have been clearly identified, the objectives directly respond to those issues, and implementation of the

strategies and projects has been selected based on the findings and recommendations of those studies.

5.5.2 Data Gaps

As noted above, there are an extensive number of studies that have been completed for the Newport Bay and Newport Coast Watersheds, and there are a number of studies planned or underway. These studies are being conducted to address identified data gaps, such as those described in the 2003 Drainage Area Management Plan Watershed Action Plans. There is good data on the contaminant loads emanating from San Diego Creek, Santa Ana-Delhi Channel and Costa Mesa Channel, but loading data is generally not available for approximately 200 storm drains and other channels draining to Newport Bay. Data gaps identified in the Watershed Action Plans include the following:

- *Nutrients* – specifically the macro-nutrients nitrogen and phosphorus and algae related issues
  - Relationship between low dissolved oxygen levels to algal blooms
  - Conceptual models to describe important processes that effect the nitrogen concentrations, bioavailability, or cycle within the watershed
  - Beneficial use impairment, potentials of adverse effects, and key linkages between nitrogen, environmental conditions, algal growth, dissolved oxygen, and beneficial uses
  - Spatial and temporal concentrations of nitrogen in groundwater and urban runoff and sites of excessive algal growth (freshwater and marine)
  - BMP potential effectiveness
- *Bacteria*
  - Relative magnitude of urban versus natural sources
  - Sources
  - Rapid bacteriological indicators
  - MST identification methods
- *Bulk Sediment*
  - Headland sediment source contribution
- *Sediment Contamination – includes contaminants that are bound to the sediment and transported through the system with the sediment*
  - Contaminants absorbtion to sediment and transported through the system with the sediment
  - Patterns of seasonal sediment contamination and in response to storms
- *Selenium*
  - A conceptual model to describe important processes of selenium

- Concentrations and loading estimates
- Foodweb and wildlife impacts in the watershed
- BMP technology and assessment

- *Toxics – metals (other than selenium), pesticides, and organochlorinated compounds are included in this category.*
  - Organochlorine and PCB concentrations
  - Food web relationships that affect pollutant pathways
  - Risks to human health, fish and other wildlife
  - Technology to identify sources of certain pesticides

There are important data gaps related to a broader understanding of the fate and transport of pollutants within the Bay and the tributary waterways, and toxicity and bioaccumulation of contaminants in the marine habitat. Important questions regarding economics and the social impacts of protecting and restoring watershed habitat have not been analyzed in detail. Through implementation of the IRCWM Plan, data gaps will be identified, prioritized and addressed. The information will be shared locally and through State information and data exchange programs, such as California Environmental Resources Evaluation System (CERES), the California Environmental Data Exchange Network (CEDEN), the Surface Water Ambient Monitoring Program (SWAMP), and the Groundwater Ambient Monitoring and Assessment (GAMA) Program (see *Section 5.6*).

5.5.3 Evaluation of Plan Performance

Each implemented project in this IRCWM Plan will include a Project Monitoring and Performance Plan and a Quality Assurance Project Plan in which water quality monitoring is performed, habitat improvements are assessed, and water supply enhancements are measured. The Performance Plan will address how the project will result in measurable improvements in water quality, watershed condition, water supply, capacity for effective watershed management, and other measurable benefits. The lead project proponent will be responsible for providing update reports to the Newport Bay Watershed Management Committee annually, or more frequently, depending on the project.

In addition to state-compatible data measurements, individual projects will establish other indicators of success as applicable. The following list shows the methods of project monitoring and performance measuring that are either already being implemented within the watershed or will be implemented with the IRCWM Plan:

- Improved water quality measurements
- Acres of wetland restored

- Feet of stream channel stabilization
- Photo documentation
- Reduction in potable water demands due to conservation programs
- Increase in local water supplies—groundwater, desalted, recycled—that offsets imported water demand
- Increased community awareness and participation
- Increased level of collaboration measured by number of projects with multiple partners or supporters.

Each Project Monitoring and Performance Plan will incorporate the following:

1) Characterizes the baseline water quality of the water body impacted and/or identifies the baseline water quantity available to the water supplier
2) Describes the manner in which the proposed activities are implemented (if applicable)
3) Determines the effectiveness of the water or watershed restoration or management activities in preventing or reducing pollution, improving water quality, conserving water, increasing water supply, providing public access, or other water management strategies
4) For stream restoration, environmental and habitat protection and improvement, wetlands enhancement and creation projects, and other similar projects, determines, to the extent feasible, the changes in the pattern of flow in affected streams, including reduction of flood flows and increases in spring, summer, and fall flows that result from the implementation of the project
5) Determines, to the extent feasible, the economic benefits resulting from changes
6) Other project-appropriate environmental monitoring that will provide data important to the accumulation of information regarding the status of the Newport Bay and Newport Coast Watersheds.

As discussed in *Section 5.5.1* above, much of the baseline data currently exists for the various projects in the existing planning, technical, and engineering studies, and the monitoring programs are in place. Additional information that will be used to evaluate Plan and project performance is included within local and regional plans, documents, and programs identified in *Chapter 6*.

5.5.4 Methods to Adapt Operations and Plan Implementation

The IRCWM Plan incorporates the principles of adaptive management; therefore, the Project Monitoring and Performance Plan, Quality Assurance Project Plan, and update reports for each project described above are critical to the long-term success of this planning

process. As noted in *Section 1.7, Process for Plan Implementation*, the Newport Bay Watershed Management Committee will meet regularly, no less than quarterly, to discuss implementation of the IRCWM Plan, collaborative opportunities, status on existing projects, proposals for new projects that meet the objectives and strategies of the IRCWM Plan, available resources, and need for plan refinement.

Section 5.4 above describes the process whereby regional priorities will be adjusted in response to regional changes. A similar methodology will be used to adapt project operations and Plan implementation to ensure progress toward achieving the objectives. This may be required when administrative, budget, schedule, or other factors present constraints to the original project plan, or project performance is not meeting expected targets for water quality improvements, habitat restoration, or water supply enhancements. Adaptive management allows for evaluation of options, including identifying additional partners, implementing additional strategies, identifying further data gaps and the means to obtain the information, restructuring some program elements within the parameters of available funding and regulatory approvals, and incorporating the results of recently completed studies that have bearing on current projects. The IRCWM Group will evaluate project and plan results and consider various options where needed to improve performance or increase benefits.

5.6 Data Management

Data acquisition and sharing will be accomplished through coordination among local agencies and stakeholder groups. This will further assist project proponents in monitoring and data management. Once information is developed and available for dissemination, the public and general stakeholders will be able to access specific data on the county's watershed website: www.ocwatersheds.com. Through the current and future technology of websites and data browsers, the public, stakeholders, and regulators can query data to assist in decision making and management objectives. In addition, water quality monitoring data can be queried and displayed, which is valuable in ensuring the success of the watershed monitoring plan. Information will be posted in lay terms so that the general public will be able to gain an understanding about and support activities within the region. Other monitoring websites will be identified and utilized as appropriate during implementation of the Plan.

As projects within the Plan are implemented, monitoring and information management will be conducted. To ensure data consistency and quality assurance, two activities will be employed, consistent with the SWRCB: quality control and quality assessment. Quality control assures that adequate sampling and technical activities are employed. Quality assessment refers to the process of quantifying the effectiveness of the quality control procedures.

5.6.1 Support for Statewide Data Needs

To establish quality assurance, the watersheds will implement techniques compatible with state programs, such as the California Environmental Resources Evaluation System (CERES), the California Environmental Data Exchange Network (CEDEN), the Surface Water Ambient Monitoring Program (SWAMP), and the Groundwater Ambient Monitoring and Assessment (GAMA) Program.

In doing so, the environmental analyses produced from each of the region's agencies and the Project Monitoring and Performance Plan for individual projects can be made available and valuable for a variety of uses. The projects proposed in this Plan will incorporate the following existing and proposed monitoring methods.

- Water Quality Monitoring: For those projects designed to improve physical quality of water, water sampling is expected to be performed in a manner compatible with state-prescribed methods. A Quality Assurance Project Plan may also be required for such projects.
- Ambient Water Quality Monitoring: Monitoring data will follow the SWAMP data reporting requirements.
- Load Reduction Monitoring: Those projects that include the removal of pollutants from water bodies will generate an annual estimate of load reductions achieved as a part of the project.
- Stream and Wetland Monitoring: Projects that include protection or restoration of streams, shorelines, or wetlands will include an annual accounting of the acreage of wetlands restored, feet of stream bank and shoreline protected, and feet of stream channel stabilized as appropriate.
- Photo-Monitoring: Projects that include restoration or construction activities will include photographic documentation done in accordance with the guidelines produced by the SWRCB.

State Information and Data Exchange Programs

The following provides an overview of the state information and data exchange programs, including CERES, CEDEN, SWAMP, and GAMA:

CERES

The CERES is an information system developed by the California Resources Agency to facilitate access to a variety of electronic data describing California's rich and diverse environments. The goal of CERES is to improve environmental analysis and planning by integrating natural and

cultural resource information from multiple contributors and by making it available and useful to a wide variety of users.

CERES collects and integrates data and information and distributes it via the World Wide Web, tapping into important information sources and contributing to advances in the science of data management and metadata cataloging by encouraging cooperation among governmental, educational, and private groups.

CERES focuses on three related components: technology, data, and community. The first, technology, includes the development of new software and network structures to accommodate the search and retrieval, organization, and accessibility demands associated with huge volumes of data in a wide range of forms. The second, data, encompasses the conversion of information into digital form as well as the evaluation of existing digital data sets and the development of metadata catalogs, required searching, data quality, and appropriate use assessment. The third, community, contains CERES' efforts to promote the use of the network for planning and policy and to foster the growth of new users and contributors in a far-reaching web of affiliations.

CERES also coordinates focused applications to support well-defined natural resource management activities and to supply the public with critical and timely information. CERES Web links that have been developed include:

- Environmental Education
- Environmental Law
- Land Use Planning Information Network
- Watershed Information Technical System
- California Wetlands Information System
- The California Environmental Information Catalog
- California Environmental Keyword Thesaurus.

Data standards are central to the exchange of information between CERES partners. Some data are exchanged by manually transferring them into a shared system. Other data are exchanged using machine-to-machine transfers. CERES has identified multiple websites and standards to be useful for coordinated data sharing, including the California Environmental Information Catalog (CEIC). CEIC is CERES own online directory for reporting and discovery of information resources for California. Potential partnerships for information exchange utilizing this system include cities, counties, utilities, state and federal agencies, private businesses, and academic institutions that have spatial and other types of data resources.

CEIC is based on the Federal Geographic Data Committee (FGDC) metadata standard. Contributors may enter data into the catalog via a convenient web interface, or with a batch process by exporting the data to an XML file made available to CEIC over the Internet.

CEDEN

The California Environmental Data Exchange Network (CEDEN) is another of CERES identified websites for coordinated data sharing. CEDEN is a growing statewide cooperative data exchange program of various groups involved in the water and environmental resources of the State of California. Most of CEDEN's data exchange services are custom developed using a robust tool set, which has been used to connect scores of programs into the network. Multiple projects are underway to extend CEDEN data exchange to additional standards, and those services should be available in the coming year. The Surface Waters Ambient Monitoring Program (SWAMP) describes the standards used for these services, as well as the Environmental Data Standards Council (EDSC), which uses standards to establish data exchanges with the CalEPA node of the EPA National Environmental Information Exchange Network.

SWAMP

The Surface Water Ambient Monitoring Program (SWAMP) was proposed to integrate existing water quality monitoring activities of the SWRCB and the RWQCB, and to coordinate with other monitoring programs.

SWAMP is a statewide ambient monitoring effort designed to assess the conditions of surface waters throughout the State of California. Responsibility for implementation of monitoring activities resides with the nine RWQCBs that have jurisdiction over their specific geographical areas of the state. Ambient monitoring refers to any activity in which information about the status of the physical, chemical, and biological characteristics of the environment is collected to answer specific questions about the status, and trends in those characteristics. For the purposes of SWAMP, ambient monitoring refers to these activities as they relate to the characteristics of water quality.

SWAMP also hopes to capture monitoring information collected under other state and regional board programs, such as the state's TMDL, Non-point Source, and Watershed Project Support programs. SWAMP does not conduct effluent or discharge monitoring that is covered under NPDES permits and Waste Discharge Requirements. In addition, local project implementation and reported water quality results will also provide additional monitoring information for the SWAMP.

Monitoring and assessment of ambient water quality and beneficial uses is necessary in order to:

- Identify and characterize water quality and beneficial use problems and threats;
- Identify trends in water quality and beneficial uses;

- Determine whether water quality standards are met;
- Evaluate the uniqueness or pervasiveness of problems;
- Evaluate the severity of problems;
- Make decisions about which problems and which locations should be prioritized for action; and
- Make decisions about what actions should be taken.

In accordance with Clean Water Act Section 305(b), the SWRCB and RWQCBs periodically compile an inventory of the state's major waters and the water quality condition of those waters, using monitoring data and other pertinent information. This inventory is known as the Water Quality Assessment. The Water Quality Assessment is the foundation upon which the TMDL Program is built, although it continues to be inadequately funded.

To enhance the need for more extensive and more thorough monitoring and assessment of the waters of the Santa Ana region, monitoring, and assessment, for both status and trends, needs to be planned, ongoing, and continuous. The Santa Ana RWQCB intends to use SWAMP resources to ensure that monitoring is conducted in each hydrologic unit once in every 5-year period. Although all hydrologic units will be monitored, current funding will enable only cursory monitoring and assessment to be done. The Santa Ana RWQCB planned to locate monitoring sites on main stem rivers and streams, just above tidal influence; main stem rivers and streams just above the confluence with major tributaries, and major tributaries just above the confluence with the main stem rivers and streams.

Ambient monitoring is not and does not need to be conducted only by SWRCB/RWQCB staff. Academic and other research groups, dischargers, and other stakeholders all have a role in monitoring and assessment. Therefore, the Central Orange County IRCWM Group will assist in meeting the goals of the Water Quality Assessment Program and the SWAMP by providing water quality data to the State's programs. This additional level of monitoring information will be conducted in a useful and coordinated manner to the State to enable sharing of information and avoid duplicative monitoring. The State's monitoring coordination program, initiated in July 2004, will assist in identifying regulatory and non-regulatory monitoring efforts in the Santa Ana region and to coordinate the SWAMP monitoring efforts with these programs.

GAMA

The primary objective of the GAMA Program is to comprehensively assess statewide groundwater quality and gain an understanding about contamination risk to specific groundwater resources. The primary goal of the Comprehensive Groundwater Quality Monitoring Program is to:

- Improve comprehensive groundwater monitoring
- Increase the availability of groundwater quality information to the public.

To facilitate a statewide, comprehensive groundwater quality-monitoring and assessment program most efficiently, uniform and consistent study-design and data-collection protocols are being applied to the entire state. The GAMA Program monitors groundwater for a broad suite of chemicals at very low detection limits, including exotic chemicals, such as wastewater chemicals and pharmaceuticals. Monitoring and assessments for priority groundwater basins are to be completed every 10 years, with trend monitoring every 3 years. The SWRCB is collaborating with the U.S. Geological Survey and Lawrence Livermore National Laboratory to implement the GAMA Program.

Stewardship of the state's groundwater resources is the shared responsibility of all levels of the government and community. A key aspect of GAMA is interagency collaboration, data sharing, and communication with local water agencies. While the GAMA Program remains voluntary, the program provides numerous benefits to federal, state, local, and community participants:

- Improves comprehensive statewide groundwater monitoring;
- Increases the availability of groundwater quality information to the public;
- Provides a mechanism to unite local, regional, and statewide groundwater programs in a common effort to understand and manage groundwater resources effectively;
- Facilitates interagency communication and data sharing between federal, state, and neighboring local agencies;
- Improves understanding of local, regional, and statewide hydrogeology, as well as groundwater quality issues and concerns;
- Provides groundwater data to establish baseline conditions and early warning of potential water quality concerns;
- Provides agencies with knowledge of groundwater trends and long-term forecasting in groundwater quality, which is important for groundwater management plan growth and preparation;
- Provides agencies with better information to respond to concerns of consumers and consumer advocate groups;
- Helps inter-basin agencies that have basin-wide or regional groundwater management objectives; and
- Creates a database with access to groundwater quality data and provides tools to aid in completing groundwater assessments.

The GAMA Program has two sampling components: the California Aquifer Susceptibility (CAS) Assessment, which addresses public supply drinking water wells, and the Voluntary Domestic Well Assessment Project, which addresses private drinking water wells. The CAS assessment utilizes low-level VOCs and age-dating analyses to assist in the evaluation of the hydrogeologic conditions within the groundwater basin/subbasin. The GAMA Program is also focused on an effort to identify and centralize the many sources of groundwater data and information available in the state. As part of this effort, the SWRCB has joined with other groundwater agencies to form a Groundwater Resources Information Sharing Team. The various groundwater data sets will be made accessible to the public and interested agencies within a Groundwater Resources Information Database.

Various groundwater monitoring and assessment programs collect a significant amount of groundwater-related data in various coverage and formats. Data in different electronic formats may not be as valuable as a single database of information. The lack of data comparability and sufficient data sharing significantly hampers oversight of groundwater resources.

Identification of measures that would increase coordination among state and federal agencies that collect groundwater contamination information would be beneficial.

Coordination is essential for the success of a Comprehensive Groundwater Quality Monitoring Program. Increased coordination will also benefit all agencies through data sharing, training costs, and project responsibilities. The emphasis should be on increasing collaboration to effectively expand existing programs to cover a wider range of sampling, analyses, and evaluation efforts. The following measures will result in increased basic interagency coordination and communication on groundwater programs:

- Share data (e.g., GIS Coverage);
- Share data collection responsibilities;
- Develop minimum sampling and analytical protocols;
- Share specialized training;
- Share laboratory facilities and information on laboratory methods;
- Ensure interagency coordination and communication;
- Meet on a periodic basis to achieve these listed elements; and
- Develop a standardized data format for electronic submittal of groundwater monitoring data.

The GAMA program recognized the value of public supply wells used in a monitoring network to assess groundwater that is used for drinking water purposes. By enhancing the analytical information already collected by the local purveyors, GAMA further analyzes for low-level

VOCs and age-dating in order to assist in assessing the hydrogeology in areas that are vulnerable to surface contamination as well as be an early warning indicator of impacts. The GAMA program has already begun to assess these high-priority areas.

Just as state agency data are being incorporated into a comprehensive database, local groundwater quality data may also assist in basin/subbasin and larger scale assessments. It is anticipated that the amount of local data is significant in some basins/subbasins. Partnerships and effective coordination with the local agencies will be an important part of the Comprehensive Groundwater Quality Monitoring Program. Thus, projects implemented as part of the Central Orange County IRCWM Plan that result in information beneficial to the GAMA Program will coordinate with the State to provide useful data.

5.6.2 Existing Monitoring Efforts

Specific types of monitoring are currently being implemented throughout the watersheds to comply with the TMDLs, NPDES permits, and General Waste Discharge Permits, as well as Department of Health Services requirements for drinking and recycled water. In the Newport Bay Watershed, there are a myriad of monitoring stations for measuring sediment, surface water quality, TMDL parameters, and other bioassessment characteristics (see *Figures 2.10* and *2.11*).

The Sediment TMDL includes a monitoring element for Newport Bay and incorporates bathymetric surveys, vegetation surveys, and sediment removal. Surface water at the Upper and Lower Newport Bay monitoring stations has been sampled since 1976. The Orange County Healthcare Agency monitors near-shore water quality weekly. The Upstream Monitoring Element consists of monitoring the sediment holding capacities of the three in-channel basins and seven foothill basins. In addition, fluvial sediment samples and streamflow data are collected from eight monitoring stations, which are located at:

- Peters Canyon Wash at Barranca Parkway
- San Diego Creek at Culver Drive
- San Diego Creek at Campus Drive
- Santa Ana-Delhi at Irvine Avenue
- Sand Canyon Channel at University Drive
- Bonita Canyon Creek at MacArthur Boulevard
- Marshburn Channel at Trabuco Road
- Agua Chinon Channel at Irvine Boulevard

The routine monitoring for nutrients includes most of the traditional monitoring that has occurred in the watershed (i.e. 24 hour composite samples collected either weekly, bi-weekly, or monthly from drainages throughout the watershed). The sampling locations are:

- Santa Ana-Delhi Channel at Irvine Boulevard
- San Diego Creek at Campus Drive
- Bonita Canyon Creek at MacArthur Boulevard
- Costa Mesa Channel at Westcliff
- El Modena-Irvine Channel at Michelle
- Lane Channel at Jamboree
- Agua Chinon Wash at Irvine Center Drive
- Peters Canyon Wash at Barranca
- San Diego Creek at Culver

The data collected from this routine monitoring is used to assess progress in the attainment of the interim and final TMDL targets for total nitrogen and total phosphorus loadings to the Bay.

The County of Orange and the watershed cities have implemented a routine monitoring program to determine compliance with bacterial quality objectives in Newport Bay. At a minimum, routine monitoring includes the collection of five samples per 30-day period at a total of 35 stations throughout Newport Bay. The results of this monitoring are analyzed each year and are presented to the Santa Ana Regional Water Quality Control Board in an Annual Data Report.

The City of Newport Beach is developing a watershed program for the Newport Coast as an organizing tool for future activities in the watershed. As part of this program, a monitoring program will specify biological indicators and metrics to assess and monitor ecosystem health relative to watershed function. Examples of applicable indicators include biomass of native riparian wetland vegetation, habitat use by declining or sensitive species, attached fresh-water algae, aquatic macro-invertebrate diversity and distribution, and the health and diversity of intertidal and subtidal communities in the marine life refuges. Additional indicators will be selected in consultation with the Santa Ana RWQCB and the County of Orange. In addition, the watershed program will include a program for mapping the areas of *Arundo* and instituting a removal program.

IRWD and OCSD monitor their wastewater systems and test wastewater and recycled water quality. In addition, each well is monitored and tested on a monthly basis for production and water quality. OCWD monitors groundwater production on a monthly basis, and MWD monitors imported water deliveries daily. Because of the water quality issues within this region, there are comprehensive monitoring programs already in place that will be incorporated into the Plan Performance and Monitoring protocols for this IRCWM Plan.

5.7 Financing

5.7.1 Funding Sources

Implementation of the Central Orange County IRCWM Plan will be funded through a variety of sources, including agency resources such as utility user fees and general revenues, capital funding which may include financing, funding available through regional agencies such as

MWD for conservation and local resource projects, federal funding, and grant funding. The agencies have planned for the projects through their individual and collaborative planning activities, and this has included financial planning to ensure project implementation within a time period that yields the highest level of benefit in terms of efficiency, economies of scale, and cost avoidance. Substantial local funding has been identified for the individual projects and is reflected in *Appendix D*.

Overall Plan implementation will be administered by the County of Orange; however, individual projects will be implemented by the project proponent. Potential grant funding/financing for projects will continue to be pursued and would be administered by the County if received on a regional basis, while other funding will be the responsibility of the implementing agency. The Plan has been structured to be used as a funding tool and promotes continued pursuit of project funding from local sources, state and federal sources, and partnerships.

5.7.2 Implementation Beneficiaries

Implementation of the IRCWM Plan will have far-reaching benefits. The following beneficiaries have been identified:

- Residents and property owners of the region
- Disadvantaged communities
- Local businesses
- Local governmental organizations – county, cities, special districts
- State agencies responsible for water quality and water supply
- State/federal agencies responsible for habitat protection
- Environmental and other community groups
- Project partners
- Local and transient tourists
- Newport Harbor boaters
- Groundwater producers outside the IRCWM Planning area
- Other water agencies reliant on the Bay-Delta and Colorado River for water supplies
- Other agencies and organizations seeking to implement programs to protect CCAs and ASBSs.

5.7.3 Support and Financing for Project Operations and Maintenance

Adequate financial support for operations and maintenance (O&M) of projects has been considered in the project prioritization process and was a factor in determining whether a project

was appropriate for inclusion in the Plan. During the project review period, O&M costs were identified to the extent feasible, and the project proponents confirmed that the financial resources are, or would be, available upon implementation. Where available, O&M costs for individual projects are included in *Appendix D*.

5.8 Impacts and Benefits from Plan Implementation

5.8.1 Impacts from Plan Implementation

With the exception of possible project-related environmental impacts that will be addressed through the CEQA process (see *Section 5.8.6* below), no negative impacts to the region or adjacent areas are anticipated due to Plan implementation. This Plan seeks to improve water quality through the use of a wide range of water management strategies implemented throughout the planning area. It further seeks to restore habitat and ecosystem processes within the Newport Bay and Newport Coast Watersheds and enhance local water supply reliability, which reduces the impact of this region on water supplies in the Bay-Delta and Colorado River. The Plan supports the urban uses within the region, seeking mutually beneficial solutions to the watershed management issues. The Plan's objectives respond to the watershed management issues, the strategies are comprehensive and appropriate for the region, and the projects have been prioritized to provide measurable, cost-effective progress toward achieving the objectives.

5.8.2 Benefits of a Regional Plan

Implementation of the IRCWM Plan and its projects will lead the Central Orange County region into a future with protected and improved water quality, a reliable water supply, and achievement of state agency priorities and program preferences for integrated regional planning. The IRCWM Plan serves as a bridge for previous planning efforts as well as ongoing efforts within the region. As such, it provides greater value as a regional planning tool and offers greater advantages than individual efforts due to its ability to create project linkages, incorporate multiple strategies, and leverage agency resources. These advantages are discussed below.

As the Plan is implemented and benefits of water quality, habitat protection, and water supply are realized, so will adjacent areas and regions benefit from the Central Orange County regional efforts. The coastal resources within Central Orange County are important regionally for their environmental, social, and economic value. In addition, Upper Newport Bay has critical habitat for the Pacific flyway. Development of local water supplies and improved reliability of existing supplies provide benefits to the Bay-Delta and the Colorado River through reduced demand for imported water. It also improves the reliability of imported water supplies for other regions that do not have adequate local supplies.

Long-term attainment and maintenance of water quality standards within the region complement efforts to restore ecosystems and habitat, enhance local water supplies, and increase outdoor recreational opportunities. Pollution reduction in impaired water bodies and sensitive habitat benefits local wildlife, which includes some endangered species. Overall improvements to watershed conditions and functions provide greater opportunities for communities to enjoy the area in which they live, including beach activities, hiking, biking, bird watching, and other activities.

The IRCWM Plan establishes an integrated regional water management model that complements IRWM efforts in south Orange County, north Orange County, and the broader Santa Ana region. Individual projects that are implemented and produce beneficial results may also be used as pilot projects that are transferable to other regions. Regional planning presents the opportunity for collective and collaborative planning in a logical and beneficial process. The prioritization of projects within the region provides the greatest benefit for the greater good.

Collaboration on regional projects and priorities will achieve substantially enhanced regional benefits, increased opportunity for project implementation, collective planning to monitor regional changes and facilitate refinements for implementation, increased participation, and cooperation by the public and interregional benefits to adjacent areas. The benefits provided through improvements to watershed and habitat areas know no boundaries. On a number of levels, neighboring regions benefit from implementation of the Central Orange County IRCWM Plan.

5.8.3 Benefits to Disadvantaged Communities/Environmental Justice

The IRCWM Group has made it a top priority to incorporate benefits to disadvantaged communities within its projects. As discussed in *Sections 2.4.2* and *2.10.2*, residents of disadvantaged communities utilize the regional parks, open space, and waters within the region as recreational hubs. Waters within the region include area beaches, local creeks and streams, and wetland environments. Since these areas are 100 percent accessible to the disadvantaged communities of Central Orange County, projects which enhance water quality in those areas will benefit these communities.

The impaired surface water quality of the watersheds greatly impacts the recreational opportunities for the disadvantaged community members, especially since the watersheds drain to the beach areas. The Santa Ana RWQCB has designated beneficial uses for some of the watershed waters for contact and non-contact water recreation. Projects proposed in this Plan will contribute to these beneficial uses and provide benefit to the region's disadvantaged communities.

The disadvantaged communities are served by the same water supplies and water systems as other areas within the region. The interests of these communities are considered in individual agency plans and this IRCWM Plan. Currently, there are no environmental justice issues related to water and wastewater facilities or recreation within this region, and no projects are proposed that would change this condition.

5.8.4 Coastal Benefits

Corona del Mar State Beach, Newport Harbor, Crystal Cove State Park, and regional parks located along stream courses serve as community gathering places and are used heavily year-round on the weekends. Many of the recreational areas are accessible via public transit and often do not charge an entrance fee for walk-in visitors. Many recreational areas are also handicapped accessible.

The major focus of this Plan is to improve water quality discharging to Upper Newport Bay, Newport Beach Marine Life Refuge, and Newport Coast Marine Life Refuge. As noted in *Chapter 2*, water quality is impaired due to drainage from the upper watershed areas. Water quality is a key consideration for the region to ensure protection of these important coastal ecosystems as well as the health and safety of the region's residents who use these areas for recreation.

5.8.5 Inland Benefits

Multiple water quality and habitat protection projects are proposed in the region, as well as improvements to the Upper Newport Bay Ecological Reserve, a main attraction in the region. These projects meet multiple objectives and provide multiple benefits, including recreational and aesthetic benefits. Expanded opportunities for recreational benefits include contact and non-contact water recreation, walking paths, bird watching, nature study, painting and photography, and other passive activities that would become available at no cost to all community members.

Educational and public outreach activities will also increase residents' understanding of water quality issues and appreciation of wetlands and other areas of significance, including how human interaction impacts habitat areas and other natural resources. Natural areas that are open and available to the public at no cost are generally utilized by disadvantaged community members, whom can become stewards of the environment through information and education. The existing Peter & Mary Muth Interpretive Center in Upper Newport Bay fills a regional need for a venue offering practical public education in the stewardship of watershed, energy, and material resources. The Center is used for educational and recreational purposes and provides and demonstrates environmental benefits. The Center will be used to inspire broad implementation of water quality and water conservation improvements across the region.

5.8.6 Environmental Impacts/Benefits to Other Resources

The Central Orange County region contains important environmental resources, extending from headwaters to the ocean, and ranging from urban landscape to open space. These resources include water, wildlife, cultural and physical landscapes; in short, every physical entity that surrounds those that find themselves within the boundaries of the watersheds themselves.

Currently, local watersheds are suffering from a variety of water resource and related land resource problems. Most of these are related to widespread changes in the watersheds, including changes in the hydrologic regime, channel instability, habitat loss, ecosystem degradation, declines in water quality, threats to recreational resources, and others. While change is a part of the evolution of any landscape, dramatic change from a balanced historical state often results in undesirable consequences.

A number of the projects identified in this Plan are in biologically sensitive areas and could have unintended negative effects on the surrounding environment if not properly located, designed and managed. Members of the IRCWM Group have a long history of working collaboratively with the resource agencies on projects within the Newport Bay and Newport Coast Watersheds and will continue to do so as this Plan is implemented to ensure that the projects are consistent with regulatory requirements and adopted plans, such as the Central/Coastal Orange County Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP).

All proposed projects within the IRCWM Plan are individually evaluated under CEQA and/or NEPA guidelines to identify potential impacts (both negative and beneficial) to the following:

- Aesthetics
- Air Quality
- Biological Resources
- Cultural Resources
- Geology and Soils
- Hazardous Materials
- Hydrology and Water Quality
- Land Use and Planning
- Noise
- Population and Housing
- Public Services
- Recreation
- Transportation and Traffic
- Utilities and Service Systems

Where significant potential negative impacts are identified, the CEQA/NEPA process will implement appropriate mitigation measures into the project. Responsibility for mitigation measures lies with the individual project sponsor(s). Where there are potential impacts to jurisdictional waters, habitats or species, mitigation requirements are determined within permitting processes with the RWQCB, ACOE, and CDFG. Federal anti-degradation policies

for surface water quality and "no net loss" policies for wetlands are typically reflected in the permit requirements.

Table 5.1 includes the status of the CEQA/NEPA review for the top 14 priority projects. The descriptions also include a section for scientific basis where supporting data/studies are identified and include potential negative impacts. In addition, the data management methods identified in *Section 5.6* will work in conjunction with environmental impact analysis and ongoing project monitoring to identify potential impacts.

6.0 RELATION TO LOCAL PLANNING

6.1 IRCWM Plan and Linkage to Local Plans

To minimize the potential for conflicts and ensure full implementation of the IRCWM Plan, the goals and policies within planning documents adopted by local agencies with land use and water resource management authority are integrated into the Plan. This planning approach is fundamental to the Plan as it builds off the extensive planning efforts and studies that have been conducted within the Newport Bay and Newport Coast Watersheds, many of which have been used to formulate goals and policies within individual agency plans. The Plan's objectives, strategies, and projects will improve watershed conditions related to water quality, habitat protection, ecosystem restoration, and local water supply reliability, consistent with the goals and policies in local adopted plans.

6.1.1 Consistency with Local Plans

This Plan is consistent with the policies in the following local land use plans that provide for appropriate land uses, water and wastewater services, flood protection, recreation, water quality, and protection of natural resources:

- General Plans and Specific Plans:
  - City of Costa Mesa General Plan: Land Use, Conservation, Open Space, and Recreation Elements
  - City of Irvine General Plan: Land Use, Parks and Recreation, Conservation, and Open Space Elements
  - City of Irvine: Great Park Preliminary Master Plan
  - City of Lake Forest General Plan: Land Use, Recreation and Resources, Public Facilities/Growth Management Elements
  - City of Newport Beach General Plan: Land Use, Harbor and Bay, Recreation, and Natural Resources Elements
  - City of Newport Beach Local Coastal Program
  - City of Santa Ana General Plan
  - City of Tustin General Plan: Land Use, Conservation/Open Space/Recreation Elements
  - City of Tustin: MCAS Tustin Specific Plan
  - County of Orange General Plan.

In addition, the Plan is consistent with adopted plans for local agencies with water resource management responsibilities, such as drinking water supply, wastewater treatment, flood control, water quality, and stormwater management. The Plan supports the policies and

recommendations of these adopted plans to ensure reliable water supplies, water quality, and protection of life and property, among others:

- Urban Water Management Plans (for reliable water supplies):
  - IRWD, City of Newport Beach, Mesa Consolidated Water District, City of Santa Ana, City of Tustin, El Toro Water District, Golden State Water Company, East Orange County Water District
- Sewer System Management Plans (to avoid water quality impacts):
  - IRWD, OCSD, Costa Mesa Sanitary District, City of Newport Beach, City of Tustin, El Toro Water District
- Master Plans for Water, Wastewater, Recycled Water, and Natural Treatment Systems
- Drainage Area Management Plan (for stormwater protection)

Lastly, the Plan is consistent with adopted local plans for habitat protection and enhancement to ensure that no regulatory conflicts arise:

- Central/Coastal Orange County Natural Community Conservation Plan/Habitat Conservation Plan.

Land use data have assisted in the regional planning and projections of water demands, water use classifications, infrastructure master planning, and reliability planning for the future as well as the identification of appropriate locations for water quality projects and habitat protection. The IRCWM Plan will continue the essential link to local plans and can be considered a planning document in return for many local land use plans. Land use within the region is further discussed in *Section 2.4* and shown in *Figures 2.7a* and *2.7b.*

6.1.2 Local Agency Planning Documents

Many existing plans and studies, including master plans, facility plans, watershed management plans, recycled water studies, feasibility studies, and long-range plans contain proposed projects that are instrumental in meeting the goals and objectives of the region. Many projects within local and regional plans and studies have been incorporated into the IRCWM Plan and will continue to be implemented in coordination with those plans. *Table 6.1, Existing Local and Regional Plans, Documents, and Programs,* lists a number of the plans and studies that were used to form the framework for the IRCWM Plan objectives and to identify strategies and projects to achieve those objectives.

Table 6.1
Existing Local and Regional Plans, Documents, and Programs

Agency	Document Title	Author	Date
Costa Mesa, City of	Capital Improvement Project, 2006-2007	City of Costa Mesa	2005
Irvine, City of	Capital Improvement Program, Proposed 2007-2008	City of Irvine	2007
Irvine, City of	General Plan	City of Irvine	06/06
Irvine, City of	Sustainable Travelways "Green Streets" Administrative Guidelines for The Great Park	Fuscoe Engineering	05/06
Lake Forest, City of	Capital Improvement Projects Budget, 2005-2007	City of Lake Forest	2005
Lake Forest, City of	General Plan	City of Lake Forest	07/01
Lake Forest, City of	Opportunities Study Program Draft EIR	EIP Associates	2006
Lake Forest, City of	Serrano Creek Collaborative Use Plan	Willdan Associates	1998
Laguna Hills, City of	Capital Improvement Plan, 2005/06-2006/07	City of Laguna Hills	2005
Newport Beach, City of	Urban Water Management Plan, 2005		
Newport Beach, City of	General Plan		
Newport Beach, City of	Capital Improvement Program, Preliminary 2007-2008	City of Newport Beach	2007
Newport Beach, City of	Newport Coast Watershed Management Plan (Draft)	Weston Solutions	2007
Orange, City of	Capital Improvements	City of Orange	2006
Santa Ana, City of	Urban Water Management Plan, 2005	Psomas	11/05
Tustin, City of	General Plan		
Tustin, City of	Urban Water Management Plan, 2005		
Tustin, City of	Capital Improvement Program 2006-2007		
County of Orange	Capital Improvements	County of Orange	2006
County of Orange	Upper Newport Bay/San Diego Creek Watershed Sediment TMDL, 2005-06 Annual Report	County of Orange	2006
County of Orange	Newport Bay Fecal Coliform TMDL Annual Report	County of Orange	2006
County of Orange	Newport Bay Watershed Nutrients TMDL, Quarterly Data Report Oct-Dec 2006	County of Orange	2006
County of Orange	Nitrogen and Selenium Management Program (NSMP) Work Plan	County of Orange	2005
County of Orange	Library of NSMP Documents; http://www.ocnsmp.com/library.asp	Various	2005 -2007
County of Orange	Drainage Area Management Plan	Co-Permittees	11/06
County of Orange / All cities	Local Implementation Plan (Jurisdictional Urban Runoff Management Plan)	Co-Permittees	2003
County of Orange	Identification of Regional BMP Retrofitting Opportunities Draft (Stormwater Program)	RBF Consulting	04/04
County of Orange	Natural Community Conservation Plan	County of Orange	1996
County of Orange	Newport Bay/San Diego Creek Watershed, Reconnaissance Study, Project Study Plan Final Draft	U.S. Army Corps of Engineers	04/99
County of Orange	Newport Bay/San Diego Creek Watershed Management Study Technical Appendices	U.S. Army Corps of Engineers	07/01
County of Orange	San Diego Creek Watershed Study, Hydraulic & Sedimentation Appendix	U.S. Army Corps of Engineers	06/03
County of Orange	Upper Newport Bay/San Diego Creek Watershed Feasibility Study, Preliminary Draft	U.S. Army Corps of Engineers	10/05
County of Orange	Serrano Creek Reconnaissance Study 905b	U.S. Army Corps of Engineers	
County of Orange	San Diego Creek Watershed Special Area	U.S. Army Corps of	2004

Table 6.1
Existing Local and Regional Plans, Documents, and Programs

Agency	Document Title	Author	Date
	Management Plan (Draft)	Engineers	
East Orange County WD	Capital Replacements and Improvements Budget for 2006-2007	East Orange County WD	2006
East Orange County WD	Urban Water Management Plan, 2005	Psomas	12/05
El Toro WD	Urban Water Management Plan, 2005	Ergun Bakall	12/05
Irvine Ranch WD	Urban Water Management Plan, 2005	Irvine Ranch WD	11/05
Irvine Ranch WD	Water Resources Master Plan	IRWD	1999
Irvine Ranch WD	San Diego Creek Watershed Natural Treatment System Master Plan	GeoSyntec Consultants	06/05
Irvine Ranch WD	San Diego Creek Watershed Natural Treatment System Revised EIR	BonTerra Consulting	01/04
Irvine Ranch WD	Cienega Filtration Project Field Demonstration Preliminary Design Report	GeoSyntec Consultants	10/06
Irvine Ranch WD	Results of the Pre-Design Optimization Study Supporting the Cienega Filtration Project	GeoSyntec Consultants	01/06
Irvine Ranch WD	Wetlands Selenium Mesocosm Pilot Study	GeoSyntec Consultants	04/03
Irvine Ranch WD	Selenium Pilot Study Column Test Results	GeoSyntec Consultants	04/03
Mesa Consolidated WD	Urban Water Management Plan, 2005	Mesa Consolidated WD	11/05
Mesa Consolidated WD	Capital Improvement Program	Mesa Consolidated WD	05/02
Moulton Niguel WD	ETWD, IRWD, and MNWD Recycled Water Project Study Draft	Tetra Tech	12/2003
MWDOC	Regional Urban Water Management Plan Update. 2005	MWDOC	12/05
MWDOC	Determining the Value of Water Supply Reliability	Orange County Business Council	8/03
Orange County WD	Groundwater Management Plan	OCWD	2004
Santa Ana RWQCB	Watershed Management Initiative Chapter	Santa Ana RWQCB	11/04
Santa Ana RWQCB	Water Quality Control Plan, Santa Ana River Basin	Santa Ana RWQCB	1995
Santa Ana RWQCB	Total Maximum Daily Loads for Organochlorine Compounds	Kathy L. Rose, Ph.D.	11/06
SAWPA	Santa Ana Integrated Watershed Plan 2005 Update	SAWPA	06/05
SAWPA	Santa Ana Integrated Watershed Plan, Volume 1: Water Resources Component	SAWPA	06/02
SAWPA	Santa Ana Integrated Watershed Plan, Volume 2: Environmental and Wetlands Component	EIP Associates	

6.2 Coordination with Local Land Use Agencies

The IRCWM planning process involves a broad stakeholder group, including representatives from each of the local agencies with land use authority (see *Section 1.5.1* and *Appendix B*). This level of involvement ensures that there is coordination with local land use planning agencies so that the planning efforts maximize the potential benefits for both land use and water resource

management. Specifically, land use agency participation occurs through the Newport Bay Watershed Executive Committee and the Newport Bay Watershed Stakeholders Group (see *Section 1.5.1*). The agencies with land use authority actively participate in these groups, which provides an effective means for coordination.

6.3 Local Planning and Water Management Strategies

Within the Central Orange County region, the nexus between land use decisions, water resource management, and coastal zone impacts has been firmly established through a number of studies conducted within the watersheds. As a result, the dynamic relationship between water management strategies and local agency planning documents benefits the IRCWM planning process. Incorporating the use of a broad range of strategies increases the benefits and minimizes the potential for conflicts with local adopted plans. For example, a number of strategies may be appropriate for certain areas or project types as they directly support the policies and goals of the planning documents. However, in some cases, a particular strategy may not be appropriate due to local land use or water resource plans. For example, a strategy combination that would improve water quality and create or restore habitat would be appropriate within an open space area identified within a land use plan, whereas it would not be suitable for an area designated as high density residential. Projects that create wetlands for water quality and stormwater management are appropriate in areas where the facilities can be managed and will not result in a public safety issue. *Table 6.2, Strategies and Local Agency Plans,* provides examples of the relationships between water management strategies and local agency plans.

Table 6.2
Strategies and Local Agency Plans

Strategy / Plan Type	General Plans	UWMPs	Water Master Plans	Wastewater Master Plans	Recycled Water Plans	NCCP/HCP	Other Resource Plans
Ecosystem Restoration	●				●	●	●
Habitat Protection	●				●	●	●
Water Supply Reliability	●	●	●		●		
Flood Management	●					●	●
Groundwater Management	●	●	●		●		●
Recreation/Public Access	●					●	●
Stormwater Management	●					●	●
Water Conservation	●	●	●	●	●		●
Water Quality Protection	●	●	●		●	●	●
Water Recycling	●	●	●	●	●		●
Wetlands	●				●	●	●

Table 6.2
Strategies and Local Agency Plans

Strategy / Plan Type	General Plans	UWMPs	Water Master Plans	Wastewater Master Plans	Recycled Water Plans	NCCP/HCP	Other Resource Plans
Enhancement/Creation							
Conjunctive Use		●	●		●	●	●
Desalination		●	●				
Imported Water	●	●	●		●		
Land Use Planning	●	●	●	●	●	●	●
NPS Pollution Control	●					●	●
Surface storage	●	●	●		●	●	●
Watershed Planning	●	●	●	●	●	●	●
Water/Wastewater Treatment	●		●	●	●		
Water Transfers		●	●				

7.0 COORDINATION FOR IMPLEMENTATION

7.1 Stakeholder Involvement for Implementation

The IRCWM Plan was developed through a comprehensive stakeholder effort involving local and regional public agencies, environmental organizations, academia, members of the public, and state and federal agencies. As discussed in *Section 1.5.1*, a formal organizational structure for stakeholder involvement has been in place for over a decade with active participation on regional watershed programs. This level of involvement and strong collaborative stakeholder relationships have made this Plan possible and will continue with Plan implementation and updates.

Stakeholders will be directly involved on multiple levels:

- The Newport Bay Watershed Management Committee, established through an MOU and comprised of IRCWM Group members, will meet quarterly (at a minimum) to evaluate Plan and project performance and make recommendations for changes where needed to ensure that the appropriate strategies are in use and the Plan's objectives are being met.
- The Newport Bay Watershed Stakeholders Group, which meets monthly, will receive regular updates on the Plan and implementation. This group will also consider the Newport Bay Watershed Management Committee periodic recommendations on modifications to the Plan and provide input.
- The Newport Bay Watershed Executive Committee will receive the Newport Bay Watershed Management Committee progress report and recommendations, consider additional stakeholder recommendations, and make policy and budget decisions for the Plan where necessary.

Although no obstacles to implementation have been identified at this point, policies, regulations, and watershed conditions will change and conflicts may arise in the future. The provision for stakeholder involvement at all levels during implementation is intended to address potential conflicts early on so that implementation is not hindered, and the highest level of benefit is received. Through this process, all stakeholders are afforded the opportunity to participate in Plan implementation and provide input on water resource and watershed management decisions.

7.2 Disadvantaged Communities Involvement for Implementation

Disadvantaged communities will be directly involved in Plan implementation and updates through participation in the Newport Bay Watershed Stakeholders Group and as supporters on individual projects. As discussed in *Sections 2.4.2* and *2.10.2*, residents of disadvantaged communities utilize the regional parks, open space, and waters within the region as recreational hubs. Waters within the region include area beaches, local creeks and streams, and wetland

environments. Non-profit organizations that serve the disadvantaged communities, such as Latino Health Access, are essential to the process to ensure that the needs of those communities are addressed through local and regional projects. The IRCWM Group will continue to provide outreach to and encourage the participation of organizations that represent the interests of disadvantaged communities and will provide value to this integrated regional planning effort.

7.3 State and Federal Agency Involvement for Implementation

Effective coordination with state and federal agencies is equally important to the success of the IRCWM Plan as coordination with local land use and water resource agencies, stakeholders, and disadvantaged communities. During Plan preparation, participants of the IRCWM Group met with staff from the SWRCB, DWR, and the Santa Ana RWQCB. This coordination will continue and expand as the Plan is implemented and future updates are made.

The Santa Ana RWQCB and CDFG participate in the Newport Bay Watershed Executive Committee. Members of the IRCWM Group also coordinate with California State Parks, the agency responsible for Crystal Cove State Park and Corona del Mar State Beach.

A number of the regional and local plans and proposed projects have been prepared by or in coordination with agencies such as the ACOE, CDFG, California Coastal Commission, and others. These and other state and federal agencies will be involved in implementation as necessary for regulatory requirements, cooperation for collaborative projects, and communication between project proponents. The IRCWM Group will continue to involve state and federal agencies in planning meetings, implementation strategies, and actions to carry out projects.

APPENDIX A
Environmental Studies within the Newport Bay and Newport Coast Watersheds

Source:
County of Orange 2003 Drainage Area Management Plan
Appendix D: Watershed Action Plans

ENVIRONMENTAL MATRIX FOR STUDIES WITHIN THE NEWPORT BAY WATERSHED

Record #	Program Name or Report Title	Sample Location	Start Date	End Date	flow conditions	entity	Bacteria	nutrients	metals	selenium	pesticides	toxicity	algae	dissolved oxygen	water chemistry	sediment	other	comments and program elements per TM#2 Assessment #1
1	Orange County NPDES/TMDL Program	W		ongoing	C	OC	1	1	1	1	1	1			1			Program Elements: WT, EP, EW
	Sediment TMDL	W	1985	ongoing	C	OC										1		Program Elements: WT, EP, EW
10	San Diego Creek Sediment Study PRISM Grant	W	2004	2005		OC					1							pending study (Karen); Program Elements: SI, UP
44	Channel Modification, Urbanization, and Channel Instability in Borrego Canyon Wash, Orange County, CA	W				UCLA										1		assessment of sediment changes in Borrego Canyon; Program Elements: SI, UP, WT
	Field Research Report for San Diego Channel Study	W	Oct-97	Oct-97	n/a	UCLA										1		channel erosion study in San Diego Creek Watershed, New profiles were added. Program Elements: UP
12	Newport Bay TMDL Dissolved Oxygen and Algae Distribution Study	UNB	May-05	Dec-05	C	OC & IRWD							1	1			1	oning (George & Amanda) Program Elements: UP, WT
13	Urban Nutrient BMP Evaluation	W	May-04	Oct-04	D	OC		1		1					1		1	includes TSS Program Elements: SI, NT
14	Nitrogen and Seleium Management Program	W	Sep-05	Jun-07		OC / SCCWRP		1		1					1		1	foodweb / tissue analysis Program Elements: SI, UP, NT, WT, EP
15	County of Orange Algae Monitoring Program	UNB	2001	ongoing	N/A	OC							1					Program Elements: UP, NT, WT, EP
42	Upper newport Bay / San Diego Creek Watershed 205(j) Water Quality Planning Grant	W	1997	1999	C	OC					1	1		1	1			evaluation monitoring focusing on toxicity rather than chemical concentration measurements Program Elements: SI, UP
41	Upper Newport Bay Water Quality Enhancement Project, 319(h) Implementation Project		n/a	n/a	n/a	OC			1	1	1	1						Program Elements: EP
47	San Diego Creek Sediment Pesticide Study	SDC		March-07	D	OC					1					1		Program Elements: SI, UP, WT
1 40	Public Health Risk Assessment for the newport Bay Watershed: n Recrational Contact and Microbiological Risk		n/a	n/a	n/a	OC/EOA	1											no sampling, discuss of implications of existing water quality information on human health Program Elements: WT, EP
9	2004 Annual Ocean and Bay Water Quality Report	NB	2000	ongoing	N/A	HCA	1											Program Elements: WT
31	City of Irvine Groundwater Discharge	W	Apr-04	ongoing	C	City		1	1	1					1		1	includes chlorine, diesel and gasoline Program Elements: WT
20	WDR for the U.S. Coast Guard for Maintenance Dredging in Lower Newport Bay	LNB		ongoing	C	US											1	monitor turbidity during dredging Program Elements: WT
47	Pesticide Source Analysis in the Upper Newport Bay Watershed Using Chiral Properties and Isotopic Fingerprinting	W		March-07	C	SCCWRP					1							Program Elements: SI
	Bight '03 - Coastal Ecology	W	7/14/2003	9/5/2003		SCCWRP			1		1	1				1	1	Pt Conception to US/MX border, organics, TOC Program Elements:
	Bight '03 - Sediment Toxicity (Coastal Ecology)					SCCWRP						1			1	1	1	fish tissue; Pt Conception-US/MX border Program Elements: SI, UP, WT
	Bight '98 - Coastal Ecology		Jul-98	Sep-98		SCCWRP						1			1			fish Program Elements: SI, UP, WT
2	Investigation of Metals Toxicity in San Diego Creek	SDC	Mar-02	Feb-03	C	SCCWRP			1	1	1	1			1			Program Elements: UP
3	Contributions of Organophosphorus pesticides from Residential Land Uses During Dry and Wet Weather	W	Dec-00	Dec-02	C	SCCWRP					1							Program Elements: SI
4	Nutrient Dynamics and Macroalgal Blooms: A Comparison of 5 Southern California Estuaries	UNB	Dec-01	Mar-03	C	SCCWRP & UCLA		1					1	1	1	1		Program Elements: UP

	Record #	Program Name or Report Title	Sample Location	Start Date	End Date	flow conditions	entity	Bacteria	nutrients	metals	selenium	pesticides	toxicity	algae	dissolved oxygen	water chemistry	sediment	other	comments and program elements per TM#2 Assessment #1
	37	Macroalgal nutrient dynamics in Upper Newport Bay	UNB	n/a	n/a		SCCWRP & UCLA		1					1			1		Program Elements: UP
1	43	The relative importance of sediment and water column supplies of nutrients to the growth and tissue nutrient content of green macroalga	UNB	n/a	n/a		SCCWRP & UCLA		1					1			1		Program Elements: UP
		Upper Newport Bay Sediment Nutrient Flux Study	UNB	Jun-05	Jun-05		SCCWRP		1								1		Program Elements: SI, UP
		Newport Bay Bird Egg Bioaccumulation Study					SCCWRP												Program Elements: UP
	38	Comparison of Nutrient Inputs, Water Column Concentrations and Macroalgal Biomass in Upper Newport Bay, CA	UNB	n/a	n/a	C	SCCWRP		1					1					literature search Program Elements: SI, UP
	39	DO Concentration as a Potential Indicator of Water Quality in NB	NB	n/a	n/a		SCCWRP							1	1				review of research and data Program Elements: UP, WT
	5	Newport Bay Sediment Toxicity Studies	NB	9/19/2000	3/12/2002	c	SCCWRP			1			1				1	1	organics were tested Program Elements: SI, UP, NT, WT
	6	Bioaccumulation of Contamination in Recreational and Forage Fishes in Newport Bay, CA in 2000-2002	NB	Nov-00	Sep-02	N/A	SCCWRP			1	1	1						1	all tests done on fish muscle tissue, DDT tested Program Elements: UP
	29	Effects of Selenium Accumulation on Larval Rainbow Trout					SCCWRP				1		1						Program Elements: UP
	45	SCCWRP Clapper Rail/UNB Food Web Study	UNB	?	2005	N/A	SCCWRP			1			1						Program Elements: UP
	45	Investigation of bioaccumulative contaminant concentration in bird eggs, food items and sediment in the San Diego Creek/Newport Bay Watershed	W	2003	2006	N/A	SCCWRP				1	1							Program Elements: UP
	45	Assessment of food web transfer of organochlorine compounds, selenium and trace metals in fishes in Newport Bay, California	NB		2007	N/A	SCCWRP/UCR/CSULB			1	1	1							Program Elements: UP
	45	Analysis of Sediment and Biota Collected from SDC Basin No. 2 for Bioaccumulative Compounds	SDC		2005	N/A	SCCWRP			1	1	1							Program Elements: UP
	34	Mitigation of Pesticide Runoff from Urban Environments, UC Coop	W	Oct-05	Mar-07	C	UC Coop					1							Program Elements: NT
	32	Agricultural BMP Implementation	W	Sep-00	11/15/2003		UC Coop	1	1										Program Elements: UP, NT
	33	Reduction of Pesticide Runoff from Nurseries, UCR	W	Jul-05	Dec-07	C	UCR					1							Program Elements: UP
	35	Atmospheric Deposition, UCR	W	n/a	n/a		UCR					1							Program Elements: SI
	45	Alex Horne Associates Study of Se in Biota in Two Locations in San Diego Creek	SDC		2003	W	RWQCB				1								Program Elements: UP
		Channel Modification, Urbanization, and Channel Instability in Borrego Canyon Wash, Orange County, CA	W		2004		UCLA										1		analysis based on field measurements Program Elements: SI, UP, EW
	46	Contributions of Marinas to fecal indicator bacteria impairment in lower Newport Bay, Southern California	W	Jul-02	Sept-03	N/A	UCI/Newport Beach	1											Evaluate vessel waste input to bay. Program Elements: SI
	46	Dune Swimmer Shedding Study, Newport Dunes, NB, CA	UNB	2001	2003	N/A	UCI	1											Contribution of swimmers bacteria to bay Program Elements: WT

Record #	Program Name or Report Title	Sample Location	Start Date	End Date	flow conditions	entity	Bacteria	nutrients	metals	selenium	pesticides	toxicity	algae	dissolved oxygen	water chemistry	sediment	other	comments and program elements per TM#2 Assessment #1
46	Bacterial Source Study in Western Regions of LNB	LNB	June-04	Mar-06	N/A	UCI	1		1	1					1		1	Tested for salinity too. Program Elements: SI
11,46	Prop 13: Newport Bay Fecal Coliform Source Identification and management plan	NB			N/A	OC/UCI	1											Focuses on differentiating urban vs. natural bacteria for management Program Elements: SI, UP
45	UCB Study of Se and Heavy Metals in Water, Sediment and Biota in the San Joaquin Marsh	W	?	2005	D	UCB			1	1								Program Elements: UP
45	CSULA Study - Comparing Multiple Methods for Removal of Selenium in the San Diego Creek and Upper Newport Bay Watersheds	W		2006	N/A	CSULA				1								Program Elements: UP, NT
36	Fire Ant Monitoring Program, DPR	W	1999	2002	C	DPR					1							Program Elements: SI
24	Natural Treatment System (NTS)	W		pending		IRWD												monitoring plan to be developed end of 2005 with monitoring beginning in early 2006 Program Elements: UP
23	Wetland Water Supply Project	W	1996	1998		IRWD		1	1	1			1	1	1		1	Program Elements: UP
22	401 Permit for Dredging in Sediment Basin 2&3	W	1998	ongoing		IRWD		1		1				1	1	1		monitor during dredging operations Program Elements: SI, WT
21	San Joaquin Marsh	W		ongoing	C	IRWD		1	1	1					1	1		monitor when taking water from SDC Program Elements: UP
45	IRWD Se Removal Demonstration Project	W		ongoing	N/A	IRWD				1								Program Elements:
30	FRD and Santiago Canyon Landfills SWPPP	W	1993	ongoing	C	IWM		1	1						1		1	test for oil & grease Program Elements: SI, WT
19	WDR for Caltrans Denitrification Facility, ETC Section 14	W		ongoing	C	Caltrans		1	1		1			1		1	1	Program Elements: SI, WT
28	Meixner & Hibbs Study "Sources of Selenium, Arsenic and Nutrients in the Newport Bay Watershed", 2004	W	Jun-02	Jan-04	C	university		1	1	1					1	1		atmospheric deposition, open space and shallow groundwater contributors Program Elements: SI, UP
27	Hibbs Study "Sources of Nutrients and Selenium in the San Diego Creek Watershed"	W	1999	2000		Defend the Bay		1		1	1			1	1		1	shallow groundwater sampling Program Elements: SI, UP
	State Mussel Watch Program	W	1977	1995	n/a	SWRCB			1		1	1						mussel tissue analyzed Program Elements: WT
	Toxic Substances Monitoring Program	W	1977	1995		SWRCB			1			1					1	organics; fish and aquatic life tests Program Elements: WT
25	Coastkeeper Santa Ana River Citizen Monitoring Program	W	2001	2003	C	Coastkeeper	1	1						1	1			Program Elements: SI, WT
26	Coastkeeper Orange County Coastal Watersheds Monitoring Program	W	2003	2005	C	Coastkeeper	1	1						1	1			Program Elements: SI, WT
16	WDR for El Modeno Gardens	W		ongoing	c	private		1	1	1	1				1		1	Program Elements: SI, WT
17	WDR for Hines Nurseries	W		ongoing	C	private		1	1	1	1				1		1	Program Elements: SI, WT
18	WDR for Bordier's Nursery	W		ongoing	C	private		1	1	1	1	1			1		1	Program Elements: SI, WT
	John Wayne Airport SWPPP	W	1997	ongoing	W	private			1	1					1		1	4 locations, 4 events; hydrocarbon, O&G Program Elements: SI, WT

Bibilography for the Newport Coastal Streams Watershed

Record #	Program Name or Report Title	Start Date	End Date	entity	Bacteria	nutrients	metals	pesticides	toxicity / TIE studies	water chemistry	fish tissue	sediments	comments	Source identification	understanding processes	Developing New Tools	determine compliance w/ WQ Standards & TMDLs	evaluate program & measure effectiveness	early warning		
1	Orange County NPDES/TMDL Program		ongoing	OC	1	1	1	1	1	1				1	1	1	1	1	1			
2	2004 Annual Ocean and Bay Water Quality Report	1975	ongoing	OCHCA	1									1			1		1			
4	Newport Bay and Coast ASBS Study		ongoing	City of Newport Beach	1	1	1	1	1	1				1	1		1	1				
5	Newport Coast Flow and Water Quality Assessment		ongoing	City of Newport Beach	1	1	1	1	1	1				1			1					
7	Runoff Source Identification in Buck Gully		ongoing	City of Newport Beach									quanitfy dry weather flow volumes	1								
13	Testing the Waters: A Guide to Water Quality at Vacation Beaches	2006	Aug-97	NRDC	1									1	1							
14	Water Quality at Southern California Beaches	2005		NRDC	1					1			water quality measurments of southern california beaches				1					
15	SARWQCB Watershed Management Initiative Chapter		2004	RWQCB	1	1								1								
16	Bioaccumulation of Contaminants in Flatfish of Southern California	1996	Jun-05	SCCWRP				1			1		PCB and DDT contaminants in flatfish tissues					1				
17	Model Monitoring Program for Large Ocean Discharges in Southern California	2002	2005	SCCWRP	1												1					
19	Water Quality and Marine Ecological Monitoring Studies for the Crystal Cove Development Project: Interim Report	Jan-00	3-Apr	RWQCB	1	1	1	1	1									1				

Newport Bay Watershed Stakeholders Group
Participants - July 2007

Access Exterminator Services Inc.
AEI-CASC Engineering
Allen Matkins
Autumnwood HOA
Bovis Lend Lease
Cal Poly Pomona
California Coastal Commission
California Department of Fish and Game
Caltrans, District 12
Centex Homes - South Coast Division
Citrus Lane HOA, Irvine
City of Costa Mesa
City of Irvine
City of Laguna Hills
City of Lake Forest
City of Newport Beach
City of Newport Beach
City of Orange
City of San Juan Capistrano
City of Santa Ana
City of Tustin
Coastal Commission
Coastal Conservancy
Connective Issue
County of Orange
County of Orange Regional Permits
County of Orange, Environmental Resources
Defend the Bay
Dudek Engineering and Environmental
Earth Resource Foundation
Environmental Coalition For The Great Park
Environmental Resources
Flow Science Inc.
Friends of HBP, WRP
Fuscoe Engineering
Haydock, Irwin
Irvine Ranch Water District
Irvine Ranch Water District
J2A Environmental
Lake Forest II HOA
Lake Forest Loan Assoc.
Lake Forest Master HOA
Latham & Watkins
MEC-Weston
Michael Brandman Associates
MJF Consulting, Inc.
Natural Resources Defense Council
Newport Aquatic Center
Newport Bay Naturalists and Friends
Nossaman & Associates
Nossaman Gunthner Knox Elliott LLP
Orange County Board of Supervisors - 5th District
Orange County Coastkeeper
Orange County Farm Bureau
Orange County Sanitation District
P.A. & Associates, Inc.
RBF Consulting
Recupero and Associates, Inc.
RGL & Associates
S4S, Inc.
Santa Ana RWQCB
Santa Ana Watershed Project Authority
Serrano Creek Conservancy
Shea Properties
Sierra Club
South Coast Res. Cons. & Dev.
South Coast Resource Conservation Foundation
Southern California Coastal Waters Research Project
Southern California Water Company
Southern California Wetlands Recovery Project
Stop Polluting Our Newport
Surfrider Foundation
The Irvine Company
U.S. Army Corps of Engineers
UC Cooperative Extension-Ag & Natural Resources
UC Irvine
UC Irvine Arboretum
Weston Solutions
Wetlands Action Network

APPENDIX C
Resolutions and Letters of Support

ORANGE COUNTY BOARD OF SUPERVISORS

MINUTE ORDER

July 24, 2007

Submitting Agency/Department: RESOURCES AND DEVELOPMENT MANAGEMENT DEPARTMENT

Adopt resolution accepting Central Orange County Integrated Regional and Coastal Watershed Management Plan; authorize submission of application for State grants for related projects; and make California Environmental Quality Act findings - All Districts

The following is action taken by the Board of Supervisors:

APPROVED AS RECOMMENDED ☒ OTHER ☐

Unanimous ☒ (1) NGUYEN: **Y** (2) MOORLACH: **Y** (3) CAMPBELL: **Y** (4) NORBY: **Y** (5) BATES: **Y**

Vote Key: Y=Yes; N=No; A=Abstain; X=Excused; B.O.=Board Order

Documents accompanying this matter:

- ☒ Resolution(s) 07-107
- ☐ Ordinances(s)
- ☐ Contract(s)

Item No. 15

Special Notes:

Copies sent to:

CEO
RDMD: Marilyn Thoms
RDMD/Accounting: Linda Schorer

7-27-07

I certify that the foregoing is a true and correct copy of the Minute Order adopted by the Board of Supervisors , Orange County, State of California.
DARLENE J. BLOOM, Clerk of the Board

By: _____
Deputy

15

Agenda Item

AGENDA STAFF REPORT

ASR Control 07-001579

10 A5

07 JUL -5 PM 3:31

MEETING DATE:	07/24/07
LEGAL ENTITY TAKING ACTION:	Board of Supervisors
BOARD OF SUPERVISORS DISTRICT(S):	All Districts
SUBMITTING AGENCY/DEPARTMENT:	Resources and Development Management Department (Approved)
DEPARTMENT CONTACT PERSON(S):	Marilyn Thoms, 714 834-2352 Larry McKenney, 714 834-5067

SUBJECT: Central County Integrated Regional Watershed Plan

CEO Concur	County Counsel Review	Clerk of the Board
Concur	Approved Resolution to Form	Consent Calendar 3 Votes Board Majority

Budgeted: N/A **Current Year Cost:** N/A **Annual Cost:** N/A

Staffing Impact: No **# of Positions:** **Sole Source:** N/A

Current Fiscal Year Revenue: N/A

Funding Source: N/A

Prior Board Action: N/A

RECOMMENDED ACTION(S)

1. Find that the subject Plan is Statutorily Exempt from the provisions of CEQA pursuant to Section 15262 of the CEQA Guidelines.
2. Approve the resolution accepting the Central Orange County Integrated Regional and Coastal Watershed Management Plan (Plan).
3. Direct staff to seek approval of partner agencies.
4. Authorize staff to submit applications for a State grant under Chapter 8 of Proposition 50 and/or Proposition 84 and IE for projects prioritized within the Plan.
5. Authorize staff to update the Plan on a regular basis.

SUMMARY:

Approval of the resolution accepting the Central Orange Integrated Regional and Coastal Watershed Management Plan (Plan) will support moving forward with proposed integrated projects and programs

RESOLUTION OF THE BOARD OF SUPERVISORS OF

ORANGE COUNTY, CALIFORNIA

July 24, 2007

WHEREAS, a goal of the Resources and Development Management Department (RDMD) is to protect water quality and the beneficial uses of streams throughout Orange County; and

WHEREAS, RDMD has led development of the Central Orange County Integrated Regional and Coastal Watershed Management Plan (IRCWMP) pursuant to Senate Bill 1672 ("SB 1672") of the State of California, known as the Integrated Regional Water Management Planning Act of 2002, approved by the Governor on September 20, 2002; and

WHEREAS, RDMD recognizes that improved coordination among local agencies with responsibilities for managing water supplies, additional development of local resources, efficient utilization of existing resources and vigilant protection of our imported resources is necessary to maximize the quality and quantity of water available to meet the region's agricultural, domestic, industrial, and environmental needs; and

WHEREAS, the Legislature further declared in SB 1672 that the implementation of the Integrated Regional Water Management Planning Act of 2002 provides a framework for local and regional agencies to come together to integrate programs and projects that protect and enhance regional water resources; and

WHEREAS, a regional water management group was formed in Central Orange County, and facilitated by the RDMD; and

WHEREAS, SB 1672 provides for the acceptance of the said Plan by participants in the regional water management group have authority to implement the Plan; and

WHEREAS, the Board of Supervisors has now reviewed said Plan with its staff and general public at its regular Board meeting on June 24, 2007;

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NOW, THEREFORE, BE IT RESOLVED that the Board of Supervisors accepts the Central Orange County Integrated Regional and Coastal Watershed Management Plan for the purposes of moving forward with the proposed projects and programs included therein in continued coordination with the IRCWMP Management and Governance Group, with RDMD serving as Administrator of the Plan; and

BE IT RESOLVED, that the Director of the Resources and Development Management Department or his designee are hereby authorized and directed to submit, for and on behalf of the Central Orange County Integrated Regional and Coastal Water Management Group, an application for a Proposition 50 grant from the State Water Resources Control Board / California Department of Water Resources in an amount not to exceed $25,000,000 for projects that will help provide a reliable water supply, protect and improve water quality, and achieve other multiple objectives in an efficient manner; and

BE IT FURTHER RESOLVED, that the Board of Supervisors of the County of Orange hereby agrees and further does authorize the aforementioned representative or his designee to certify that the County of Orange has and will comply with all applicable state statutory and regulatory requirements related to any state grants received.

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The foregoing was passed and adopted by the following vote of the Orange County Board of Supervisors, on July 24, 2007, to wit:

AYES:	Supervisors:	PATRICIA BATES, JOHN M. W. MOORLACH, JANET NGUYEN BILL CAMPBELL, CHRIS NORBY
NOES:	Supervisor(s):	
EXCUSED:	Supervisor(s):	
ABSTAINED:	Supervisor(s):	

Chris Norby

CHAIRMAN

STATE OF CALIFORNIA)
)
COUNTY OF ORANGE)

I, DARLENE J. BLOOM, Clerk of the Board of Orange County, California, hereby certify that a copy of this document has been delivered to the Chairman of the Board and that the above and foregoing Resolution was duly and regularly adopted by the Orange County Board of Supervisors .

IN WITNESS WHEREOF, I have hereto set my hand and seal.

DARLENE J. BLOOM
Clerk of the Board
County of Orange, State of California

Resolution No: 07-107

Agenda Date: 07/24/2007

Item No: 15

I certify that the foregoing is a true and correct copy of the Resolution adopted by the Board of Supervisors , Orange County, State of California

DARLENE J. BLOOM, Clerk of the Board of Supervisors

By: _____
Deputy

RESOLUTION NO. 2007-43

A RESOLUTION OF THE CITY COUNCIL
OF THE CITY OF NEWPORT BEACH
AUTHORIZING THE CITY TO APPLY FOR STATE GRANTS RELATING TO
INTEGRATED WATERSHED MANAGEMENT PLANNING AND
THE RHINE CHANNEL

WHEREAS, Newport Bay is an impaired water body under the Federal Clean Water act for four categories of pollutants - sediment, nutrients, fecal Coliform, and toxic pollutants, with the Rhine Channel having special toxicity problems that need attention; and

WHEREAS, as an impaired water body, the Bay is subject to the creation and implementation of daily limits of these pollutants and plans to achieve certain water quality goals within a time certain; and

WHEREAS, these limits and plans are called Total Maximum Daily Loads (TMDLs); and

WHEREAS, the Bay is also part of a complex watershed system that stretches into Tustin, Irvine, Lake Forest, Orange, Santa Ana, Costa Mesa, and unincorporated territories; and

WHEREAS, the voters of California passed both Propositions 50 and 84 in an attempt to improve water quality, water supply, and regional watershed planning in the state; and

WHEREAS, the California Department of Water Resources and the California State Water Resources Control Board, as a part of implementing the Legislature's directive through Propositions 50 and 84, has set forth grant guidelines and procedures for eligible jurisdictions to receive funding for water quality and watershed projects; now, therefore be it

RESOLVED by the City Council of the City of Newport Beach, that application be made to the California Department of Water Resources and State Water Resources Control Board to obtain an Integrated Regional Watershed Implementation Grant pursuant to the Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002 (Water Code Section 79560 *et seq*), and to enter into an agreement to receive a grant for the Newport Bay Watershed IRWMP. The Mayor of the City of Newport Beach is hereby authorized and directed to prepare the necessary data, conduct investigations, file such application, and execute a grant agreement with the California Department of Water Resources or the State Water Resources Control Board; and be it also

RESOLVED by the City Council of the City of Newport Beach, that application be made to the California Department of Water Resources and State Water Resources Control Board to obtain an Integrated Regional Watershed Implementation Grant pursuant to the Safe Drinking Water, Water Quality and Supply, Flood Control, River, and Coastal Protection Bond Act of 2006 (Public Resources Code Section 75000 *et seq*) and to enter into an agreement to receive a grant for the Newport Bay Watershed IRWMP or for improvements to the Rhine Channel's toxicity problems. The Mayor of the City of Newport Beach is hereby authorized and directed to prepare the necessary data, conduct investigations, file such application, and execute a grant agreement with the California Department of Water Resources or the State Water Resources Control Board.

ADOPTED this 26th day of June, 2007.

MAYOR

ATTEST:

LaVonne M. Harkless
CITY CLERK

CITY OF NEWPORT BEACH CALIFORNIA

STATE OF CALIFORNIA }
COUNTY OF ORANGE } ss.
CITY OF NEWPORT BEACH }

I, LaVonne M. Harkless, City Clerk of the City of Newport Beach, California, do hereby certify that the whole number of members of the City Council is seven; that the foregoing resolution, being Resolution No. 2007-43 was duly and regularly introduced before and adopted by the City Council of said City at a regular meeting of said Council, duly and regularly held on the 26th day of June 2007, and that the same was so passed and adopted by the following vote, to wit:

Ayes: Henn, Curry, Selich, Webb, Daigle, Gardner, Mayor Rosansky

Noes: None

Absent: None

Abstain: None

IN WITNESS WHEREOF, I have hereunto subscribed my name and affixed the official seal of said City this 27th day of June 2007.

LaVonne M. Harkless
City Clerk
Newport Beach, California

(Seal)

RESOLUTION NO. 2007- 18

RESOLUTION OF THE BOARD OF DIRECTORS OF THE IRVINE RANCH WATER DISTRICT ACCEPTING THE CENTRAL ORANGE COUNTY INTEGRATED REGIONAL AND COASTAL WATER MANAGEMENT PLAN AND GRANT APPLICATION

WHEREAS, the Proposition 50 Water Security, Clean Drinking Water, Coastal and Beaches Act of 2002 was passed by voters in November 2002 authorizing the legislature to appropriate approximately $380 million to Integrated Regional Water Management projects; and

WHEREAS, the California Legislature declared in Senate Bill 1672 that the implementation of Proposition 50 will facilitate the development of Integrated Regional Water Management Plans, thereby improving water quality, maximizing water supply, and protecting the environment by providing a framework for local agencies to integrate local programs and projects; and

WHEREAS, a regional water management group has formed in Central Orange County, facilitated by the County of Orange, Irvine Ranch Water District and the City of Newport Beach, in which the cities and agencies located within the watershed are participating with the intent of developing an Integrated Regional Water Management Plan.

NOW, THEREFORE, be it resolved that the Irvine Ranch Water District does hereby accept the Integrated Regional Water Management Plan and submittal of a grant application to the Department of Water Resources and the State Water Resources Control Board for the purposes of moving forward with projects and programs to be prioritized in the Plan.

ADOPTED, SIGNED and APPROVED this 25th day of June, 2007.

President, IRVINE RANCH WATER DISTRICT and of the Board of Directors thereof

Secretary, IRVINE RANCH WATER DISTRICT and of the Board of Directors thereof

APPROVED AS TO FORM;
BOWIE, ARNESON,
WILES & GIANNONE

By

STATE OF CALIFORNIA)
) SS.
COUNTY OF ORANGE)

I, Nancy Savedra, Assistant Secretary of the Board of Directors of Irvine Ranch Water District, do hereby certify that the foregoing Resolution was duly adopted by the Board of Directors of said District at a regular meeting of said Board held on the 25th day of June 2007, and that it was so adopted by the following vote:

AYES:	DIRECTORS	Matheis, Miller, Reinhart, Withers and Swan
NOES:	DIRECTORS	None
ABSTAIN:	DIRECTORS	None
ABSENT:	DIRECTORS	None

(SEAL)

Assistant Secretary of IRVINE RANCH WATER DISTRICT and of the Board of Directors thereof

STATE OF CALIFORNIA)
) SS.
COUNTY OF ORANGE)

I, Nancy Savedra, Assistant Secretary of the Board of Directors of Irvine Ranch Water District, do hereby certify that the above and foregoing is a full, true and correct copy of Resolution No. 2007-18 of said Board, and that the same has not been amended or repealed.

Dated: 6/28/07

Assistant Secretary of IRVINE RANCH WATER DISTRICT and of the Board of Directors thereof

(SEAL)

Latino Health Access
1701 N. Main St., Suite 200
Santa Ana, CA 92706-2605
(714) 542-7792
www.latinohealthaccess.org

May 1, 2007

Mr. Larry McKenney
Director, Watershed and Coastal Resources Division
Resources and Development Management Department
300 N. Flower, 7th Floor
Santa Ana, CA 92703-5000

Subject: Central Orange County Integrated Regional & Coastal Water Management Plan

Dear Mr. McKenney:

Latino Health Access supports the development and implementation of the Central Orange County Integrated Regional Water Management Plan (Plan).

The mission of Latino Health Access is to assist in improving the quality of life and health of uninsured, under-served people through quality preventive services and educational programs, emphasizing responsibility and full participation in decisions affecting health.

The Plan involves numerous water resource projects that will significantly benefit the communities in the region. It is essential to support efforts that involve our community with water management issues. We greatly appreciate and support the Plan and the benefits it will bring to the communities of Central Orange County.

Implementation of the Plan will provide a significant measure in achieving environmental justice by offering safe, clean, and healthy environments for all to live, work, and recreate on a fair and equal basis.

Sincerely,

America Bracho, MPH, CDE
President and CEO

Office of the City Council

City of Tustin
300 Centennial Way
Tustin, CA 92780
www.tustinca.org
(714) 573-3010
FAX (714) 838-1602

May 10, 2007

Mr. Larry McKenney
Director, Watershed and Coastal Resources Division
Resources and Development Management Department
300 N. Flower, 7th Floor
Santa Ana, CA 92703-5000

Subject: Central Orange County Integrated Regional & Coastal Water Management Plan

Dear Mr. McKenney:

The City of Tustin supports the development and implementation of the Central Orange County Integrated Regional Water Management Plan (Plan).

The Plan involves numerous potential water resource projects that will significantly benefit the communities in the region. The City of Tustin supports the Plan and the benefits it will bring to the communities of Central Orange County provided it does not impair, in any way, our City Council's land use authority.

Implementation of the Plan will provide a significant measure in achieving environmental justice by offering safe, clean, and healthy environments for all to live, work, and recreate on a fair and equal basis.

Sincerely,

Lou Bone
Mayor

Mayor: 2007: Central O.C. Integrated Reg. & Coastal Water Mgmt.

c: Jerry Amante
Doug Davert
Tony Kawashima
Jim Palmer
William Huston
Tim D. Serlet

www.ci.irvine.ca.us

City of Irvine, One Civic Center Plaza, P.O. Box 19575, Irvine, California 92623-9575 (949) 724-6000

May 15, 2007

Mr. Larry McKenney
Director, Watershed and Coastal
Resources Division
Resources and Development
Management Department
300 N. Flower, 7th Floor
Santa Ana, CA 92703-5000

Subject: Central Orange County Integrated Regional & Coastal Water Management Plan

Dear Mr. McKenney:

The City of Irvine supports the development and implementation of the Central Orange County Integrated Regional Water Management Plan (Plan).

The Plan involves numerous water resource projects that will significantly benefit the communities in the region. It is essential to support efforts that involve our community with water management issues. As stated by our City representative at the Newport Bay Watershed Executive Committee meeting on May 2, 2007, we support the Plan and the benefits it will bring to the communities of Central Orange County provided it does not impair, in any way, our City Council's land use authority.

Implementation of the Plan will provide a significant measure in achieving environmental justice by offering safe, clean, and healthy environments for all to live, work, and recreate on a fair and equal basis.

If you have any questions regarding the City's support for the Plan please feel free to contact me. I can be reached at (949) 724-7509.

Sincerely,

Manuel Gomez
Director of Public Works

c: Mike Loving, Water Quality Administrator

California Regional Water Quality Control Board
Santa Ana Region

Linda S. Adams
Secretary for
Environmental Protection

3737 Main Street, Suite 500, Riverside, California 92501-3348
Phone (951) 782-4130 • FAX (951) 781-6288 • TDD (951) 782-3221
www.waterboards.ca.gov/santaana

Arnold Schwarzenegger
Governor

June 27, 2007

Robert Stein, P.E.
Principal Civil Engineer
City of Newport Beach
Public Works Department
3300 Newport Boulevard
Newport Beach, CA 92663

Email Delivery rstein@city.newport-beach.ca.us

SUPPORT FOR THE CENTRAL ORANGE COUNTY INTEGRATED REGIONAL & COASTAL WATER MANAGEMENT PLAN

Dear Mr. Stein:

On behalf of the Regional Water Quality Control Board, Santa Ana Region, I am writing this letter of support for the development and implementation of the Central Orange County Integrated Regional & Coastal Water Management Plan (Plan). The Plan aims to establish a plan for the effective management, restoration, and preservation of the Newport Bay Watershed including Newport Bay, designated Critical Coastal Areas adjacent to the Bay, and the Areas of Special Biological Significance (State Water Quality Protection Areas) along Newport Coast.

The Plan promotes projects and programs that can protect water quality standards within the Newport Bay watershed, while significantly improving the health and well-being of the community in a sustainable manner. The Plan includes water supply projects, water conservation programs, water quality improvement projects, canyon stabilization, habitat restoration and protection of the sensitive marine life areas along the coast. The Plan also promotes a cutting-edge educational program to encourage local high school students to become involved in watershed and environmental projects and programs with the hope that these students will enter the budding watershed program at UCI. Further, a web portal is under construction that will allow community members, naturalists and ecologists to enter into focused discussions on a spectrum of environmental protection and habitat restoration issues. By engaging the community at a more fundamental decision-making level, this Plan provides a significant forum for all those advocating for a safe, clean, and healthy environment.

Board staff believes the Plan for the Newport Bay Watershed will benefit regional water quality and the communities of Central Orange County, and we encourage its development and eventual implementation. If you would like to contact me, please call me directly at 951 782-3234.

Sincerely,

Mark G. Adelson, Senior Environmental Scientist
Chief, Regional Planning Programs Section

ORANGE COUNTY
COASTKEEPER
EDUCATION / ADVOCACY / RESTORATION / ENFORCEMENT

3151 Airway Avenue, Suite F-110
Costa Mesa, CA 92626
Phone 714-850-1965
Fax 714-850-1592
Website www.Coastkeeper.org

June 26, 2007

Robert Stein P.E.
Principal Civil Engineer
City of Newport Beach
Public Works Department
Newport Beach Ca. 92663

Re: Support for the Central Orange County Integrated Regional & Coastal Water Management Plan

Dear Mr. Stein,

On behalf of Orange County Coastkeeper, I am writing this letter of support for the development and implementation of the Central Orange County Integrated Regional & Coastal Water Management Plan (Plan). The plan aims to establish a plan for the effective management, restoration, and preservation of the Newport Bay Watershed including Newport Bay and reciving waters of the Areas of Special Biological Significance along Newport Coast.

The Plan promotes projects and programs that can significantly improve the health and wellbeing of the community in a sustainable manner. The Plan includes water supply projects, canyon stabilization, habitat restoration and protection of sensitive marine life areas along the coast. The Plan also promotes a cutting-edge educational program to encourage local high school students to become involved in watershed and environmental projects and programs with the hope that these students will enter the budding watershed program at UCI. Further. A web portal is under construction that will allow community members, naturalists, and ecologists to enter into focused discussions on a spectrum of environmental protection and habitat restoration issues. By engaging the community at a more fundamental decision-making level, this Plan provides a significant forum for all those advocating for a clean, and healthy environment.

We greatly appreciate the Plan for the Newport Bay Watershed and the benefits it will bring to the communities of Central Orange County. If you would like to contact me, please call me directly at 714-904-3671 x304.

Sincerely,

Raymond Hiemstra
Associate Director-Programs
Orange County Coastkeeper

Department of Water Quality

June 19, 2007

Robert Stein. P.E.
Principal Civil Engineer
City of Newport Beach
Public Works Department
3300 Newport Boulevard
Newport Beach, CA 92663

Dear Mr. Stein:

On behalf of the City of Laguna Beach, I am writing this letter of support for the development and implementation of the Central Orange County Integrated Regional & Coastal Water Management Plan (Plan). The Plan aims to establish a plan for the effective management, restoration, and preservation of the Newport Bay Watershed including Newport Bay and receiving waters of the Areas of Special Biological Significance along Newport Coast.

The Plan promotes projects and programs that can significantly improve the health and well-being of the community in a sustainable manner. The Plan includes water supply projects, water conservation programs, water quality improvement projects, canyon stabilization, habitat restoration and protection of the sensitive marine life areas along the coast. The Plan also promotes a cutting-edge educational program to encourage local high school students to become involved in watershed and environmental projects and programs with the hope that these students will enter the budding watershed program at UCI. Further, a web portal is under construction that will allow community members, naturalists and ecologists to enter into focused discussions on a spectrum of environmental protection and habitat restoration issues. By engaging the community at a more fundamental decision-making level, this Plan provides a significant forum for all those advocating for a safe, clean, and healthy environment.

We greatly appreciate and support the Plan for the Newport Bay Watershed and the benefits it will bring to the communities of Central Orange County. If you would like to contact me, please call me directly at (949) 497-0328.

Sincerely,

David Shissler, PE
Director of Water Quality

505 FOREST AVE. • LAGUNA BEACH, CA 92651 • TEL (949) 497-0378 • FAX (949) 494-1864

UNIVERSITY OF CALIFORNIA, IRVINE

BERKELEY · DAVIS · IRVINE · LOS ANGELES · RIVERSIDE · SAN DIEGO · SAN FRANCISCO · SANTA BARBARA · SANTA CRUZ

June 19, 2007

Robert Stein. P.E.
Principal Civil Engineer
City of Newport Beach
Public Works Department
3300 Newport Boulevard
Newport Beach, CA 92663

Email Delivery rstein@city.newport-beach.ca.us

Re: Support for the Central Orange County Integrated Regional & Coastal Water Management Plan

Dear Mr. Stein:

On behalf of the Urban Water Research Center at UC Irvine, I am writing this letter of support for the development and implementation of the Central Orange County Integrated Regional & Coastal Water Management Plan (Plan). The Plan aims to establish a plan for the effective management, restoration, and preservation of the Newport Bay Watershed including Newport Bay and receiving waters of the Areas of Special Biological Significance along Newport Coast. As the designated liaison between UCI and the Back Bay Science Center it seems appropriate that we consider working jointly on this effort.

The Plan promotes projects and programs that can significantly improve the health and well-being of the community in a sustainable manner. The Plan includes water supply projects, water conservation programs, water quality improvement projects, canyon stabilization, habitat restoration and protection of the sensitive marine life areas along the coast. The Plan also promotes a cutting-edge educational program to encourage local high school students to become involved in watershed and environmental projects and programs with the hope that these students will enter the budding watershed program at UCI. Further, a web portal is under construction that will allow community members, naturalists and ecologists to enter into focused discussions on a spectrum of environmental protection and habitat restoration issues. By engaging the community at a more fundamental decision-making level, this Plan provides a significant forum for all those advocating for a safe, clean, and healthy environment.

We greatly appreciate and support the Plan for the Newport Bay Watershed and the benefits it will bring to the communities of Central Orange County. If you would like to contact me, please call me directly at 949-824-5620 or wcooper@uci.edu.

Sincerely Yours,

William J. Cooper

Director
Urban Water Research Center, and
Professor

THE HENRY SAMUELI SCHOOL OF ENGINEERING
DEPARTMENT OF CIVIL & ENVIRONMENTAL ENGINEERING
IRVINE, CA 92697-2175

William J. Cooper, Professor
Civil and Environmental Engineering
PHONE: (949) 824-5620, FAX: (949) 824-3672

CAL STATE FULLERTON

Office of the Dean
College of Natural Sciences and Mathematics
(714) 278-2638/ (714) 278-5390 fax
Office of the Dean
College of Natural Sciences and Mathematics
(714) 278-2638/ (714) 278-5390 fax

June 27, 2007

Robert Stein. P.E.
Principal Civil Engineer
City of Newport Beach, Public Works Department
3300 Newport Boulevard
Newport Beach, CA 92663

Dear Mr. Stein:

I am writing as Dean of the College of Natural Sciences and Mathematics at California State University, Fullerton, to provide support for the development and implementation of the Central Orange County Integrated Regional & Coastal Water Management Plan. This Plan addresses an increasingly important problem - the effective management, restoration, and preservation of the Newport Bay Watershed including Newport Bay and receiving coastal waters, some of which are designated Areas of Special Biological Significance. As a longstanding coastal ecologist who has studied many of these shorelines, I can attest to the importance of the activities included in this Plan.

Increasingly plans such as the Integrated Regional & Coastal Water Management Plan are being called for to address regional watershed issues. The Central Orange County Plan springs from prior work and promotes important projects and programs, including water supply projects, water conservation programs, water quality improvement projects, canyon stabilization, habitat restoration and protection of the sensitive marine life areas along the coast. The Plan also promotes an ambitious and important educational program, which will involve local high school students in watershed and environmental projects. Further, a web portal will be initiated, which will allow community members, naturalists and ecologists to enter into focused discussions on a spectrum of environmental protection and habitat restoration issues. Engaging community members in fundamental decision-making is a proven method for taking effective actions to improve environmental quality; community backing is often a requisite for achieving a safe, healthy environment that supports ecological functions and provides needed ecological services.

For all of these reasons, I am pleased to support the Plan for the Newport Bay Watershed and the benefits it will bring to the communities of Central Orange County. Please feel free to contact me directly at 714-278-

2638 should you wish to speak to me about the Plan and its potential to improve environmental quality in this important watershed.

Sincerely,

Dr. Steven N. Murray
Dean, College of Natural Sciences and Mathematics and
Professor of Biology
Email: smurray@fullerton.edu

SURFRIDER FOUNDATION
NEWPORT BEACH CHAPTER
323 Jasmine, Corona del Mar, CA 92625

July 25, 2007

Mr. Larry McKenney
Director, Watershed and Coastal Resources Division
Resources and Development Management Department
300 N. Flower, 7th Floor
Santa Ana, CA 92703-5000

Subject: Central Orange County Integrated Regional & Coastal Water Management Plan

Dear Mr. McKenney:

The Newport Beach Chapter of Surfrider Foundation supports the development and implementation of the Central Orange County Integrated Regional Water Management Plan.

This plan will benefit our communities, particularly our water management efforts. To bring together what has been a patchwork of programs into an integrated plan means that each of these programs will be much more effective.

As a group that focuses on water quality and runoff issues, we look forward to the implementation of this plan as a major step forward.

Cordially,
Nancy Gardner

Nancy Gardner
Steering Committee

Newport Bay
Naturalists
& Friends

July 25, 2007

Mr. Larry McKenney
Director, Watershed and Coastal Resources Division
Resources and Development Management Department
300 N. Flower, 7th Floor
Santa Ana, CA 92703-5000

Subject: Central Orange County Integrated Regional & Coastal Water Management Plan

Dear Mr. McKenney:

The Newport Bay Naturalists and Friends (NBNF) supports and has been directly involved in the development and implementation of the Central Orange County Integrated Regional Water Management Plan (Plan). Since the Newport Bay which is our organization's primary concern, is the receiver of all runoff from the Newport Bay Watershed, we our encouraged by the regional approach to problems that directly and indirectly affect the bay.

The Plan involves numerous water resource projects that will significantly benefit the communities in the region and specifically Newport Bay. It is essential to support efforts that involve our community with water management issues. We greatly appreciate and support the Plan and the benefits it will bring to the communities of Central Orange County.

Implementation of the Plan will provide a significant measure towards achieving environmental justice by offering safe, clean, and healthy environments for all to live, work, and recreate on a fair and equal basis. The Newport Bay and it's associated watershed provide recreational and educational opportunities for the whole region, and indeed even national and international opportunities to both residents of and visitors to the region.

Sincerely,

Dennis J Baker
President
Newport Bay Naturalists and Friends

P. O. Box 10804
Newport Beach,
CA 92658
949.640.1751
www.newportbay.org

PATRICIA C. BATES
SUPERVISOR, FIFTH DISTRICT

ORANGE COUNTY HALL OF ADMINISTRATION
10 CIVIC CENTER PLAZA, 5TH FLOOR
333 W. SANTA ANA BLVD., SANTA ANA, CALIFORNIA 92702-0687
PHONE (714) 834-3550 FAX (714) 834-2670
http://bos.ocgov.com/fifth/

July 24, 2007

Ms. Mary Anne Skorpanich
Interim Director, Watershed and Coastal Resources Division
Resources and Development Management Department, County of Orange
300 North Flower Street, 7th Floor
Santa Ana, CA 92703-5000

Re: Central Orange County Integrated Regional & Coastal Water Management Plan

Dear Ms. Skorpanich:

On behalf of the Fifth District, I am pleased to submit this letter of support for the development and implementation of the Central Orange County Integrated Regional Water Management Plan (Plan). Portions of the Fifth District, including Serrano Creek, flow into the Newport Bay, linking my constituents directly to this Plan. The Plan involves numerous water resource projects that will significantly benefit the communities of the region. I fully support this integrated approach which includes the participation from the key Cities, Special Districts and stakeholders.

I applaud the Watershed and Coastal Resources Division for achieving success with the South County Integrated Regional Water Management Plan, which is a similar effort. I am confident that this Central Plan will follow in the footsteps of the South County Plan and achieve similar success. The Watershed Division has done an outstanding job in facilitating the development of both Plans, resulting in inter-agency cooperation on regional water resource issues.

Implementation of the Plan will bolster efforts for safer, cleaner and healthier communities in which to live, work and enjoy. Please do not hesitate to contact Eileen Takata of my staff at (714) 834-3550 for continued Fifth District participation and support.

Sincerely,

Pat.

PAT BATES
Supervisor, Fifth District

APPENDIX D
Project Descriptions

Project: **Runoff Reduction Program for CCA #69, #70 and #71 and ASBS #32 and #33**
Priority: **A01A/B**
Implementing Agency: **Irvine Ranch Water District/ City of Newport Beach**
Agency Contact: **Mark Tettemer, tettemer@irwd.com**
Bob Stein, **rstein@city.newport-beach.ca.us**

Water Management Strategies

Water Quality Protection and Improvement / Water Conservation

Project Partners/Supporters

- City of Newport Beach
- The Irvine Company
- Coastkeeper
- Municipal Water District of Orange County
- Metropolitan Water District of Southern California

Project Description

Urban runoff has proved to be a significant problem along the Newport Coast, and has led to the Newport Coast being classified as a Critical Coastal Area (CCA) by the RWQCB. Over-irrigation is one of the primary sources of dry-season urban runoff, and frequently carries with it fertilizers, pesticides and other contaminants which pollute water-ways and ultimately the Pacific Ocean. It is of particular concern in the Newport Coast area of IRWD's service area, where several creeks including Buck Gully, Morning Canyon, Los Trancos and Muddy Canyon drain into areas designated as an Area of Special Biological Significance (ASBS). Irvine Ranch Water District and the City of Newport Beach have both conducted pilot weather-based controller retrofit programs and extensive monitoring projects, particularly within the Buck Gully watershed to help address the problem.

There are several contributing factors that lead to over-irrigation; some technical, some design based, some behavioral.

- Inappropriate irrigation scheduling – most customers on the Coast have automatic irrigation controllers with water management features. However, very few customers and/or their landscape contractors program the controllers in such as way as to optimize water use and minimize runoff.
- Low distribution uniformity (poor coverage) – most sites have poor distribution uniformity due to poor design and compounded by poor maintenance. Most customers compensate for this type of problem by increasing the irrigation.

- Poor irrigation system maintenance –checking for broken laterals, broken or clogged heads, weeping valves is not conducted on a regular (monthly basis). Since irrigation systems typically run in the early morning most customers are unaware of problems and respond to dry spots by increasing the irrigation schedule.
- Lack of knowledge and awareness – while IRWD makes every effort to promote water use efficiency, there is still a general lack of understanding regarding the relationship between over-irrigation and runoff, and more importantly how it can be addressed.
- Landscape design – in addition to irrigation design, appropriate plant selections can contribute to reduced irrigation needs. California Friendly plants – drought-tolerant, low-water use and native plants do not require as much supplemental irrigation as turf grass, and therefore the potential for over-irrigation and associated runoff is minimized.

This integrated project is designed to address the urban runoff problem stemming from over-irrigation and urban runoff, and includes multiple strategies targeted to residential landscapes and non-residential (common area) landscapes. This project led by the Irvine Ranch Water District and the City of Newport Beach will be developed in collaboration with key stakeholders such as The Irvine Company and Coastkeeper to leverage efforts, funding and impact. The program strategy focuses on implementing solutions and includes:

- Outreach, Education and Training
- Direct Site Assistance
- Performance Monitoring

The performance monitoring element is designed to evaluate the ongoing effectiveness of the implementation efforts. Feedback from the performance monitoring will be used to make project adaptations in order to continue to improve the overall project effectiveness.

Project Location

IRWD/ City of Newport Beach

Project Timeline

Fiscal Year	07	08	09	10	11	12	13
Program Development							
Program Implementation							
Monitoring Efforts							

Economic Feasibility

Prop 50 / Prop 84	$1,070,000
Local Matching Funds	$250,000
Local Stakeholder Matching	$750,000
Percent Local Matching	48.3%
Total	$2,070,000

Annual Operating And Maintenance Costs: Not applicable

Similar Projects, Linkage, Interdependence

IRWD has implemented the Residential Runoff Reduction Study and the Buck Gully project, and has baseline dry-season flow and water quality data for the Buck Gully area. The City of Newport Beach has also conducted water quality and flow monitoring programs in Buck Gully. IRWD operates a low flow diversion facility at Los Trancos and Muddy Creeks, and has dry season flow monitoring data on a daily basis, dating back to 2002.

The City of Newport Beach has installed approximately 300 weather-based irrigation controllers as part of its watershed management program. IRWD has experience in managing ET controller programs, financial incentive programs and landscape-related technical expertise. Both agencies have significant experience in mounting effective public information campaigns and conducting targeted outreach.

Performance Measures

Performance can be measured in several ways:

- Tracking of customer participation levels and number of irrigation improvement measures implemented
- Analysis of the post-implementation flow data from Los Trancos and Muddy Creeks – IRWD already operates dry-season flow diversion facilities with flow monitoring.
- Post-implementation flow monitoring and water quality sampling at strategic points throughout the watershed.
- The project also includes the development and evaluation of the Impact Metric, a tool the City will design to evaluate impact on the ASBS.

Baseline Related Studies and Plans:

Residential Runoff Reduction (R3) Study – IRWD – installation of ET controllers and monitoring and analysis of any resulting change in water use and run-off. (Budget $1M).

Buck Gully Runoff Reduction Study – IRWD - included dry-season monitoring and installation of ET controllers at non-residential properties in the Upper Reach of Buck Gully. (Budget $450,000).

City of Newport Beach ET Controller Installation Program – installation of approximately 300 ET controllers at targeted residential properties in the Newport Coast watershed.

Tactical Incentives Program – IRWD provides financial incentives, conducts outreach and program marketing for customers to upgrade residential and commercial fixtures to more water efficient devices. (Total budgeted FY 06/07 $0.9M.)

Project: **Serrano Creek Bank Stabilization and Sediment Reduction to CCA #69 and ASBS #32**
Priority: **A02**
Implementing Agency: **County of Orange / City of Lake Forest / IRWD**
Agency Contact: **Katany Mansour, mansour.katany@rdmd.ocgov.com**
Disadvantaged Community: **Yes, Regional Benefit**

Water Management Strategies

Water Quality Protection and Improvement / Environmental and Habitat Protection and Improvement / Flood Control

Project Partners/Supporters

- City of Lake Forest
- Orange County Flood Control District
- Irvine Ranch Water District
- City of Newport Beach

Project Description

Serrano Creek, a tributary of San Diego Creek, drains an area of approximately 2,590 acres. Serrano Creek has undergone substantial erosion in recent years due to upstream development. The streambed has experience substantial degradation and widening, to the point where there is potential for the loss of property and life. Eroding Serrano Creek is a significant source of sediment to Upper Newport Bay, for which there is a sediment TMDL allocation. The banks along approximately 1.1 mile of Serrano Creek will be stabilized from Trabuco Road to Rancho Parkway (Reach 2).

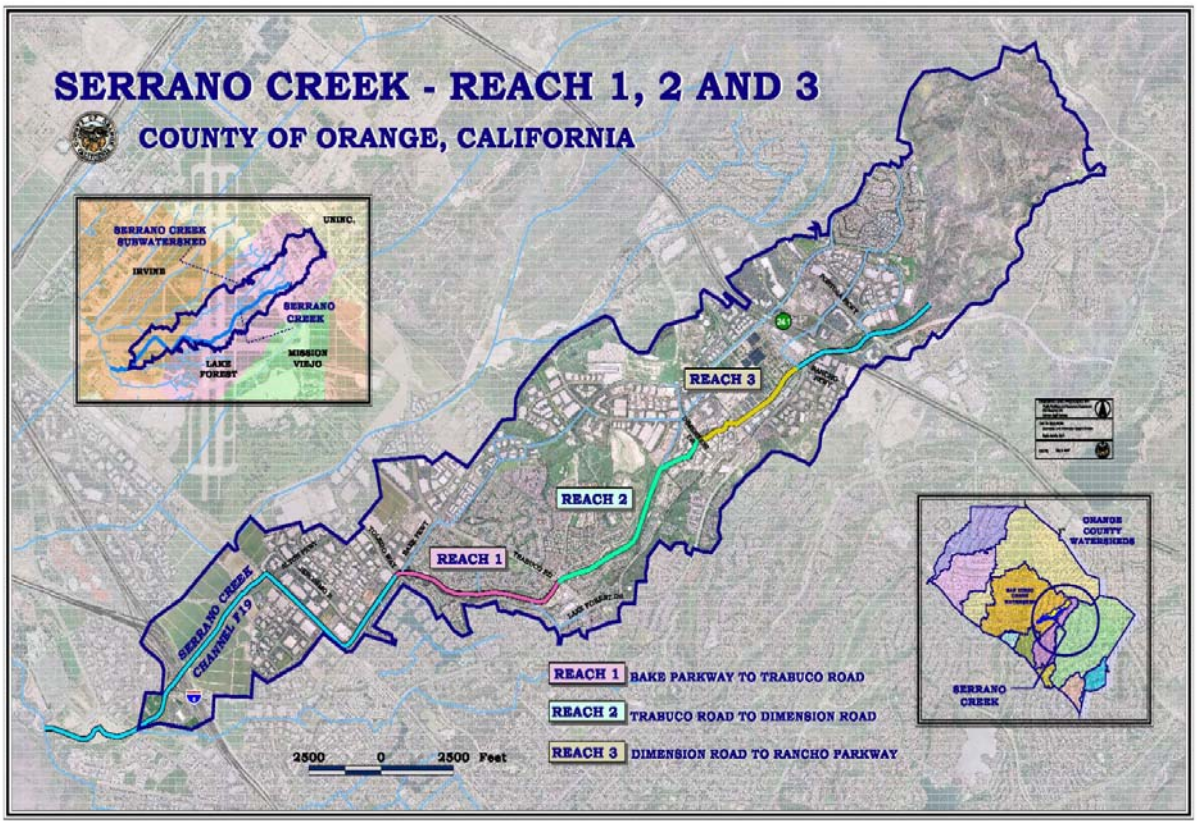
This project provides environmental and other multiple benefits by:

- Addresses the existing flood and erosion problems.
- Maximizes opportunities for habitat improvement and recreation uses.
- Reduces Sediment Total Maximum Daily Load (TMDL) to Upper Newport Bay.

Eroding Serrano Creek is a significant source of sediment to Upper Newport Bay, for which there is a Sediment Total Maximum Daily Load (TMDL) allocation set by the Santa Ana Regional Water Quality Control Board.

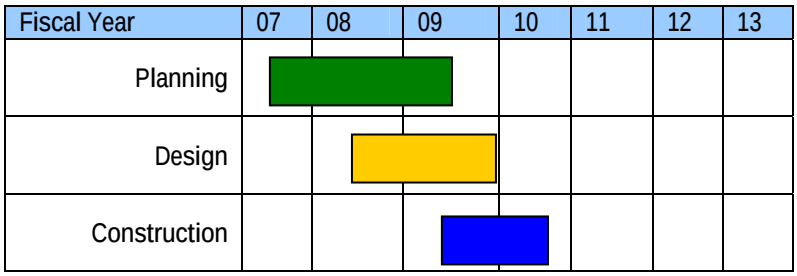
Project Location

The larger project consists of two reaches: Reach 2 is from Trabuco Road to Dimension Drive and Reach 3 is from Dimension Drive to Rancho Parkway, just below the 241 toll road. These two reaches total approximately 2.2 miles.



Reach 2, about 1.1 miles, is the current project that is part of this plan.

Project Timeline



Economic Feasibility

Prop 50 / Prop 84	$2.75 million
Other State Funding	$1 million
Local Matching Funds	$3.75 million
Percent Matching	63.3%
Total	$7.5 million

Annual Operating and maintenance Costs**:** $150,000 shared cost via MOU between County of Orange, City of Lake Forest, and Irvine Ranch Water District and Orange County Flood Control District.

Similar Projects, Linkage, Interdependence

The County has implemented numerous environmental and habitat restoration projects over the past years, including:

- Serrano Creek Stabilization and Habitat Restoration Project (Phase I)
- San Diego Creek Restoration Project
- Upper Newport Bay Restoration Project

All of these projects reduce the sediment loading into Upper Newport Bay (CCA #69) as well as reduce the hazard of loss of life and property

Performance Measures:

The primary performance measure will be the reduction of sediment delivered to Upper Newport Bay.

Baseline Related Studies and Plans:

- City of Lake Forest Study entitled, Serrano Creek Collaborative Use Plan
- Concept Study, Dr. Chang's (Currently in Progress)
- MOU among County of Orange, The Orange County Flood Control Dist., Irvine Ranch Water Dist., and The City of Lake Forest
- Watershed Action Plan
- Watershed Management Plan

Project: **Restoration of ASBS and CCA (CCAs #69, #70, #71 and ASBS #32 and #33) and development of regionally applicable Ecosystem Impact Metric**

Priority: **A03**

Implementing Agency: **City of Newport Beach**

District Contact: **Bob Stein, rstein@city.newport-beach.ca.us**

Water Management Strategies

Water Quality Protection and Improvement / Ecosystem Restoration / Environmental and Habitat Protection and Improvement / Recreation and Public Access

Project Partners/Supporters

- Newport Beach Mayor
- Coastal Commission
- Fish and Game
- National Marine Fisheries Service
- Fish and Wildlife
- Santa Ana RWQCB
- Harbor Commission
- Army Corps of Engineers
- Department of Water Resources
- IRWD
- Irvine Company
- Surfrider
- Coastkeepers

Project Description

Problem statement: Habitat loss from human activities and the introduction of invasive species is a growing concern along the coast and estuarine environments of California. Impact to the biodiversity and abundance of key species has been identified as issues in the Newport Coast ASBS and Critical Costal Areas. Loss of biodiversity has been identified through long-term studies by Cal State Fullerton linked to the introduction of invasive brown algae into the ASBS. Additionally, issues of loss of eelgrass and associated habitat of the Newport CCA have been identified in recent studies.

Proposed solution: This project implements a set of restoration activities which will enhance and restore habitat in the ASBS. The study component will also add to current understanding of the impact of watersheds on the ASBS. The project includes several components:

Brown algae removal: The introduction and subsequent invasion of non-indigenous species (NIS) is among the greatest threats to biodiversity and native ecosystem functioning. Through the effects of competition, predation, and habitat alteration, biological invasions reduce native species abundances and diversity, alter community structure, and modify ecosystem functioning (e.g., microbial dynamics, productivity, and nutrient cycling). Although much work has been conducted on the effects of many invasive species, especially in terrestrial systems, the abundance, distribution, and ecological effects of NIS of seaweeds in coastal systems have been particularly under studied. From prior work by Cal State Fullerton, we know that NIS of seaweeds on southern California rocky shores have become significant components of intertidal community structure. In particularly high abundance is the invasive brown alga Sargassum muticum that was introduced to the west coast of North America in 1902 and became an established component of southern California intertidal habitats in the 1970s. In the Little Corona del Mar ASBS, Sargassum is particularly prevalent. We propose to investigate the effects of Sargassum on community structure at Little Corona del Mar through removal experiments. The results of this can then the used in the management of invasive seaweed species throughout the ASBS.

Eelgrass restoration: Eelgrass is an ecologically important plant that forms meadows on soft sediments in southern California bays and estuaries. Its distribution however, conflicts with the maintenance of harbor infrastructure such that obtaining permits from wildlife and resource agencies for renovation of public and private piers and docks is extremely difficult due to stringent and costly mitigation requirements if the project cannot avoid impacts to eelgrass caused by docks and piers. Impacts, in these cases result from shading effects on the bayfloor which reduce light levels below the minimum required for eelgrass to grow. The purpose of this project is to identify and test dock and pier designs within Newport Bay that will (1) avoid or reduce long-term impacts to eelgrass from the effects of shading/shadows and (2) enable permit applicants to obtain the necessary permits to renovate or construct new docks and piers within Newport Bay while at the same time, ensuring that marine resources of Newport Bay are protected.

Impact metric: This project component builds on the impact metric work currently being undertaken in the tidal area of the Newport ASBS. Developing an impact metric is key to assessing the relative effectiveness of different BMP approaches since it includes multiple lines of evidence analyzed in concert. This is critical since the zone of potential impact within the ASBS will naturally exhibit a high degree of environmental stochasticity. Further, many of the variables potentially measured likely respond to seasonal, annual, or interannual changes irrespective of the effects that would result from terrestrial runoff. Measuring a multitude of variables in the intertidal zone is a good first step to developing the impact metric, however the ASBS boundaries extend well beyond the shoreline. Subtidal habitats often exhibit a smaller degree of natural variability which can be confidently measured, and hence including variables measured within subtidal habitats within the ASBS is an obvious step towards vastly improving the value of the metric as an indicator of BMP effectiveness.

Project Location

P

Fiscal Year	07	08	09	10	11	12	13
Planning							
Implementation							
Monitoring							

Economic Feasibility

Prop 50 / Prop 84	$300,000
Local Matching Funds	$100,000
Percent Matching	25.0%
Total	$400,000

Annual Operating and Maintenance Costs: Not applicable

Similar Projects, Linkage, Interdependence

The projected project benefits include both broad and specific improvements in water quality, watershed management and stakeholder participation. Specific beneficial uses as defined in the

Basin Plan will be protected, improved or enhanced. The reduction in public use will enhance REC-1 and REC-2 and improve the marine environment and further protect the ASBS (MAR and BIOL). The project will also provide much needed information on the offshore community within the ASBS which may be potentially impacted by watershed runoff and anthropogenic activities within Newport Bay. It also provides critical information from subtidal habitats to include in the impact metric currently in development.

Performance Measures

The effectiveness of this program will be assessed through:

- Assessment of brown algae presence/reduction success
- Assessment of eelgrass restoration success
- Near shore impact assessment validation

Performance measures will be determined from existing baseline data and established literature. Photo documentation will be used as well as GIS tools to track project implementation and monitor improvements.

Baseline Related Studies And Plans:

- City of Newport Beach impact metric design and evaluation (on-going)
- Cal State Fullerton rockweed restoration studies (on-going)

Project: **Implementation of Regionally Relevant Low Impact Design Projects for Reduction of Metals, Sediments and Bacteria in the ASBSs and CCAs (CCAs #69, #70, #71 and ASBS #32 and #33)**

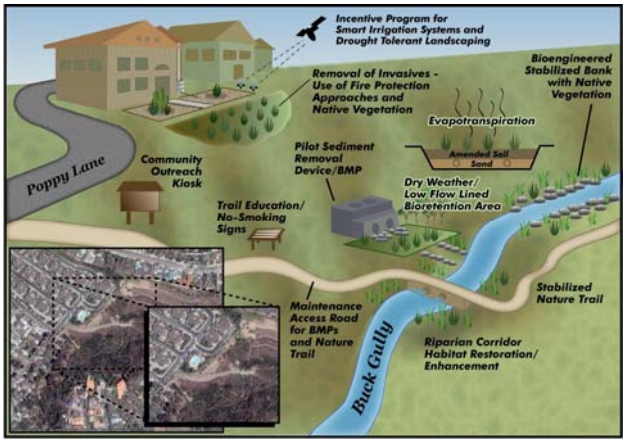
Priority: **A04**

Implementing Agency: **City of Newport Beach**

Agency Contact: **Bob Stein, Rstein@city.newport-beach.ca.us**

Water Management Strategies

Water Quality Protection and Improvement / Ecosystem Restoration / Environmental and Habitat Protections and Improvement



Project Partners/Supporters

- Newport Beach Mayor
- Coastal Commission
- Fish and Game
- National Marine Fisheries Service
- Fish and Wildlife
- Santa Ana RWQCB
- Harbor Commission
- Army Corps of Engineers
- Department of Water Resources
- IRWD
- Irvine Company
- Surfrider
- Coastkeepers

Project Description

Problem statement: The Newport Water Quality and Flow Assessment Study (Weston 2006) identified a number of pollutants of concern detected in dry and wet weather flows from the coastal canyon creeks that discharge to the ASBS. Pollutants of concern that were identified in Buck Gully and Morning Canyon (the more urbanized watersheds) included sediments, metals and bacteria. Based on estimates of pollutant loading to the ASBS, dry weather flows constitute the largest metal loading. Furthermore, greater bacteria and sediment loading is associated with wet weather flows.

Proposed solution: An integrated approach is needed to address the potential impacts to the ASBS from dry and wet weather flows from the coastal canyon creeks in more urbanized watersheds. This integrated approach incorporates a number of different management and implementation strategies for reducing and sediments, bacteria and metals loading to the ASBS.

This project achieves this goal through pollution prevention and runoff reduction measures. The key elements of this project are the use of low impact development bioretention techniques to treat dry weather flows and the first flush wet weather flows. This LID BMP will be integrated with a gross solid and sediment removal BMP to address potential clogging of the bioretention facility. An innovative solution to removal of fine sediments is proposed as a key element to this BMP. This project is also integrated with the runoff reduction program and the erosion control projects in Buck Gully to further reduce dry weather flows and sediment loading.

Project components include:

- Implementation of Pilot BMP for dry weather and low wet weather flows: This BMP will include a pilot system for fine sediment removal and allow for coarse grain sediment to be transported to the ASBS (this is important for sand replenishment).
- Pollutant Source Tracking in the Watershed and at the ASBS shoreline: The aim of this component is to better identify bacterial sources for prospective source control management.

This project will include the following components:

- Assess bacterial removal rates and loads in the BMP
- Quantify in situ re-growth of E. coli and enterococcus in subtrophic soil
- Identify the source of fecal pollution source input in the upper watershed
- Provide information on potential human health risk from exposure to runoff impacted coastal water
- Provide information to fine tuning best management practice for fecal bacterial reduction in the watershed

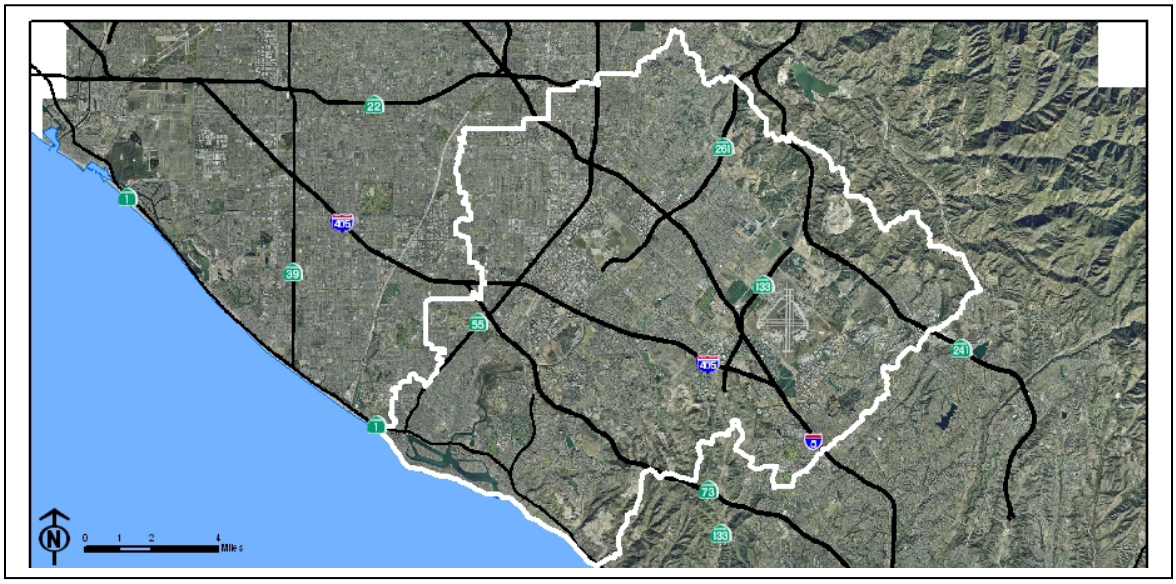
Public Outreach, Education Information, and Trail Enhancement near pilot BMP: The project will incorporate a variety of features such as information kiosks, pet waste stations and trail enhancements. Trail enhancement will include use of innovative erosion control techniques to minimize trail erosion and channelization. Pet waste stations will be part of the bacterial load reduction strategy

Effectiveness assessment and information management: The effectiveness of this project will be assessed through a number of different means including:

- Public surveys to assess changes in understanding and behavior
- Flow monitoring (both baseline and post implementation)
- Contaminant load assessments (both baseline and post BMP implementation)
- Source identification validation
- The development of information management systems

Project Location

This project has elements throughout the study area.



Project Timeline

Fiscal Year	07	08	09	10	11	12	13
Planning							
Design							
Construction							
Monitoring							

Economic Feasibility

Prop 50 / Prop 84	$750,000
Matching Funds	$125,000
Percent Matching Funds	14.3%
Total	$875,000

Operating and Maintenance Costs: Not applicable

Performance Measures

Monitoring will consist of:

- The assessment of long term aquatic habitat improvement in the ASBS.
- Load reduction monitoring of the Poppy Lane project.
- Public surveys to assess increases in awareness, understanding and behavior change in residential and commercial areas.

Performance measures will be determined from existing baseline data and established literature. Photo documentation will be used as well as GIS tools to track project implementation and monitor improvements.

Baseline Related Studies and Plans:

This project follows from a water quality and flow assessment study undertaken in the Newport Coastal watersheds which identified metals, sediments and bacteria as contaminants of concern (Weston Solutions, Inc. 2006a. Newport Coast Water Quality and Flow Assessment. Prepared for the City of Newport Beach. 2006). These contaminants were predominantly transported by dry weather flows and as such a low impact development approach was designed to address those flows using bioretention and evapo-transpiration.

Project: **Copper Reduction Program for CCA #69, ASBS #33 and ASBS #32**
Priority: A05
Implementing Agency: City of Newport Beach
Agency Contact: Bob Stein, rstein@city.newport-beach.ca.us

Water Management Strategies

Water Quality Protection and Improvement / Ecosystem Restoration / Environmental and Habitat Improvement / Recreation and Public Access

Project Partners/Supporters

- Newport Beach Mayor
- California Coastal Commission
- California Department of Fish and Game
- National Marine Fisheries Service
- U.S. Fish and Wildlife Service
- Santa Ana RWQCB
- Harbor Commission
- U.S. Army Corps of Engineers
- California Department of Water Resources
- Irvine Ranch Water District
- The Irvine Company
- Surfrider Foundation, U.S.A
- Coastkeeper

Project Description

Problem statement**:** The results of the Water Quality and Flow Assessment (Weston 2006) identified metals (specifically copper) as the pollutant of concern in dry and wet weather flows. The impact of the metals to the ASBS is being further investigated through bioaccumulation studies. Copper has also been identified as the pollutant of concern in Newport Bay and has been associated primarily with the use of certain maritime paints and brake pad wear. Preliminary cross contamination study results have identified a connection between lower Newport Bay and the Newport ASBS. Therefore copper inputs to the Bay may impact the ASBS.

Proposed solution**:** A boat paint management program will be implemented to reduce the presence of metals in the marine environment and hence the potential for uptake by eelgrass. Elements of this project include:

Copper reduction program: The program will include a public outreach and incentive component to reduce copper contaminants from entering the marine environment. This includes boat paint

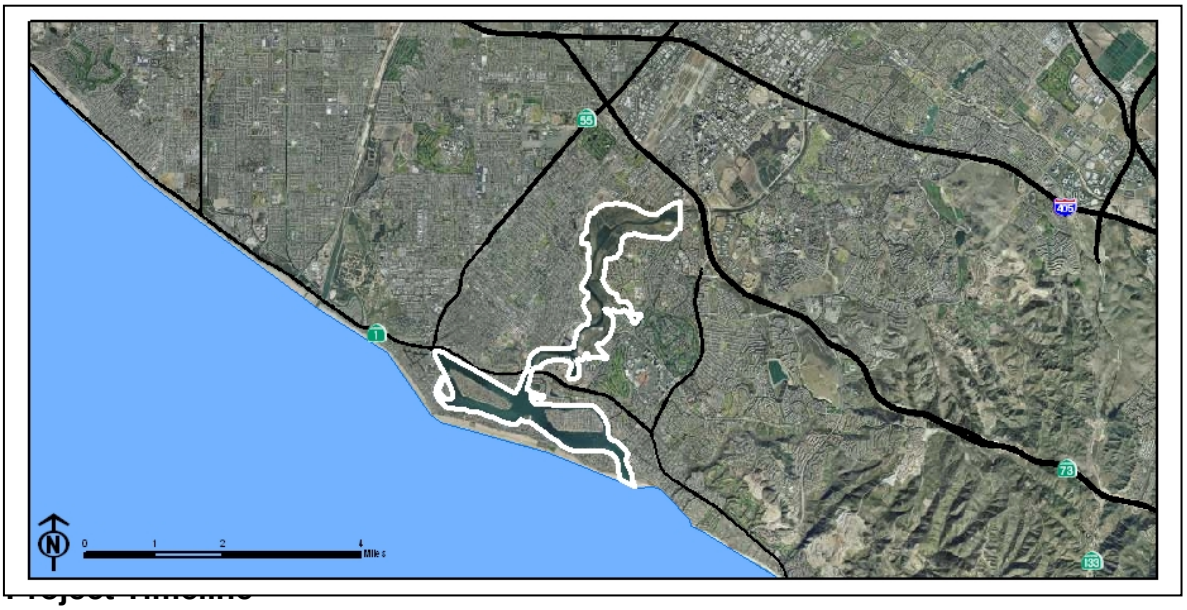
management and a brake pad partnership program whereby auto repair facilities will be targeted as outreach partners to ensure proper maintenance of car brake pads (a known source of copper). Additionally, targeted street sweeping will be used to remove road-related copper contamination.

Eelgrass Contaminant Transport: Within Newport Bay, eelgrass covers approximately 132 acres of bayfloor habitat. Its importance in cycling contaminants, however, is not well understood within the Newport Bay ecosystem nor is it understood if contaminants affect the distribution of eelgrass with Newport Bay. Root systems are known to act as sinks for some metals and may be bound up in eelgrass for long periods of time. When both above and below-ground components of eelgrass decompose, concentrations of contaminants are bound up in the sediments. Upon oxidation however, these contaminants are released, transported through detrital and DOM pathways and become bioavailable. Metals uptake has therefore been identified as a potential transport mechanism into the ASBS.

Pollutant modeling**:** The project is also based on results of preliminary flow modeling and assessments undertaken by Everest Consultants and Weston Solutions Inc. which identified Newport Harbor as a significant potential source of contamination. Heavy metal residues from boat paint are considered one of the most likely sources of contamination. The proliferation of eelgrass in Newport Bay.

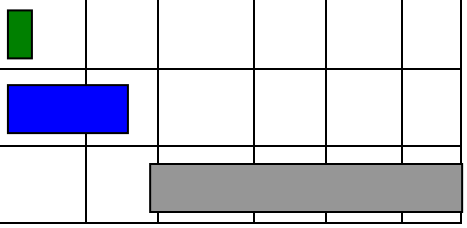
Effectiveness assessment: the effectiveness of this program will be assessed through the implementation of an effectiveness monitoring program. This program will include street sweeping documentation, surveys to auto repair facilities, and validation of pollutant modeling as well as validated understanding of contaminant transport mechanisms.

Project Location



Project Timeline

Fiscal Year	07	08	09	10	11	12	13
Planning							
Implementation							
Monitoring							



Economic Feasibility

Prop 50 / Prop 84	$110,000
Matching Funds	$40,000
Percent Local Matching	26.7%
Total	$150,000

Annual Operating and Maintenance Costs: Not applicable

Performance Measures:

Monitoring will consist of:

- The assessment of long term aquatic habitat improvement in the ASBS.
- Metal load reduction monitoring in the ASBS.

The effectiveness of this program will be assessed through the implementation of an effectiveness monitoring program. This program will include street sweeping documentation, surveys to auto repair facilities, and validation of pollutant modeling as well as validated understanding of contaminant transport mechanisms.

Similar Projects, Linkage, Interdependence

- Weston Solutions, Inc. 2006a. Newport Coast Water Quality and Flow Assessment. Prepared for the City of Newport Beach. 2006

and its surrounds will also provide valuable habitat in one of the last remaining large wetland areas in Orange County. The project will also enhance 25 acres of deteriorated riparian woodland adjacent to the wetland. That woodland was originally planted as a mitigation site in the 1980's, but has since deteriorated and lacks plant diversity, so its habitat value is currently limited.

The SR 133/I-5 NTS is located within an existing detention basin owned and operated by Caltrans. The drainage area includes the Marshburn Channel and tributaries upstream from the SR 133/I5 Interchange. The basin is currently being used to treat small storm runoff from SR 133 and I-5 interchange. An off-line water quality wetland would be constructed within the detention basin to treat dry weather low flows that are delivered from the Marshburn Channel. Treated effluent from the wetland would be returned to the Marshburn Channel by gravity.

Project: **Buck Gully and Morning Canyon (ASBS #32 and CCA #70) – Canyon and Creek Bank Erosion Control BMPs and Riparian and Freshwater Wetland Restoration Project**

Implementing Agency: **City of Newport Beach**

Priority: **A06**

Agency Contact: **Bob Stein, rstein@city.newport-beach.ca.us**

Water Management Strategies

Water Quality Protection and Improvement / Ecosystem Restoration / Environmental and Habitat Protection and Improvement / Recreation and Public Access

Project Partners/Supporters

- Newport Beach Mayor
- Coastal Commission
- Fish and Game
- National Marine Fisheries Service
- Fish and Wildlife
- Santa Ana RWQCB
- Harbor Commission
- Army Corps of Engineers
- Department of Water Resources
- IRWD
- Irvine Company
- Surfrider
- Coastkeepers

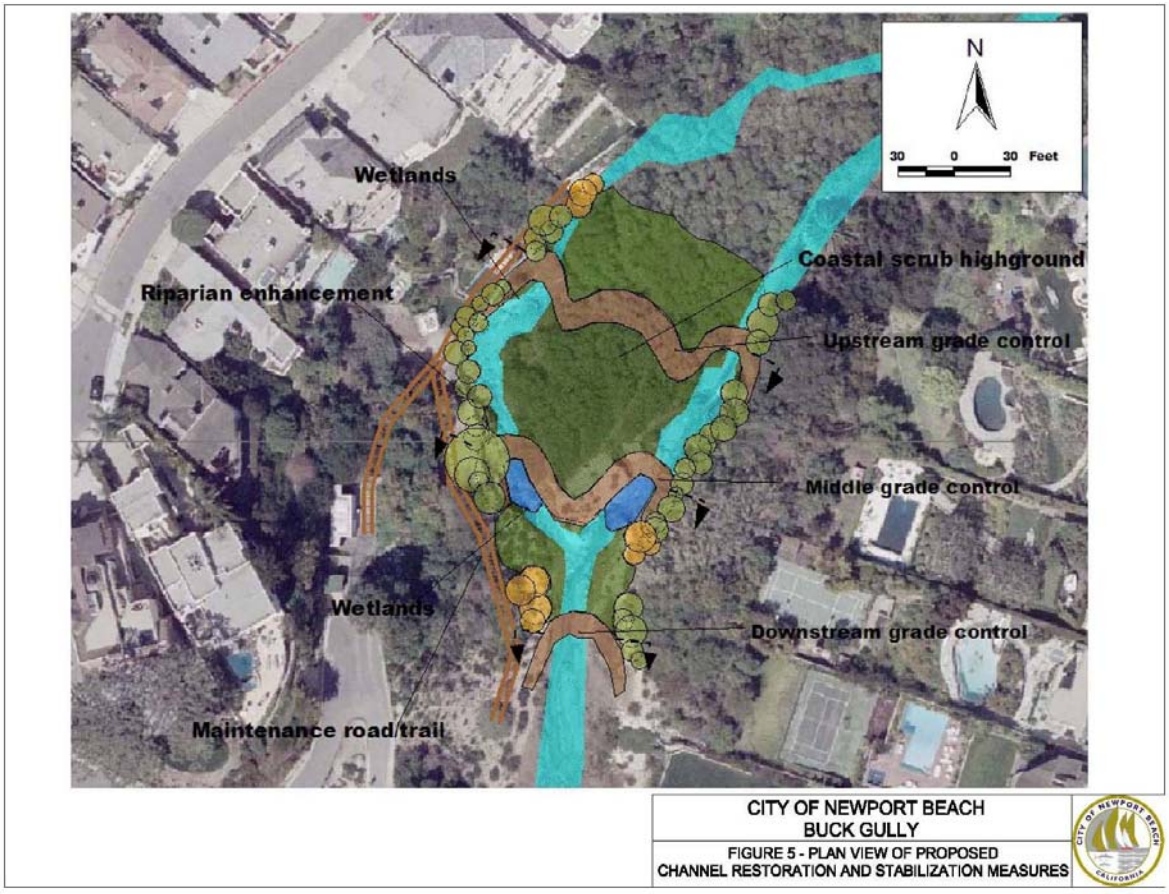
Project Description

Problem statement: The water quality and flow assessment study undertaken in Newport (Weston 2006) showed that sediment transport was a concern and had the potential to impact the ASBS. Erosion in the Newport canyons is also well documented with significant bank instability in areas where vegetation and urban runoff contribute. One area of significant concern is in the coastal reach of Buck Gully where grade control and bank stabilization is needed, together with habitat restoration.

Proposed solution: This project is designed to reduce sediment loads, improve water quality and reduce erosion within Buck Gully and Morning Canyons through the construction of a wetland treatment system, grade control and bank stabilization. The project will:

- Reduce impact to the canyon creeks, water quality, habitat and bank stabilization (hydromodification) through the implementation of grade controls, bank stabilization and wetland treatment system.
- Reduce the potential for downstream impacts to the ASBS.
- Control erosion to reduce the loads of sediment entering the ASBS by treating flows prior to entry into the marine environment.
- Improve habitat through the removal of invasive plants and restoration of wetland habitat.

Effectiveness assessment: The effectiveness assessment for this project is anticipated to include assessments of sediment loads (both baseline and post implementation), water quality characteristics (such as nutrients, bacteria, metals etc), and photo documentation.



Proposed Buck Gully Erosion Control project

Project Location

Project Timeline

Fiscal Year	07	08	09	10	11	12	13
Planning							
Design							
Construction							
Operation or Monitoring Efforts							

Economic Feasibility

Prop 50 / Prop 84	$500,000
Matching Funds	$1,000,000
Percent Local Matching	66.7%
Total	$1,500,000

Annual Operating and Maintenance Costs: Not available

Similar Projects, Linkage, Interdependence:

This project follows from a water quality and flow assessment study undertaken in the Newport Coastal watersheds which identified copper as a contaminant of concern (Weston Solutions, Inc. 2006a. Newport Coast Water Quality and Flow Assessment. Prepared for the City of Newport Beach. 2006). The project is also based on results of preliminary flow modeling and assessments.

Project: **Newport Bay Watershed Natural Treatment System (NTS) (CCA#69, ASBS #32 and #33)**
Priority: **A07**
Implementing Agency: **Irvine Ranch Water District**
Agency Contact: **Mark Tettemer, tettemer@irwd.com**

Water Management Strategies

Water Quality Protection and Improvement / NPS Pollution Control / Environmental and Habitat Protection and Improvement

Project Description

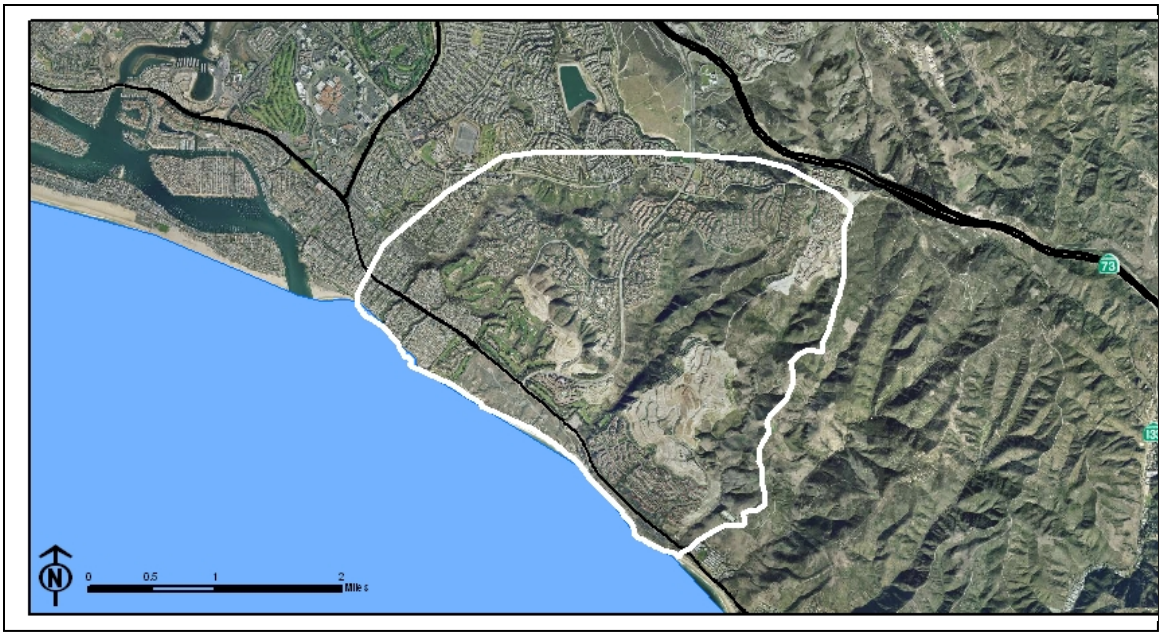
The Natural Treatment System (NTS) is a planned system of approximately 40 constructed wetlands sites to improve water quality in San Diego Creek, Newport Bay, and coastal waters influenced by the Bay. NTS wetlands consist of local sites being constructed by developers as a part of their development projects, and seven regional sites constructed by IRWD (San Joaquin Marsh and Sites 26, 53, 55, 56, 62, and 64). Based on the performance of the existing IRWD San Joaquin Marsh wetland system, the NTS wetlands are expected to remove 70% of the nitrogen and significant portions of pathogens, phosphorus, and various other regulated pollutants from urban runoff prior to it being discharged into San Diego Creek and Newport Bay, both of which have established and proposed TMDL's; Upper Newport Bay is also a "Ecological Reserve" and a designated "critical coastal area.". Construction of several new regional NTS wetlands are underway, with additional funds being necessary for additional planned sites: South San Joaquin Marsh (Site 62; formerly "SAMS 1") and SR133/I-5 (Site 53) (the San Joaquin Marsh was constructed in the late 1990's, prior to the development of the comprehensive NTS Master Plan).

The South Marsh NTS is a 10-acre wetland constructed for urban runoff treatment, serving the entire San Diego Creek watershed in Central Orange County. The wetland

and its surrounds will also provide valuable habitat in one of the last remaining large wetland areas in Orange County. The project will also enhance 25 acres of deteriorated riparian woodland adjacent to the wetland. That woodland was originally planted as a mitigation site in the 1980's, but has since deteriorated and lacks plant diversity, so its habitat value is currently limited.

The SR 133/I-5 NTS is located within an existing detention basin owned and operated by Caltrans. The drainage area includes the Marshburn Channel and tributaries upstream from the SR 133/I5 Interchange. The basin is currently being used to treat small storm runoff from SR 133 and I-5 interchange. An off-line water quality wetland would be constructed within the detention basin to treat dry weather low flows that are delivered from the Marshburn Channel. Treated effluent from the wetland would be returned to the Marshburn Channel by gravity.

Project Location



Project Timeline

Fiscal Year	07	08	09	10	11	12	13
Planning							
Implementation							
Monitoring							

Economic Feasibility

Prop 50 / Prop 84	$1,000,000
Matching Funds	$7,300,000
Percent Local Matching	89.2%
Total	$9,300,000

Annual Operating and Maintenance Costs: $1,000,000/year

Similar Projects, Linkage, Interdependence:

IRWD has extensive experience over the last 10 plus years in implementation and operations of constructed wetlands through the 320 acre San Joaquin Marsh. The planned NTS sites are smaller than the Marsh, but will operate under the same basic principles. IRWD has also constructed and operated a large number of technically sophisticated water and wastewater facilities including treatment plants over many years.

Performance Measures:

IRWD has developed its comprehensive Wetland Performance Tracking (WetTraq) Plan for monitoring the NTS wetlands for both performance and impact avoidance. WetTraq will allow IRWD to closely track wetlands performance and adapt operations as necessary. WetTraq data will be available to the greater watershed wide monitoring program administered by the County of Orange.

Baseline Related Studies and Plans:

- San Diego Creek NTS Master Plan and EIR

Project: **County-Wide Pharmaceutical Disposal Program/"No Drugs Down the Drain" Pharmaceutical Education Outreach Tool Box (CCA #69, ASBS #32, #33, #30)**

Priority: **A08**

Implementing Agency: **City of Newport Beach/Orange County Sanitation District**

Agency Contact: **Tom Meregillano, tmeregillano@ocsd.com**

Water Management Strategies

Water Quality Protection and Improvement / Water Supply Reliability / Water and Wastewater Treatment

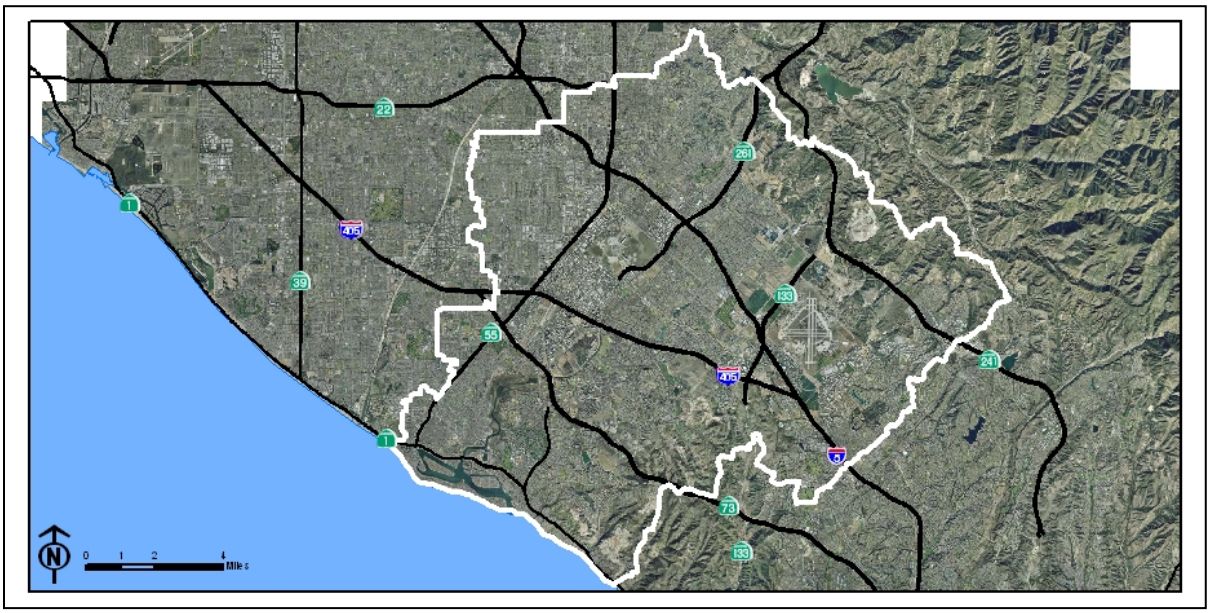
Project Partners/Supporters

- County of Orange
- Cities of Costa Mesa, Irvine, Lake Forest, Laguna Beach, Santa Ana and Tustin
- Ca. Fish and Game
- US Fish and Wildlife
- Surfrider Foundation, U.S.A.
- Coastkeeper
- Heal the Bay
- Cal Dept of Parks
- Santa Ana RWQCB
- Harbor commission
- IRWD
- Department of Water Resources

Project Description

This project is focused at reducing the amount of pharmaceutical drugs being disposed by the general public into the sanitary sewer system. The goal of the project will be to develop a regional tool to educate the public about the environmental effects of disposing pharmaceutical drugs in the sewer lines. This will include solutions to proactively address this problem for achieving water quality levels required for ocean discharge, biosolids reuse, and water reclamation for the Ground Water Replenishment System.

Project Location: Region-wide



Project Timeline

Fiscal Year	07	08	09	10	11	12	13
Planning							
Design							
Construction							
Operation and Monitoring Efforts							

Economic Feasibility

Prop 50 / Prop 84	$140,000
Matching Funds	$250,000
Percent Local Matching	64.1%
Total	**$390,000**

Operating and Maintenance Costs: Not applicable

Project: **Dry Weather Diversion at Pelican Point (ASBS #33)**
Priority: **A09**
Implementing Agency: **City of Newport Beach**
Agency Contact: **Bob Stein, rstein@city.newport-beach.ca.us**

Water Management Strategies

Water Quality Protection and Improvement / Ecosystem Restoration / Environmental and Habitat Protection and Improvement / Recreation and Public Access

Project Partners/Supporters

- The Irvine Company

Project Description

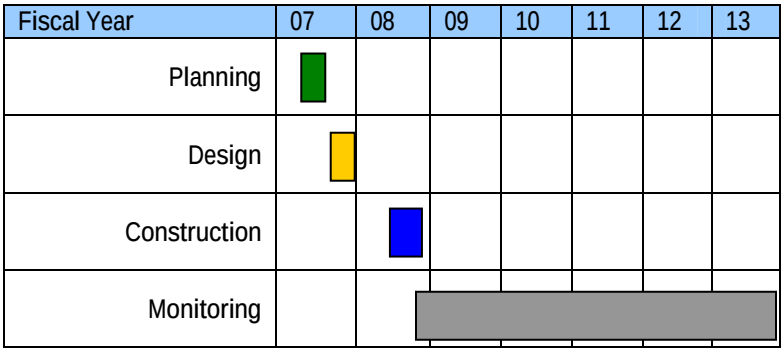
Problem statement**:** The Water Quality and Flow Study (Weston, 2006) identified dry weather flows as a key transport mechanism for pollutants of concern which are then transported to the ASBS.

Proposed solution**:** A stormwater diversion will be constructed at Pelican Point to divert dry weather discharge to the sanitary sewer, thereby preventing runoff-associated discharge from entering the ASBS marine environment.

Effective assessment: The effectiveness of this project will be assessed through the monitoring of stormwater flows before and after the diversion is implemented.

Project Location – at Pelican Point

Project Timeline



Economic Feasibility

Prop 50 / Prop 84	$25,000
Matching Funds	$375,000
Percent Local Matching	93.8%
Total	$400,000

Annual Operating and Maintenance Costs: Not available

Performance Measures:

Monitoring will consist of:

- Assessment of dry weather flows.
- Load reduction monitoring for Pelican Creek and Shaw's Cove

The effectiveness of this project will be assessed through the monitoring of stormwater flows before and after the diversion is implemented.

Baseline Related Studies and Plans:

Weston Solutions, Inc. 2006a. Newport Coast Water Quality and Flow Assessment. Prepared for the City of Newport Beach. 2006

Project: **Upper Newport Bay Ecosystem Restoration (CCA #69)**
Implementing Agency: **County of Orange**
Priority: **A10**
Agency Contact: **Susan Brodeur, susan.brodeur@rdmd.ocgov.com**

Water Management Strategies

Water Quality Protection and Improvement / Ecosystem Restoration / Environmental and Habitat Protection and Improvement / Recreation and Public Access

Project Partners/Supporters

City of Newport Beach

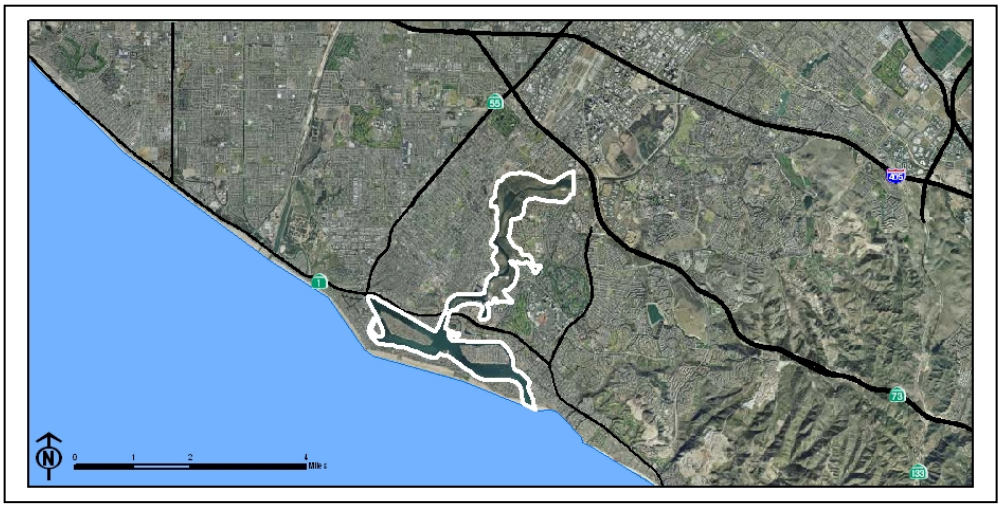
Project Description

Upper Newport Bay Ecosystem Restoration Base Contract Project Features

This project will restore the capacity of existing in-bay sediment detention basins and enhance biological resources. In addition, the project will meet the criteria outlined by the EPA and RWQCB for total maximum daily load inputs into the bay, particularly sediment. Two in-bay basins will be deepened and expanded, and a large island in the upper basin will be removed and reconstructed closer to the lower basin. Restoration measures include vegetation clearing and addition of san to the least tern nesting island, removal of dredge spoils on Shellmaker Island and restoration to mudflat, segmentation of the main dike to reduce predator access, and restoration of side channels. Phase 1 of the restoration project is currently under construction.

Project Location

Upper Newport Bay is located in Newport Beach, California, Orange County. The area encompasses the uplands, wetlands and open-water channel north of Pacific Coast Highway bridge and the basins of the Upper Newport Bay bordered by Jamboree Road.



Project Timeline

Fiscal Year	07	08	09	10	11	12	13
Planning	Complete						
Design	Complete						
Construction							
Monitoring							

Economic Feasibility

Prop 50 / Prop 84	$2 million
Other State Funds	$13 million
Federal Funds	$12 million
Other Matching Funds (Prop 12 and USACE)	$14 million
Percent Local Matching	95.1%
Total	$41 million

Annual Operating and Maintenance Costs: $1.5 million/year

An annuity fund for maintenance was established in 2002 with funds from the American Trader Oil spill (currently at $3.8 million).

An annuity fund was created in 1998 under the Department of Fish and Game for long term maintenance needs of the Department for the Upper Newport Bay Preserve.

Similar Projects, Linkage, Interdependence:

A similar project of dredging of the Upper Bay was undertaken by the County of Orange in 1998

Performance Measures

Ecological monitoring will be performed upon completion of the project. Monitoring will be conducted during the 2nd, 5th and 10th year after completion of construction. Some monitoring will be required annually.

Baseline Related Studies and Plans:

- Upper Newport Bay Feasibility Study

Project: **Implementation of Public Impact Reduction to ASBS (CCAs #69, #70, #71 and ASBS #32 and #33)**
Priority: **A11**
Implementing Agency: **City of Newport Beach**
Agency Contact: **Bob Stein, rstein@city.newport-beach.ca.us**

Water Management Strategies

Water Quality Protection and Improvement / Ecosystem Restoration / Environmental and Habitat Protection and Improvement / Recreation and Public Access

Public Impact to ASBS

Project Partners/Supporters

- City of Laguna Beach
- Newport Beach Mayor
- Coastal Commission
- Fish and Game
- National Marine Fisheries Service
- Fish and Wildlife
- Santa Ana RWQCB
- Harbor Commission
- Army Corps of Engineers
- Department of Water Resources
- IRWD
- Irvine Company
- Surfrider
- Coastkeepers

Project Description

Problem statement: The preliminary results of the Public Use Survey being performed by the City of Newport Beach under a Proposition 50 grant indicates that heavy public usage of the ASBS shoreline poses a significant impact on both flora and fauna.

Proposed solution: This project comprises a number of different components aiming to reduce the impact of public use in the ASBS.

Public exclusion: Coastal communities in urban southern California are being altered by anthropogenic disturbances. Studies indicate shifts in rocky intertidal macroinvertebrates and macrophytes including a shift from large, fleshy, highly productive seaweeds towards a less productive flora dominated by crustose algae and disturbance-tolerant, turf-

formers. Some of these changes are believed to be attributable to the impacts of human use. We propose to reduce the impacts of human visitors by excluding them from portions of the intertidal zone and determining the change in community composition in these excluded areas as compared to control areas.

Expansion of docent program: This portion of the project proposes to expand the docent program such that docents are present at times of high public presence and that they are provided with tools to educate the public on the effects of trampling.

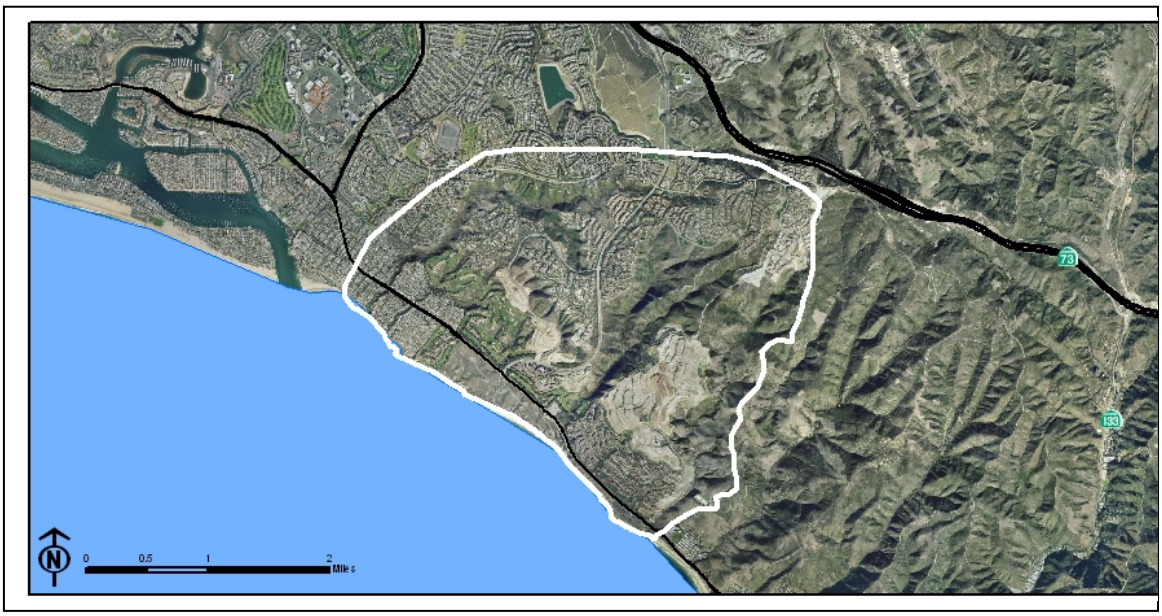
Alternative education practices: We propose to investigate non-intrusive methods for elementary through university level school groups visiting local rocky shores during education field trips. By offering alternatives to typical destructive "collect and show" instruction, we hope to discourage and alleviate some of the negative impacts that educational field trips have on rocky shore flora and fauna. Potential alternatives include:

- Touch tanks.
- Touching but not removing "show and tell."
- Web based digital collections such as a Digital Algal Herbarium.

Public education and effectiveness assessment: Rocky intertidal communities along the Orange County coastline have been severely degraded over the last 60 years due to the urbanization. The consequence of urbanization has been a reduction in the abundance and diversity of rocky intertidal plants and animals a reduction in recruitment potential, and delayed period of recovery due to constant, adverse public use. To counter these effects, local governments and Non-Governmental Organizations (NGOs) are working together to reduce the impacts of continued human use in ASBS. Management tools such as signage, enforcement, and educational outreach will be evaluated to determine their effectiveness in reducing impacts on marine resources. A two-year impact assessment Public Use Impact Study will be implemented to evaluate these management tools. Assessments will be conducted within the Robert Badham, Newport Coast ASBS, and Heisler Park ASBS areas by volunteers overseen by City staff and State Parks personnel.

Effectiveness assessment: Effectiveness monitoring will include public surveys, docent interviews and long term studies to understand the impact of management practices on the preservation and restoration of the ASBS.

Project Location



Project Timeline

Fiscal Year	07	08	09	10	11	12	13
Planning							
Implementation							
Monitoring							

Economic Feasibility

Prop 50 / Prop 84	$180,000
Matching Funds	$60,000
Percent Local Matching	25%
Total	$240,000

Annual Operating and Maintenance Costs: Not applicable

Similar Projects, Linkage, Interdependence:

In-depth public use impact surveys are currently being conducted in Central Orange County's Areas of Special Biological Significance as part of the City's Proposition 50 Grant Award. These studies are providing valuable, site-specific data on the specific

types of human-use impacts occurring in Robert Badham ASBS, Newport Coast ASBS, and Heisler Park ASBS areas.

Performance Measures:

Monitoring will consist of:

- The assessment of long term aquatic habitat improvement in the ASBS.
- ASBS public use site surveys to quantify types of public use impacts to intertidal resources and the species and communities at risk from specific types of public use impacts.
- Interviews of docents, rangers, managers, and users to evaluate management tools and their effectiveness.
- Information management regarding policy changes and municipal activities.

Performance measures will be determined from existing baseline data and established literature. Photo documentation will be used as well as GIS tools to track project implementation and monitor improvements.

- Comparison to baseline public use survey data collected in 2007-2008
- Monitor ASBS habitat and ecology restoration
- Comparison to management programs within other areas of California and the U.S.
- Review against existing literature

Project: **Nitrogen and Selenium Management Program Watershed-Scale BMP Implementation Program – Phase I (CCA #69, ASBS #32)**
Priority: **A12 (links to A15)**
Implementing Agency: **County of Orange**
Agency Contact: **Karen Cowan, karen.cowan@rdmd.ocgov.com**

Water Management Strategy

Water Quality Protection and Improvement / Watershed Planning

Project Partners/Supporters

- California Department of Transportation
- County of Orange
- Orange County Flood Control District
- City of Costa Mesa
- City of Irvine
- City of Laguna Hills
- City of Laguna Woods
- City of Lake Forest
- City of Newport Beach
- City of Orange
- City of Santa Ana
- City of Tustin
- Irvine Ranch Water District
- The Irvine Company
- The Great Park Corporation
- Golden State Water Company
- Tustin Legacy Community Partners
- Lennar
- Maguire Properties
- Nexus Construction Services
- Integral Communities, Inc
- Orange County Coastkeeper
- Stop Polluting Our Newport
- Santa Ana Regional Water Quality Control Board

Project Description

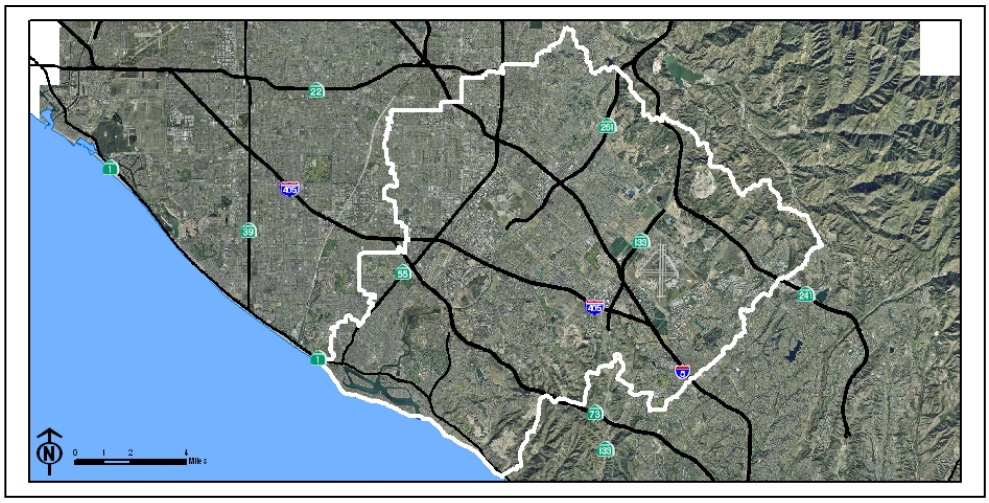
The Regional Board issued Order No. R8-2004-0021 (NPDES No. CAG998002) (Order) on December 20, 2004 which specifies waste discharge requirements for short-term (i.e., one year or less) groundwater-related discharges and for de minimus discharges within the Newport Bay watershed. This Order was originally proposed in early 2004 and was subsequently postponed due to issues raised by the watershed stakeholders. The draft permit proposed a concentration limit of 4 µg/L selenium, which due to existing levels in the groundwater and the lack of a treatment technology to decrease concentrations to the proposed effluent limit, would have resulted in a de facto ban on these types of discharges in the watershed. The implications of such a ban would have had a profound impact on the operation of water utilities, the redevelopment and clean-up of MCAS Tustin and the construction and maintenance of private and public works

projects in the watershed. In consideration of these issues, the final issued Order incorporated an alternative compliance approach to allow the County, watershed cities, The Irvine Company, Irvine Ranch Water District, Cal Trans and other private and public stakeholders to form a Working Group to develop and implement a comprehensive Work Plan to address selenium and nitrate discharges in the watershed over the five year permit term. Stakeholders participating in the Working Group are allowed to continue groundwater-related discharges for the duration of the permit term. The Order establishes certain tasks that must be completed by the Working Group through the implementation of the Work Plan, including filling the data gaps regarding selenium and nutrients to understand the extent of the ecosystem impacts, examining Best Management Practices (BMPs) and treatment technologies that can reasonably be applied throughout the watershed to reduce the inputs of selenium and nitrates, building upon this knowledge to develop a management program (i.e. a trading, offset, or mitigation program) for selenium and nutrients in the watershed, and, if necessary, developing a site specific objective for selenium for the Newport Bay watershed. The Order establishes specific and aggressive deadlines for many of these tasks, with a final compliance deadline of December 20, 2009 (the term of the Order). Meeting these deadlines is critical for compliance with the requirements of the Order

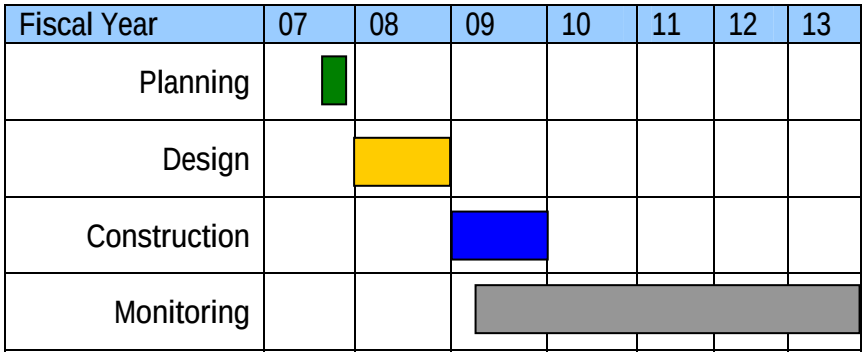
This project is designed as the pilot phase of a watershed-wide BMP Implementation program for the management of nitrogen and selenium.

PROJECT LOCATION

Entire Watershed. Exact siting of the BMPs will be determined in Spring 2008.



Project Timeline



Economic Feasibility

Prop 50 / Prop 84	$1 million
Matching Funds	$1 million
Percent Local Matching	50%
Total	$2 million

Operating and Maintenance Costs: TBD

Similar Projects, Linkage, Interdependence:

This project is directly linked to the entire Nitrogen and Selenium Management Program (NSMP), which is one part of overall project (*see Baseline Related Studies and Plans*). It is also potentially linked to a newly developing project, a toxicity management plan, as that project will also require the development of a BMP implementation plan.

This project is the first of its kind in Orange County and has the support of a diversity of stakeholders, including the Regional Board, municipalities, special districts, private sector, and environmental community. Other aspects of the program (the full NSMP) have been very successful thus far.

There are related efforts underway, locally and regionally, focusing on both selenium and nutrients that the Work Plan should coordinate with on a regular basis. These other efforts provide important opportunities for collaboration on identifying key questions and developing technical approaches, in addition to improving cost effectiveness through sharing relevant data and assessment tools. For selenium, these include:

- The interagency (USEPA, US Fish and Wildlife Service, US Geological Survey, NOAA Fisheries) effort underway to develop selenium guidelines specific to California. The interagency effort is focusing initially on San Francisco Bay and the monitoring and impact assessment approach in Task 1 of the Work Plan follows the approach being used by the interagency effort
- The Santa Ana Regional Water Quality Control Board's study of patterns of selenium contamination in surface water and groundwater throughout the Newport Bay watershed.

For nutrients, these studies include:

- Monitoring and research conducted as part of the Nutrient TMDL
- The Santa Ana Regional Water Quality Control Board's Triennial Review of the Nutrient TMDL
- The joint USEPA / State Water Resources Control Board Regional Technical Advisory Group, which is developing guidelines for assessing the likelihood of nutrient impacts on freshwater systems
- The joint (Santa Ana Regional Water Quality Control Board, County of Orange, SCCWRP) Upper Newport Bay Macroalgal Remote Sensing and Dissolved Oxygen Study, which has the twin goals of improving methods of quantifying the extent of algal growth and of linking algal growth to a measure (i.e., dissolved oxygen) of beneficial use impairment
- The Santa Ana Regional Water Quality Control Board Newport Bay Sediment Nutrient Flux Study, which is examining the extent to which benthic sediments act as an active reservoir in the nutrient cycling dynamics of Newport Bay
- The County of Orange Source Characterization study, which focuses on improving estimates of the urban runoff and groundwater infiltration contributions to stormdrain flows.

Performance Measures:

The monitoring element has not been determined at this time. However, ultimate effectiveness would include monitoring concentrations at various critical nodes in the watershed to ensure attainment of water quality standards and biological monitoring to ensure compliance with relevant criteria to protect wildlife and aquatic life. At minimum the background water quality will be measured, along with influent and effluent for selenium and nitrogen. Since bacteria is also a critical parameter for waters entering the watershed bacteria indicators will be included. The

Baseline Related Studies and Plans:

This project is part of a much larger effort, the NSMP. The work products of the NSMP have been reviewed by the most technically knowledgeable resource agency staff in the United States and very knowledgeable regulatory staff, including the USGS, USFWS, US EPA, State Board,

and Regional Board. Additionally, an independent advisory panel of experts reviewed the baseline work that will be the basis for the model that is developed for the BMP implementation plan. Management of the program is being conducted through the County of Orange. There is a minimum of one dedicated staff person at a supervisory level assigned to the project whose main responsibility is to ensure project success.

- Nutrient TMDL
- Toxics TMDL (EPA,2002)
- Order No. R8-2004-0021 - the NPDES permit issued by the Santa Ana Regional Water Quality Control Board for the Newport Bay watershed
- NSMP Work Plan - the description of the specific activities that will be conducted by the NSMP Working Group to comply with Order No. R8-2004-0021.
- Summary of Data Resources - Nov. 1, 2005 - a listing of relevant studies and reports
- Identification of Data Gaps for Selenium - March 23, 2006 - A summary of gaps in available selenium data for the watershed to provide the basis for development of field sampling plans to fill these data gaps.
- Conceptual Model for Nitrogen - May 9, 2006 - a guide for structuring hypothesis development, monitoring efforts, data interpretation and nitrogen-related management decisions.
- Conceptual Model for Selenium - May 15, 2006 - a guide for structuring hypothesis development, monitoring efforts, data interpretation and selenium-related management decisions.
- Selenium Sources in the Newport Bay Watershed, June 26, 2006. A summary of sources of selenium in the Newport Bay watershed, including analyses of the ranges of concentrations and loads for each source.
- A Comparison of Methods for Measuring Total Selenium and Selenium Species in Water, Final Report, May 8, 2006.
- BMP Data Needs - Nov. 15, 2005. A summary of data needed to evaluate potential selenium and nitrogen BMPs and treatment technologies.
- Identification/Assessment of Selenium and Nitrogen BMPs/Treatment Technologies - March 31, 2006. A summary of relevant features of potential BMPs and technologies for selenium and nitrogen treatment.
- Summary of Monitoring DataResults and Interim Report on Bioavailability and Effects of Selenium - December 11, 2006
- SSO Complete Submittal Package - December 20, 2006
- Water Quality Credit Trading Programs - March 2, 2007
- Development of a Site-specific Objective (SSO) for Selenium in the Newport Bay Watershed Scope of Work with Initial Cost Estimates - March 2, 2007
- NSMP Final Interim Report, November 2, 2006
- NSMP Interim Report, September 8, 2006
- NSMP Interim Report, March 18, 2006

Project: **Buck Gully Habitat Restoration and Fire Prevention (CCA #70, ASBS #32)**
Priority: **A13**
Implementing Agency: **City of Newport Beach**
Agency Contact: **Bob Stein, rstein@city.newport-beach.ca.us**

Water Management Strategies

Water Quality Protection and Improvement / Ecosystem Restoration / Environmental and Habitat Protection and Improvement

Project Partners/Supporters

- Newport Beach Mayor
- Coastal Commission
- Fish and Game
- National Marine Fisheries Service
- Fish and Wildlife
- Santa Ana RWQCB
- Harbor Commission
- Army Corps of Engineers
- Department of Water Resources
- IRWD
- Irvine Company
- Surfrider
- Coastkeepers

Project Description

Problem statement: Buck Gully and Morning Canyon are areas of the Newport Coastal Watershed with known habitat impairment. The urbanization of land surrounding the canyons has led to increased runoff which in turn has led to the encroachment of invasive plant species. This has led to both habitat loss and increased fire risk.

Proposed solution: This project is intended to enhance habitat and manage and mitigate against fire in the upper northern area of Reach 2 of Buck Gully. The anticipated work includes a variety of integrated plans designed to restore the ecological habitat using native plantings and reduce fire risk and associated impact on the ASBS.

Habitat restoration and fire prevention: These plans include:

- Fuel modification program in Reach 2 of Buck Gully and Morning Canyon
- Residential incentive program for using drought-resistant native plants
- Pilot landscaping project to encourage use of native plants
- Outreach to garden centers to encourage use of native plantings

- Removal of invasive plants in canyon areas and public land
- Use of drought tolerant plants in public landscaping
- Restoration of native coastal scrub habitat through selective plantings

Effectiveness monitoring: Program effectiveness will be measured through the assessment of fire risk and photo documented improvements to habitat along canyon areas.

Project Location

Project Timeline

Fiscal Year	07	08	09	10	11	12	13
Planning							
Design							
Implementation							
Monitoring							

Economic Feasibility

Prop 50 / Prop 84	$275,000
Matching Funds	$125,000
Percent Local Matching	31.3%
Total	$400,000

Annual Operating and Maintenance Costs: Not applicable

Performance Measures:

Monitoring will consist of:

- The assessment of fire risk.
- Assessment of habitat improvements
- Public surveys to assess increases in awareness, understanding and behavior change in residential and commercial areas.

Performance measures will be determined from existing baseline data and established literature. Photo documentation will be used as well as GIS tools to track project implementation and monitor improvements.

Project: **Cienega Filtration Project (CCA #69, ASBS #32)**
Priority: **A14**
Implementing Agency: **Irvine Ranch Water District**
Agency Contact: **Mark Tettemer, tettemer@irwd.com**

Water Management Strategies

Water Quality Protection and Improvement / NPS Pollution Control / Environmental and Habitat Protection and Improvement

Project Partners/Supporters

- City of Irvine
- Irvine Unified School District

Project Description

The Cienega Filtration Project (Cienega) is a biofilter designed to remove selenium from surface water in the Peters Canyon Channel tributary of San Diego Creek in central Orange County. The biofilter is a ¾"-rock filter bed, encased in geofabric and constructed underneath a high school playfield adjacent to the channel. Under anoxic (without oxygen) conditions, natural soil/water bacteria convert the selenium from generally mobile forms of selenium into less mobile and immobile forms. A collateral benefit of this natural process is the preferential and complete removal of nitrogen from the water. Cienega has been developed over several years, from laboratory bench scale testing to a field demonstration mocked up to show how a full scale project would operate and perform. This project entails the design and construction of the full scale Cienega.

Cienega will treat approximately 3 cubic feet per second (cfs) of surface water from Peters Canyon Channel, removing essentially all nitrogen and most of the selenium in the water. Testing indicates selenium concentrations can be reduced from approximately 60 micrograms/liter (ug/l), the greatest inflow concentration tested, down to less than 5 ug/l, which is the current Total Maximum Daily Load (TMDL) standard for San Diego Creek downstream. It is expected Cienega can produce similar return flow concentrations with even higher inflow concentrations, but 60 ug/l is likely the highest inflow concentration that can be expected from the channel.

Project Location

Cienega is located in the westernmost 3.75 acres of the Irvine Unified School District Creekside Continuation High School site at the northwest corner of Barranca Parkway and Harvard Avenue, in the City of Irvine.

Project Timeline

Fiscal Year	07	08	09	10	11	12	13
Planning	Complete						
Design							
Construction							
Monitoring							

Economic Feasibility

Prop 50 / Prop 84	$2,000,000
Other State Funds	$4,654,000
Federal Funds	$190,300
Matching Funds: Prop. 13 Grant, Project Partners (city of Irvine and Other Dischargers), IRWD Capital Budget	$19,655,700
Percent Local Marketing	89.2%
Total	$26,500,000

Annual Operating And Maintenance Costs: $750,000

IRWD is a California Water District, which already provides a multitude of water, wastewater, and recycled water services. Cienega will be one of approximately ten water/wastewater plants operated and maintained by IRWD. IRWD has the expertise and experience needed to operate and maintain Cienega.

Cienega is expected to be operated by IRWD on behalf of multiple project partners, which are dischargers that are required to offset their nitrogen and selenium dischargers elsewhere. Thus, O&M will be funded through partnership agreements, backstopped by IRWD water user fees.

It should also be noted that there is a watershed-wide working group (25 participants) developing the Nitrogen and Selenium Management Program (NSMP), which has as one of its objectives the development of a trading program. That trading program may be used to regionalize the benefits of Cienega.

Similar Projects, Linkage, Interdependence:

- Michelson Water Reclamation Plant (MWRP)
- Irvine Desalter Project (IDP)
- Deep Aquifer Treatment System (DATS)
- San Diego Creek Natural Treatment System (NTS)

Performance Measures:

The Regional Board sponsored and is managing a USEPA 319(h) Non-Point Source grant for the Field Demonstration. That grant requires a Quality Assurance Project Plan (QAPP) for the Field Demonstration. The data collected and analyzed from the Field Demonstration will be available to the Statewide monitoring efforts.

In addition, the Full Scale Project performance will be monitored and reported in accordance with Waste Discharge Requirements (WDR's) issued by the Regional Board.

It is expected that the performance measures will include inflow/return flow measurements of nitrogen and selenium, along with other basic constituents; removal rates for those constituents; periodic speciation of the inflow and return flow selenium compounds; and occasional media sampling to measure biofilm health and accumulation rates.

Baseline Related Studies and Plans:

During the development of Cienega, IRWD has performed multiple levels of pilot testing:

1. Initial Laboratory Column Test – report available
2. Mesocosm Test – report available
3. Pre-Design Optimization Study (PDOS) – report available
4. Preliminary Design Report – report available
5. Field Demonstration – under construction; results to be analyzed after 6 months of operation/maintenance

- IRWD Selenium Pilot Study Column Test Results (2003)
- Wetland Selenium Mesocosm Study (2003)
- Results of the Pre-Design Optimization Study (2006)
- Cienega Preliminary Design Report (2006)

Project: **Nitrogen and Selenium Management Program Watershed-Scale BMP Implementation Program – Phase II (CCA #69, ASBS #32)**
Priority: **A15 (links to A12)**
Implementing Agency: **County of Orange**
Agency Contact: **Karen Cowan, karen.cowan@rdmd.ocgov.com**

Water Management Strategy

Water Quality Protection and Improvement / Watershed Planning

Project Partners/Supporters

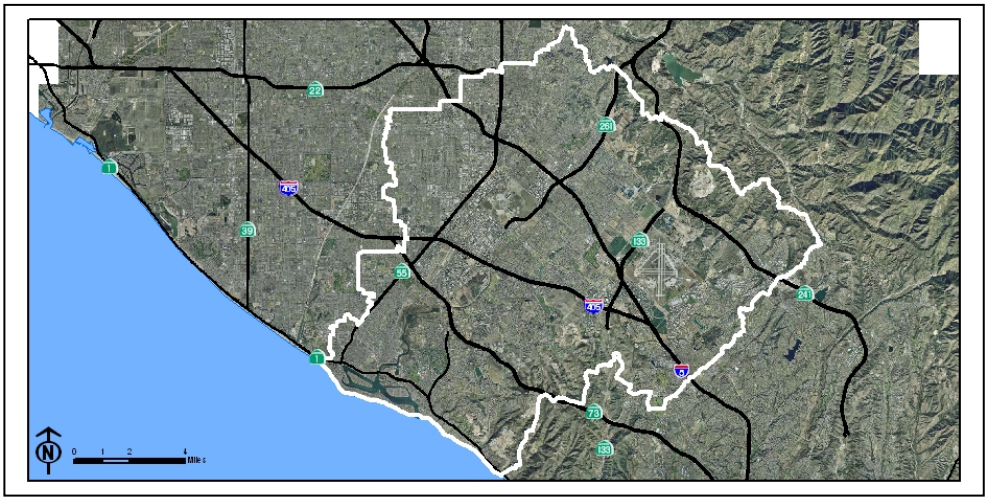
- California Department of Transportation
- County of Orange
- Orange County Flood Control District
- City of Costa Mesa
- City of Irvine
- City of Laguna Hills
- City of Laguna Woods
- City of Lake Forest
- City of Newport Beach
- City of Orange
- City of Santa Ana
- City of Tustin
- Irvine Ranch Water District
- The Irvine Company
- Santa Ana Regional Water Quality Control Board
- The Great Park Corporation
- Golden State Water Company
- Tustin Legacy Community Partners
- Lennar
- Maguire Properties
- Nexus Construction Services
- Integral Communities, Inc
- Orange County Coastkeeper
- Stop Polluting Our Newport

Project Description

This project is a continuation of Project A-12 and further assesses the . The Nitrogen and Selenium Management Program is a five year, comprehensive stakeholder effort focused on nitrogen and selenium issues in the Newport Bay watershed. One of the goals of the project is to develop a watershed-wide management program for inputs of elevated levels of selenium and nitrogen from groundwater sources. This project is designed as the full-scale implementation of the watershed-wide BMP program for the management of nitrogen and selenium.

Project Location

Entire Watershed. Exact siting of BMPs to be determined (and linked to the results of the Phase I Pilot program).



Project Timeline

Fiscal Year	07	08	09	10	11	12	13
Planning							
Design							
Construction							
Monitoring							

Economic Feasibility

Prop 50 / Prop 84	$2 million
Matching Funds	$18 million
Percent Local Matching	80.6%
Total	$20 million

Annual Operating and Maintenance Costs: TBD

Baseline Related Studies and Plans:

This project is part of a much larger effort, the NSMP. The work products of the NSMP have been reviewed by the most technically knowledgeable resource agency staff in the United States and very knowledgeable regulatory staff, including the USGS, USFWS, US EPA, State Board, and Regional Board. Additionally, an independent advisory panel of experts reviewed the baseline work that will be the basis for the model that is developed for the BMP implementation plan. Management of the program is being conducted through the County of Orange. There is a minimum of one dedicated staff person at a supervisory level assigned to the project whose main responsibility is to ensure project success.

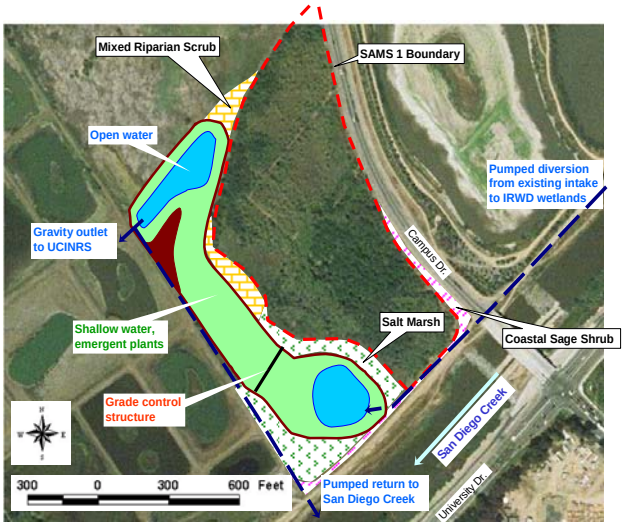
- Nutrient TMDL
- Toxics TMDL (EPA,2002)
- Order No. R8-2004-0021 - the NPDES permit issued by the Santa Ana Regional Water Quality Control Board for the Newport Bay watershed
- NSMP Work Plan - the description of the specific activities that will be conducted by the NSMP Working Group to comply with Order No. R8-2004-0021.
- Summary of Data Resources - Nov. 1, 2005 - a listing of relevant studies and reports
- Identification of Data Gaps for Selenium - March 23, 2006 - A summary of gaps in available selenium data for the watershed to provide the basis for development of field sampling plans to fill these data gaps.
- Conceptual Model for Nitrogen - May 9, 2006 - a guide for structuring hypothesis development, monitoring efforts, data interpretation and nitrogen-related management decisions.
- Conceptual Model for Selenium - May 15, 2006 - a guide for structuring hypothesis development, monitoring efforts, data interpretation and selenium-related management decisions.
- Selenium Sources in the Newport Bay Watershed, June 26, 2006. A summary of sources of selenium in the Newport Bay watershed, including analyses of the ranges of concentrations and loads for each source.
- A Comparison of Methods for Measuring Total Selenium and Selenium Species in Water, Final Report, May 8, 2006.
- BMP Data Needs - Nov. 15, 2005. A summary of data needed to evaluate potential selenium and nitrogen BMPs and treatment technologies.
- Identification/Assessment of Selenium and Nitrogen BMPs/Treatment Technologies - March 31, 2006. A summary of relevant features of potential BMPs and technologies for selenium and nitrogen treatment.
- Summary of Monitoring DataResults and Interim Report on Bioavailability and Effects of Selenium - December 11, 2006

- SSO Complete Submittal Package - December 20, 2006
- Water Quality Credit Trading Programs - March 2, 2007
- Development of a Site-specific Objective (SSO) for Selenium in the Newport Bay Watershed Scope of Work with Initial Cost Estimates - March 2, 2007
- NSMP Final Interim Report, November 2, 2006
- NSMP Interim Report, September 8, 2006
- NSMP Interim Report, March 18, 2006

Project: **South San Joaquin Marsh Natural Treatment System (CCA #69, ASBS #32)**
Priority: **A16**
Implementing Agency: **Irvine Ranch Water District**
Agency Contact: **Mark Tettemer, Tettemer@irwd.com**

Water Management Strategies

Wetlands Enhancement and Creation / Storm Water Capture and Management /Water Quality Protection and Improvement / Recreation and Public Access / NPS Pollution Control



Conceptual Layout of South San Joaquin Marsh NTS

Project Partners/Supporters

To be determined

Project Description

A new 10-acre wetland will be constructed to provide urban runoff treatment for the entire San Diego Creek watershed. The wetland is expected to remove 70 percent of nitrogen as well as significant portions of pathogens, phosphorus, and various other regulated pollutants from the water it treats.

Project Location

Project Timeline

Fiscal Year	07	08	09	10	11	12	13
Planning	Completed						
Design							
Construction							
Monitoring							

Economic Feasibility

Prop 50 / Prop 84	$1.0 million
Federal Funds	$1.3 million
Other	$1.0 million
Total	$3.3 million

Annual Operating and Maintenance Costs: $100,000

Related Studies and Plans:

- San Diego Creek NTS Master Plan and EIR

Project: **San Diego Creek Levee System FEMA Certification Study (CCA #69, ASBS #32)**
Priority: **A17 (links to A18)**
Implementing Agency: Irvine Ranch Water District
Agency Contact: **Mark Tettemer, Tettemer@irwd.com**

Water Management Strategies

Flood Management / Watershed Planning

Project Partners/Supporters

To be determined

Project Description

The San Diego Creek Levee system is not currently FEMA certified. The stability of the San Diego Creek levee system is critical to the reliability of the Michelson Water Reclamation Plant. There is currently a temporary floodwall located on top of the levee.

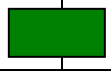
Temporary wall along San Diego Creek adjacent to IRWD's Michelson Treatment Plant

This project includes the following elements:

- Identify criteria required for FEMA certification
- Complete geotechnical investigations required to obtain levee characteristics
- Research design, construction, and maintenance information on the levee system
- Make recommendations for certifying the San Diego Creek Levee system

Project Location

Project Timeline

Fiscal Year	07	08	09	10	11	12	13
Planning							

Economic Feasibility

Prop 50 / Prop 84	TBD
Matching Funds	TBD
IRWD	TBD
Total	$145,000

Operating and Maintenance Costs: TBD

Project: **Michelson Water Reclamation Plant Permanent Flood Wall (CCA #69, ASBS #32)**
Priority: **A18 (links to A17)**
Implementing Agency: **Irvine Ranch Water District**
Agency Contact: **Mark Tettemer, Tettemer@irwd.com**

Water Management Strategies

Flood Management / Water Supply Reliability

Project Partners/Supporters

To be determined

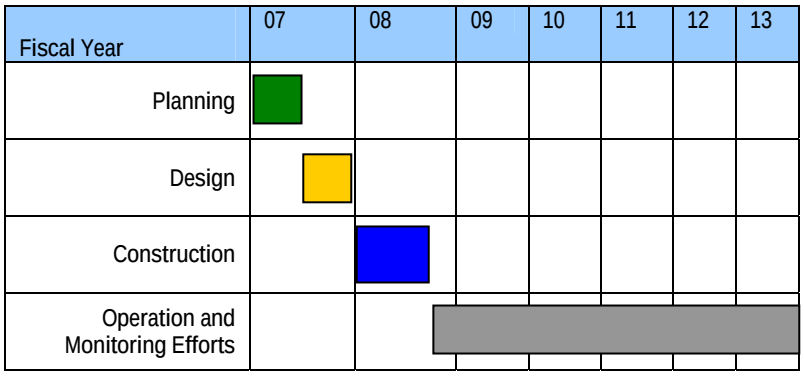
Project Description

The 18-million gallon per day Michelson Water Reclamation Plant is adjacent to the San Diego Creek, a levee-based County of Orange Flood Control District facility. The creek no longer has a 100-year capacity, so a permanent flood wall needs to be constructed on the western levee of the creek to provide approximately 200-year flood protection for the Michelson Water Reclamation Plant.

Photo of sign adjacent to temporary wall along San Diego Creek adjacent to Michelson Treatment Plant

Project Location

Project Timeline



Economic Feasibility

Prop 50 / Prop 84	TBD
Matching Funds	TBD
IRWD	TBD
Total	$7.623 million

Annual Operating and Maintenance Costs: TBD

Related Studies and Plans:

- FEMA Certification to be developed (see A17 - San Diego Creek Levee System FEMA Certification Study CCA #69, ASBS #32)

Project: **Study of Nutrient Load in Bay and Algae Bloom – Cross Contamination Study to CCA #69 and SWQPA #32**
Priority: **A19**
Implementing Agency: **City of Newport Beach**
Agency Contact: **Bob Stein, Rstein@city.newport-beach.ca.us**

Water Management Strategies

Water Quality Protection and Improvement / Ecosystem Restoration / Environmental and Habitat Protection and Improvement

Algae Bloom in Newport Bay

Project Partners/Supporters

- Newport Beach Mayor
- Coastal Commission
- Fish and Game
- National Marine Fisheries Service
- Fish and Wildlife
- Santa Ana RWQCB
- Harbor Commission
- Army Corps of Engineers
- Department of Water Resources
- IRWD
- Irvine Company
- Surfrider
- Coastkeepers

Project Description

Problem statement: Results of the Newport Water Quality and Flow Assessment Study (Weston, 2006) showed that some pollutants of concern in the creeks were derived from fertilizers and pesticides. The overuse or misuse of these chemicals leads to significant pollution events in the ASBS including the potential for algal blooms.

Proposed solution: This project is designed to reduce harmful fertilizer and pesticide use (and hence presence in runoff) and assess nutrient loads in urban runoff and their potential for causing algal blooms. Two key elements include:

Programs targeting reduction in fertilizer and pesticide use: Urban development in the Newport area has lead to increased use of herbicides, pesticides and fertilizers. Evidence of this was found in the Weston Solutions, Inc. 2006a. Newport Coast Water Quality and Flow Assessment. Prepared for the City of Newport Beach. 2006. This program will aim to increase awareness and motivate behavioral change in key users of these chemicals. Outreach will be targeted towards chemical suppliers (such as garden centers etc), commercial landscaping

operations, and residents. Alternative options will be promoted in concert with education material on use of drought resistant plants and runoff reduction.

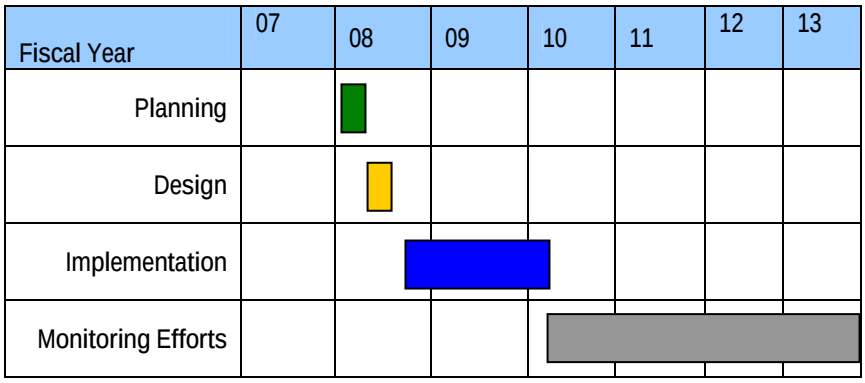
Nutrient transport studies: Current understanding of the Newport Bay flow dynamics suggests that Newport Coast ASBS may be influenced by two sources of urban input: the urban runoff from Buck Gully watershed and plume from Newport Bay outlet. The transport of nutrients and algae from Newport Bay to the area is determined by coastal circulation and volume of the water outflow from the Newport Bay. Since the tidal range for the Newport Bay watershed is significantly greater than Buck Gully, this project hypothesizes that nutrient and algal bloom in the Newport Bay have a more significant impact on the water quality and beneficial uses of Newport Coast ASBS than the local runoff from Buck Gully. This project will incorporate the Newport Bay outlet plume modeling project to understand the impact of nutrient loading and algal bloom on the ASBS. Transecting sampling from Newport Bay outlet to the ASBS will be taken both parallel and vertically from the shore for analysis of nutrients and algae.

Effectiveness assessment: the effectiveness of this program will be assessed through

- monitoring of behavior changes regarding fertilizer use,
- monitoring fertilizer and pesticide outreach programs to residents and suppliers
- monitoring of nutrient loads and algae presence(both baseline and post program implementation)

Project Location

Project Timeline



Economic Feasibility

Prop 50 / Prop 84	$375,000
Matching Funds	$75,000
Total	$450,000

Annual Operating and Maintenance Costs: TBD

Baseline Related Studies and Plans:

Weston Solutions, Inc. 2006a. Newport Coast Water Quality and Flow Assessment. Prepared for the City of Newport Beach. 2006.

Project: **Baker Pipeline Regional Water Treatment Plant**
Priority: **A20**
Implementing Agency: **Irvine Ranch Water District**
Agency Contact: **Mark Tettemer, Tettemer@irwd.com**

Water Management Strategies

Water Supply Reliability

Project Partners/Supporters

To be determined

Project Description

This project is designed to construct a 25 MGD microfiltration plant to treat raw water from the Santiago Lateral and/or Irvine Lake through the Baker pipeline. This new water treatment plant would greatly enhance both treated water supply and water system reliability in South Orange County.

Existing Baker Plant to be redesigned for treatment of untreated water

Project Location

Project Timeline

Fiscal Year	07	08	09	10	11	12	13
Planning							
Design							
Construction							
Operation and Monitoring Efforts							

Economic Feasibility

Prop 50 / Prop 84	$1 million
Matching Funds	$47.7 million
IRWD Capital Fund	$11.925 million
Santiago Aqueduct Commission	$35.775 million
Total	$48.7 million

Annual Operating and Maintenance Costs: $2.7 million

Project: **Lake Forest Recycled Water Expansion**
Priority: **A21**
Implementing Agency: **Irvine Ranch Water District**
Agency Contact: **Mark Tettemer, Tettemer@irwd.com**

Water Management Strategies

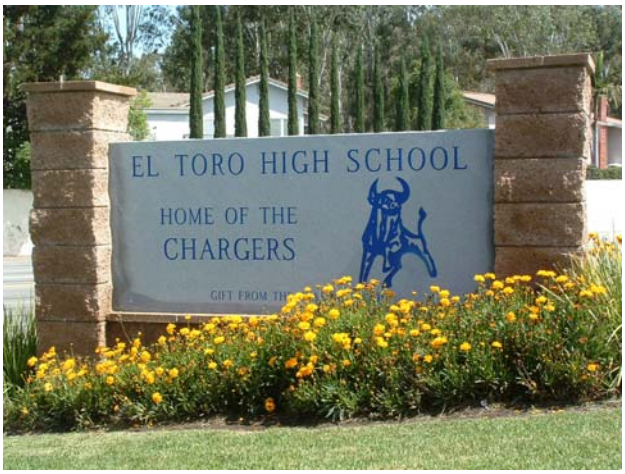
Water Recycling / Water Supply Reliability / Water Conservation

Project Partners/Supporters

El Toro Water District

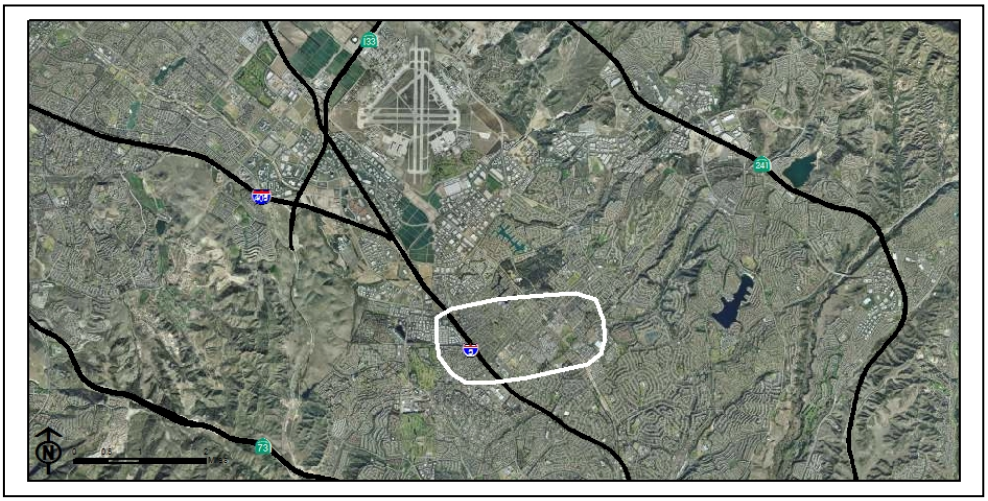
Project Description

This project involves the expansion of IRWD's Recycled Water System into the south-eastern portion of the City of Lake Forest. The project studied the extension of IRWD's existing recycled water distribution system to serve up to 112 sites, 84 of which are in IRWD's service area and 28 of which are in the adjacent water district (El Toro Water District) service area.



Largest potential recycled water use site in project area, El Toro High School.

Project Location



Project Timeline

Fiscal Year	07	08	09	10	11	12	13
Planning							
Design							
Construction							
Operation and Monitoring Efforts							

Economic Feasibility

Prop 50 / Prop 84	TBD
Matching Funds	TBD
IRWD	TBD
El Toro Water District	TBD
Total	$6.82 million

Annual Operating and Maintenance Costs: $98,700

Project: **District-Wide Recycled Water Expansion Project**
Priority: **A22**
Implementing Agency: **Irvine Ranch Water District**
Agency Contact: **Mark Tettemer, Tettemer@irwd.com**

Water Management Strategies

Water Recycling / Water Supply Reliability / Water Conservation

Project Partners/Supporters

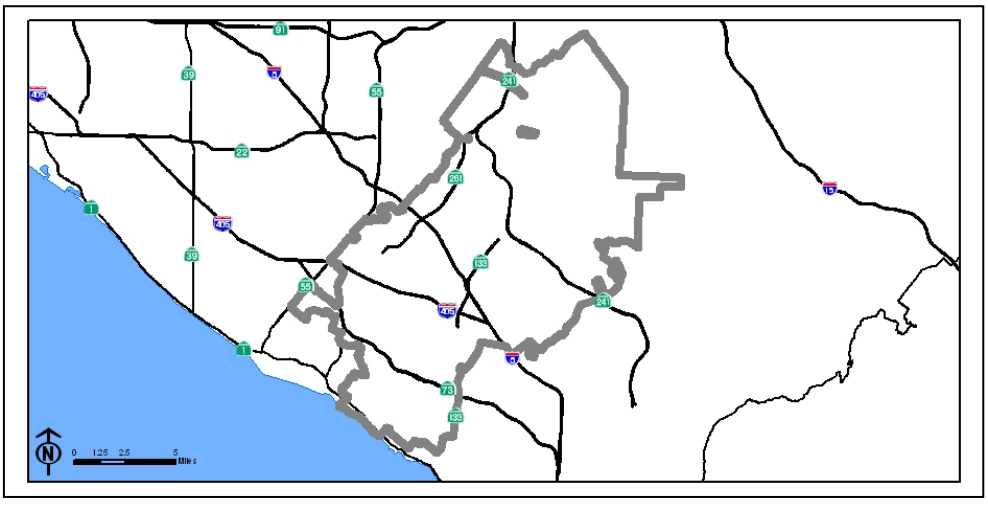
To be determined

Project Description

This project involves the design and construction of an expanded recycled water distribution system. IRWD is preparing to study where viable recycled water distribution system expansion projects may be based on existing potable customers that could be converted to recycled water.

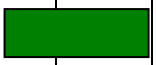
IRWD Service Area

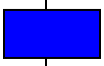
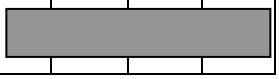
Project Location



Project Timeline

Fiscal Year	07	08	09	10	11	12	13
Planning							
Design							
Construction							
Operation and Monitoring Efforts							



Economic Feasibility

Prop 50 / Prop 84	TBD
Matching Funds	TBD
Irvine Ranch Water District	TBD
El Toro Water District	TBD
Total	$6.82 million

Annual Operating and Maintenance Costs: $98,700

Project: **Siphon Reservoir Conversion to Recycled Water Storage**
Priority: **A23**
Implementing Agency: **Irvine Ranch Water District**
Agency Contact: **Mark Tettemer, Tettemer@irwd.com**

Water Management Strategies

Water Recycling / Water Supply Reliability / Storm Water Capture and Management

Siphon Reservoir

Project Partners/Supporters

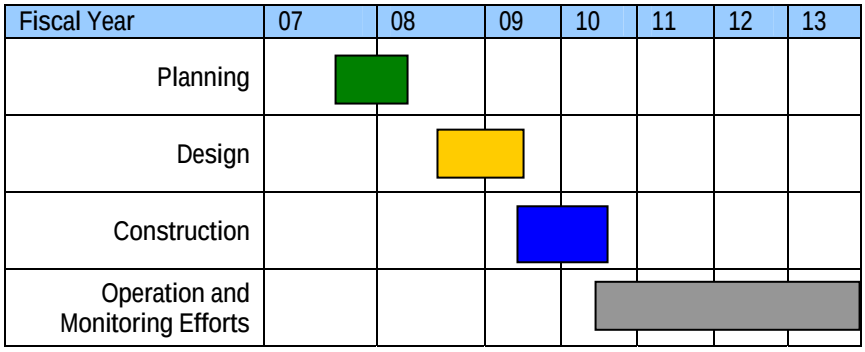
To be determined

Project Description

This project is designed for IRWD to acquire the reservoir from The Irvine Company to start using the reservoir as a seasonal recycled water storage facility. The reservoir will be filled with recycled water during low irrigation months to be later used in high irrigation summer months. The project will allow approximately 450 acre-feet per year (AFY) of sewage to be treated and served as irrigation, which otherwise would had been treated and sent to the ocean. In addition, the project would reduce the need to import approximately 450 AFY of State Water Project or Colorado River water.

Project Location

Project Timeline



Economic Feasibility

Prop 50 / Prop 84	TBD
Matching Funds	TBD
Total	$7 million

Annual Operating and Maintenance Costs: $10,000

Related Studies And Plans:

- Preliminary Planning Study

Project: **Peters Canyon Reservoir Conversion to Recycled Water Storage**
Priority: **A24**
Implementing Agency: **Irvine Ranch Water District**
Agency Contact: **Mark Tettemer,** Tettemer@irwd.com

Water Management Strategies

Water Recycling / Water Quality Protection and Improvement / Water Supply Reliability / Storm Water Capture and Management

Aerial of Peters Canyon Reservoir

Project Partners/Supporters

To be determined

Project Description

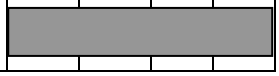
This project will convert water storage for agricultural use from imported water to recycled water. The storage capacity in the reservoir will allow for approximately 450 acre-feet per year (AFY) of wastewater to be treated and used for irrigation, reducing the amount of wastewater disposed of in the ocean. In addition, the project will reduce the need to import approximately 450 AFY of State Water Project or Colorado River water.

Project Location

Project Timeline

Fiscal Year	07	08	09	10	11	12	13
Planning							
Design							
Construction							
Operation or Monitoring Efforts							



Economic Feasibility

Prop 50 / Prop 84	TBD
Matching Funds	TBD
Agency Funds	TBD
Total	$14 million

Annual Operating and Maintenance Costs: $10,000

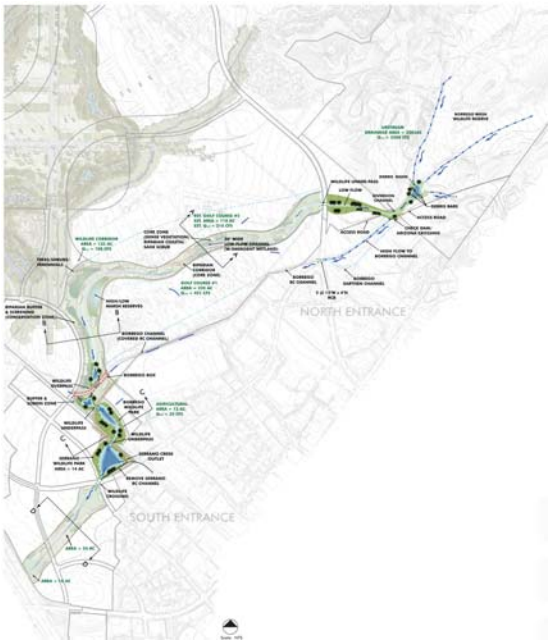
Related Studies and Plans:

- Preliminary Planning Study

Project: **Irvine Wildlife Corridor**
Priority: **A25**
Implementing Agency: **Orange County Great Park Corporation**
District Contact: **Glen Worthington, gworthington@ocgp.org**

Water Management Strategies

Environmental and Habitat Protection and Improvement / Storm Water Capture and Management / NPS Pollution Control / Groundwater Management / Water Supply Reliability



Irvine Wildlife Corridor within the Orange County Great Park

Project Partners/Supporters

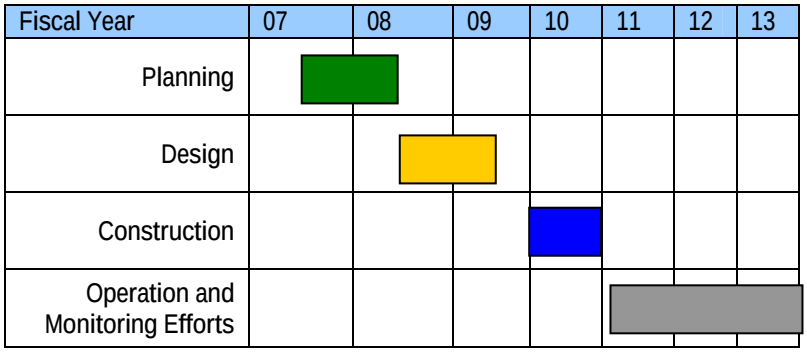
To be determined

Project Description

The Irvine Wildlife Corridor will provide a dedicated open space for wildlife migration between natural habitats located within and adjacent to the City of Irvine. The project will create a critical link reconnecting two large areas of open space – the Limestone-Whiting Wilderness Park and the proposed El Toro National Wildlife Refuge to the north and the Irvine Open Space Preserve, Irvine Ranch Land Reserve, Laguna Coast Wilderness Park, and Crystal Cove State Park to the south.

Project Location

Project Schedule



Economic Feasibility

Prop 50 / Prop 84	TBD
Matching Funds (Tax Increment Financing and Development Agreement Fees – Heritage Fields)	TBD
Total	$125 million

Annual Operating and Maintenance Costs: $600,000

Related Studies And Plans:

- Wildlife Corridor Master Plan of Drainage
- Integrated Master Plan of Drainage, Water Quality, and Habitat Management

Project: **The Orange County Great Park**
Priority: **A26**
Implementing Agency: **Orange County Great Park Corporation**
District Contact: **Glen Worthington, gworthington@ocgp.org**

Water Management Strategies

Recreation and Public Access / Storm Water Capture and Management / Water Supply Reliability / Water Conservation

Project Partners/Supporters

To be determined

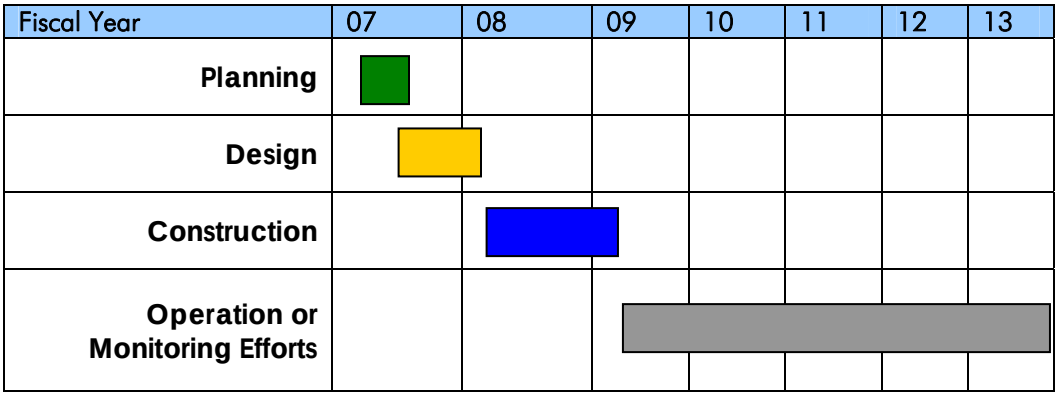
Project Description

The 2,300-acre Orange County Great Park will be developed on the site of the former El Toro Marine Cop Air Station. The regional park will promote sustainability and cultural experiences. The remaining 2,300 acres of the site, Heritage Fields, will be privately developed into mixed-use residential housing that will integrate seamlessly into portions of the park, again maintaining objectives that promote sustainability and cultural experiences.

Project Location

Project Timeline

The Great Park is currently being master planned. Construction on the first phase will begin in 2009.



Economic Feasibility

Prop 50 / Prop 84	$325.5 million
Matching Funds	$604.5 million
Total	$903 million

Annual Operating and Maintenance Costs: $18.5 million estimated