PEÑASQUITOS WATERSHED
URBAN RUNOFF MANAGEMENT PLAN
– JANUARY 2003 –

CITY OF SAN DIEGO,
LEAD AGENCY

CITY OF DEL MAR
CITY OF POWAY
COUNTY OF SAN DIEGO

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EXECUTIVE SUMMARY

The Los Peñasquitos Lagoon, one of the most cherished coastal wetland environments in Southern California, is home to a rich variety of native plant and wildlife species and provides critical habitat for migratory birds. Additionally, the Lagoon is treasured for the aesthetic and recreational benefits it provides.

In recent years, there has been a growing concern that the Los Peñasquitos Lagoon and Creek as well as their tributaries are being impacted by pollution associated with urban and storm water runoff. Controlling pollution in runoff is critical to preserving aquatic resources and the economic viability of the San Diego region. The Los Peñasquitos Watershed Urban Runoff Management Program is intended to be one in a series of efforts to protect and improve water quality, thereby protecting the natural resources within the watershed and ensure sustainability for future generations. In addition, the City of San Diego is leading an effort to develop a comprehensive Peñasquitos Watershed Management Plan by March of 2005, in cooperation with watershed stakeholders, local jurisdictions and other governmental agencies. This comprehensive plan will identify priorities and strategies for the protection and restoration of natural systems of groundwater recharge, native vegetation and riparian zones, water flows, beneficial uses of waters and overall water quality.

The Peñasquitos Watershed Urban Runoff Management Plan has been prepared by the City of San Diego, as lead agency, in collaboration with the Cities of Del Mar and Poway as well as the County of San Diego – all local agencies which have jurisdiction within the Peñasquitos watershed. The Plan meets the requirements of the National Pollutant Discharge Elimination System (NPDES) Municipal Storm Water Permit for San Diego Copermittees (Order No. 2001-01, NPDES No. CAS0108758). The Municipal Storm Water Permit requires the development and implementation of Watershed Urban Runoff Management Programs for each of nine watershed areas within San Diego County, including the Peñasquitos watershed. This document represents the plan the jurisdictions and stakeholders have prepared to implement said Program.

The Watershed Urban Runoff Management Program's primary goal is to positively affect the water resources of the Peñasquitos Watershed while balancing economic, social, and environmental constraints. The Program identifies four primary objectives to strive towards this goal: (1) develop and expand methods to assess and improve water quality within the watershed; (2) integrate watershed principles into land use planning; (3) enhance public understanding of sources of water pollution within the watershed; and (4) encourage and enhance stakeholder involvement within the watershed. To help reach these goals and objectives, the Peñasquitos Watershed Urban Runoff Management Plan identifies and prioritizes water quality related issues within the watershed that can be potentially attributed to discharges from the municipal storm drain systems. Additionally, activities to abate sources of pollution and restore and protect beneficial uses are also identified. During this initial year, the evaluation of watershed conditions, or water quality assessment, was based upon a very limited data set. As more data becomes available, it is important that the Program be evaluated and

allowed to evolve. Therefore, constituents that have been identified as "high priority" water quality issues in this year's assessment may be removed from the high priority list in future years. The reverse holds true for issues that were not identified as high priority water quality issues in this year's assessment.

The data from this year's water quality assessment suggests that total suspended solids are a potential constituent of concern. In the Peñasquitos watershed, total suspended solids, or sediment, can negatively impact and alter habitat, including streams systems and salt marsh habitat in Los Peñasquitos Lagoon. Other potential constituents or conditions of concern identified in the assessment that may represent high priority water quality issues in the future include: diazinon, total dissolved solids, and slight to moderate benthic community degradation. The water quality assessment is discussed in detail in Section 3.

To address the high priority and potential high priority issues identified in this year's assessment, this Plan recommends a series of activities in Section 4, in addition to the existing and planned activities identified in the Land Use Planning, Watershed-Based Education, and Public Participation Strategy sections (sections 5-7). Specifically, Peñasquitos Watershed Copermittees and stakeholders will address the high priority and potential high priority water quality issues through additional years of water quality data collection and analysis, development and implementation of the Peñasquitos Watershed Management Plan to address total suspended solids, total dissolved solids and benthic community degradation, development and implementation of source water protection guidelines to address total dissolved solids, implementation of a regional integrated pest management campaign to address diazinon and other pesticides, and implementation of the Standard Urban Storm Water Mitigation Plan's development requirements to address sedimentation and siltation. These activities are expected to evolve as new information becomes available regarding the watershed's water quality conditions and the activities' effectiveness and as funding allows.

The Peñasquitos Watershed Urban Runoff Management Program has been developed with the input from a diverse set of stakeholders, who will also be an integral part of program implementation. It is the goal of all participating jurisdictions to work cooperatively with other agencies, non-governmental organizations, and private citizens at the watershed level in order to positively affect the water resources of the region and achieve compliance with the Municipal Permit. It should be noted that this plan has been written with the public in mind as a means to engage San Diego area residents in watershed issues and to facilitate public understanding of challenges related to the protection of our precious water resources.

Participating agencies consider this point in time to be the beginning of a continuous long-term process, which will be further developed and refined over time. Consistent with the Municipal Permit, Program amendments and/or revisions will be submitted to the California Regional Water Quality Control Board – San Diego Region for review as part of the annual reporting process. The cities of San Diego, Del Mar, Poway and the County of San Diego share the implementation responsibilities for the Program along

with other stakeholders. Due to the commitments of these agencies, this watershed program is expected to extend beyond the Municipal Permit expiration date of February 21, 2006.

The Peñasquitos Watershed Urban Runoff Management Program signifies the beginning of a long-term effort to protect and enhance the water quality of the Lagoon, Creek and tributaries at the watershed level. This Program also hopes to provide a mechanism for coordination of existing water quality-related efforts in the watershed. The Program was developed with stakeholder participation and will integrate, where pertinent, with other projects such as the planned Peñasquitos Watershed Management Plan. In addition to developing our understanding of the ecosystem, there is a desire to locate storm water Best Management Practices within creek sections where appropriate downstream of existing urbanized areas because of the long-term water quality benefits.

Using the watershed approach, the Cities of San Diego, Del Mar and Poway as well as the County of San Diego aim to protect and enhance aquatic resources in a cost effective, environmentally sensitive, and collaborative manner.

REPORT ORGANIZATION

This report is organized in three major sections:

- Section I, “Introduction and Watershed Description,” provides general information about the Peñasquitos watershed and the regulatory context within which this program was developed;
- Section II, “Water Quality Assessment,” provides an assessment of the quality of the water of receiving bodies within the watershed and identifies and prioritizes related challenges; and,
- Section III, “Plan of Action,” outlines the activities the local jurisdictions will undertake in cooperation with others in order to address the water quality problems that have been identified.

1 PROGRAM FRAMEWORK

1.1 INTRODUCTION

Pollutant loads associated with urban and storm water runoff discharged into streams, bays, and oceans from municipal storm drain systems have been identified under local, regional, and national research programs as one of the principal causes of water quality problems in most urbanized regions. Runoff reaching our waterways has the potential to contain a host of constituents like trash and debris, bacteria and viruses, oil and grease, sediments, nutrients, and metals. These pollutants can adversely affect receiving and coastal waters, associated biota, and public health.

The Peñasquitos watershed is within the boundaries of the Cities of San Diego, Del Mar and Poway, and County of San Diego. These local jurisdictions are committed to finding creative and effective ways to improve the water quality of the receiving waters of the Peñasquitos watershed, such as the Los Peñasquitos Lagoon and Pacific Ocean, while also complying with the National Pollutant Discharge Elimination System Municipal Storm Water Permit (Order No. 2001-01), hereafter referred to as the Municipal Permit.

While the Cities of San Diego, Del Mar, Poway and the County of San Diego ("Peñasquitos Watershed Copermittees") have developed and are in the process of implementing broad water pollution prevention programs within their respective jurisdictions, the Peñasquitos Watershed Urban Runoff Management Program focuses specifically on water quality related issues within the Peñasquitos watershed that can be potentially attributed (wholly or partially) to discharges from the municipal storm water conveyance system (also referred to as the storm drain system) and may be addressed through a cross-jurisdictional approach.

The primary goal of this inter-jurisdictional effort is to positively affect the water resources of the Peñasquitos watershed while balancing economic, social and environmental constraints. The following objectives have been identified in order to achieve the program goal:

1) Develop/expand methods to assess and improve water quality within the watershed;
2) Integrate watershed principles into land use planning;
3) Enhance public understanding of sources of water pollution; and,
4) Encourage and develop stakeholder participation.

1.1.1 WHY A WATERSHED?

A watershed is defined as a contiguous area of land that drains to a particular location, usually a water body such as a creek, lake, or lagoon (See Figure 1-1, below). The term is not restricted to surface water drainage characteristics as it includes interactions with subsurface water. Watersheds come in all shapes and sizes and cross-county,

state and national boundaries[1]. The delineation of a watershed, or drainage area, depends on the scale of reference and small watersheds are combined together to become larger watersheds. Watershed boundaries follow the major ridgelines around river channels and meet where the water flows out of the watershed, usually the mouth of a stream or river.

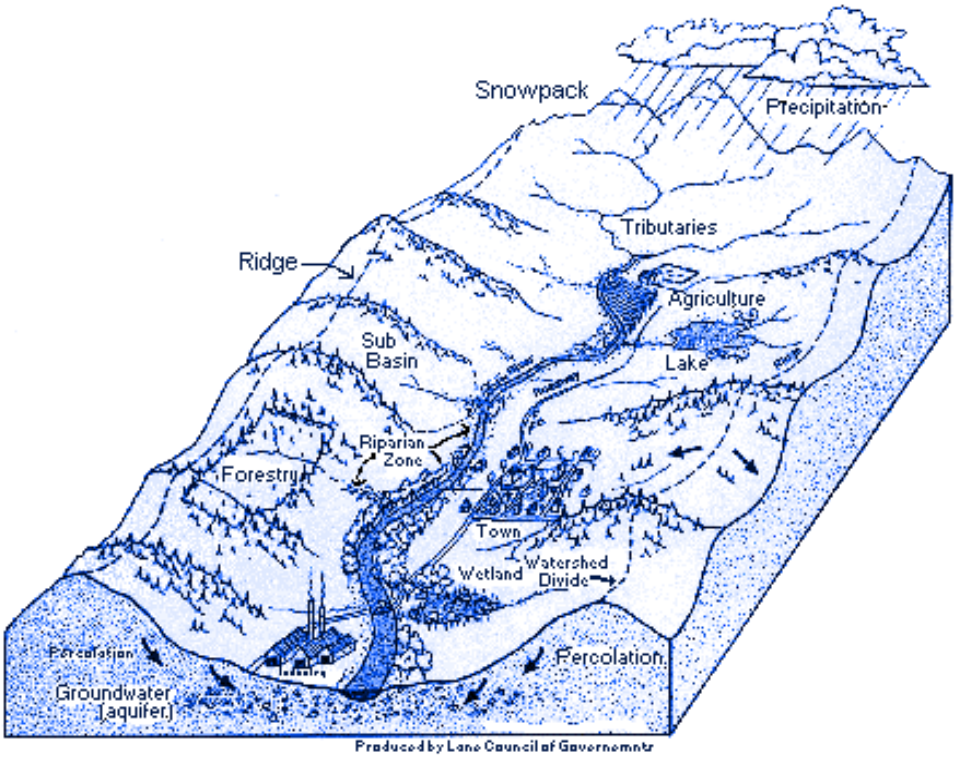

Figure 1-1. Typical watershed. Source: U.S. EPA, Office of Wetlands, Oceans & Watersheds. http://www.epa.gov/OWOW/.

In San Diego County, all waterways west of the Peninsular Range ultimately reach to the Pacific coast. While watersheds can be large or small, we all live in a watershed as every stream, tributary, or river has an associated watershed.

Because the water moves downstream in a watershed, any activity that affects the water quality, quantity, or rate of movement at one location can affect the watershed and receiving waters at downstream locations. Before reaching a stream, surface runoff accumulates from the highest points in a watershed and flows downhill across lawns, rooftops, parking lots, and roads, picking up many constituents along the way that pollute our rivers and beaches. For this reason, everyone living or working within a watershed needs to contribute to ensure the health of the watershed.

[1] U.S. Environmental Protection Agency, 2002.

Most environmental management activities have been traditionally been based on the jurisdictional limits of participating institutions including cities, counties, and states. While logical from legal and budgetary perspectives, this geographic division of land has limited applications when considering environmental processes at large. Watersheds, on the other hand, make sense for water quality management as they represent geographic units of hydrological processes. Watersheds are "readily identifiable landscape units that integrate terrestrial, aquatic, geologic, and atmospheric processes[2]."

1.1.2 SAN DIEGO WATERSHEDS

San Diego County encompasses an area of over 4,000 square miles in the southwest corner of California. The northwest to southeast trending Peninsular Range divide two hydrologic regions in the San Diego region. The San Diego Hydrologic Region drains in a westerly direction toward the Pacific Ocean and the Colorado Hydrologic Region drains in an easterly direction toward the Colorado River.

There are a total of 11 major watersheds or *hydrologic units* in the San Diego Hydrologic Region encompassing a land area of nearly 3,000 square miles (See Figure 1-2). Eight major stream systems originate on the western slope of the Peninsular Range and discharge into the Pacific Ocean. From north to south they are San Juan Creek, and the Santa Margarita, San Luis Rey, San Dieguito, San Diego, Sweetwater, Otay, and Tijuana Rivers. In addition, there are three hydrologic units whose headwaters are located between the Peninsular Range and the Pacific Ocean. These include the Carlsbad, Peñasquitos, and Pueblo San Diego units[3].

[2] Clements *et al.*, 1996.
[3] Project Clean Water, 2002.

Figure 1-2. San Diego Hydrologic Units.

In California, the State Water Resources Control Board (SWRCB) and its nine Regional Water Quality Control Boards ("Regional Board's") have primary responsibility for the protection of water quality. This requires preventing and reducing water pollution in our rivers, streams, lakes, beaches, bays, and groundwater. Within this regulatory context, the San Diego Regional Board determines the appropriate scale to define watersheds in the region. For regulatory purposes, the Regional Board has divided the San Diego region into 11 Watershed Management Areas as illustrated in Figure 1-3.

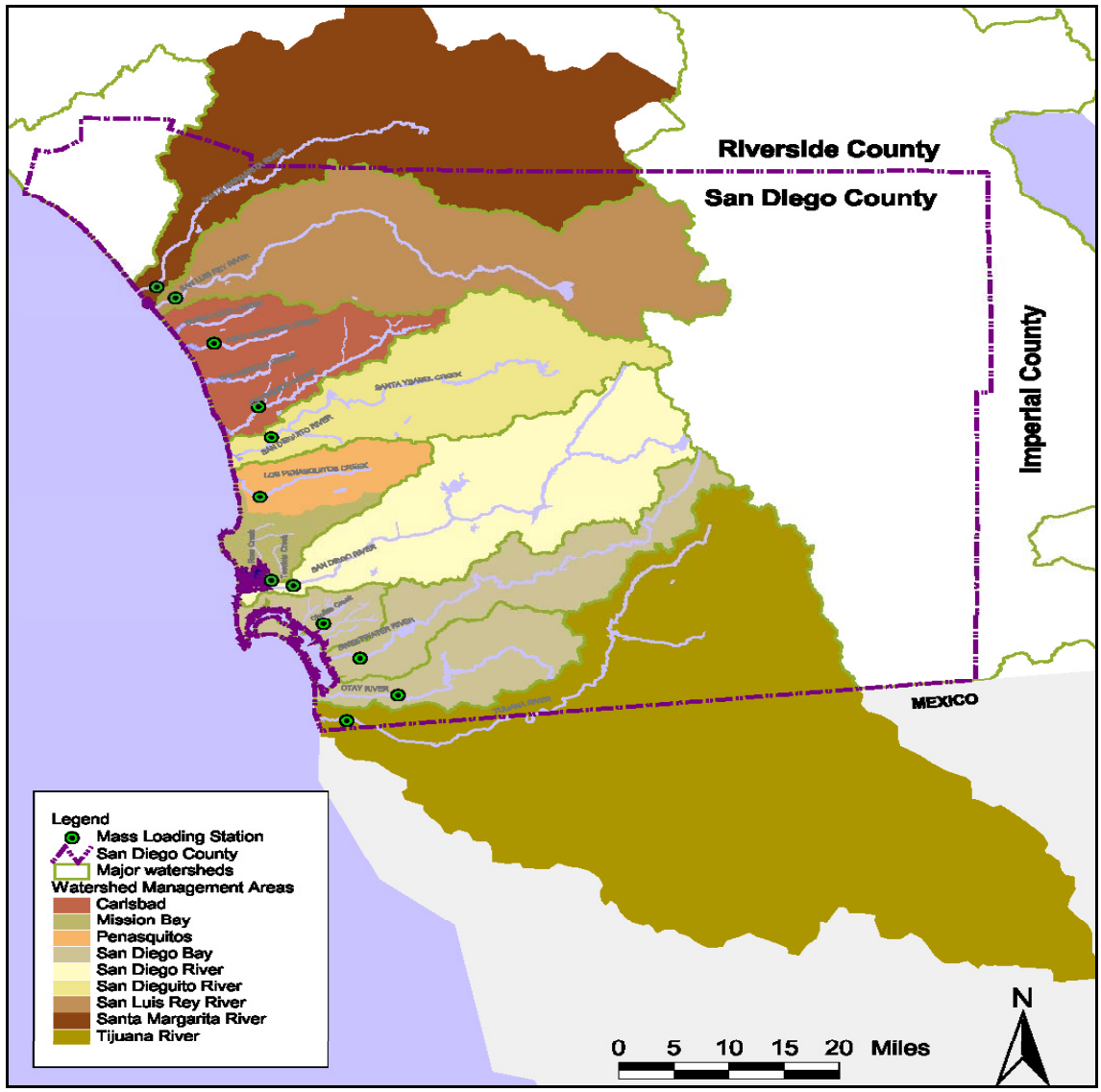

Figure 1-3. San Diego Watershed Management Areas.

1.1.3 BACKGROUND

Pollutant loads associated with urban and storm water runoff are considered one of the leading causes of water quality impairment in the San Diego region and nationwide. Pollutants carried in urban and storm water runoff, indiscriminate of dry or wet weather conditions, routinely find their way to our creeks, lagoons, bays, and ocean via the municipal storm drain systems. Unlike many other regions in the country, storm drain systems in San Diego are separate from sanitary sewer systems. The Peñasquitos watershed storm drain system, like the drainage system throughout San Diego county, conveys urban runoff and rainwater from our streets, rooftops, driveways, parking lots, and other impervious areas, directly to the river and Pacific Ocean without receiving any form of treatment.

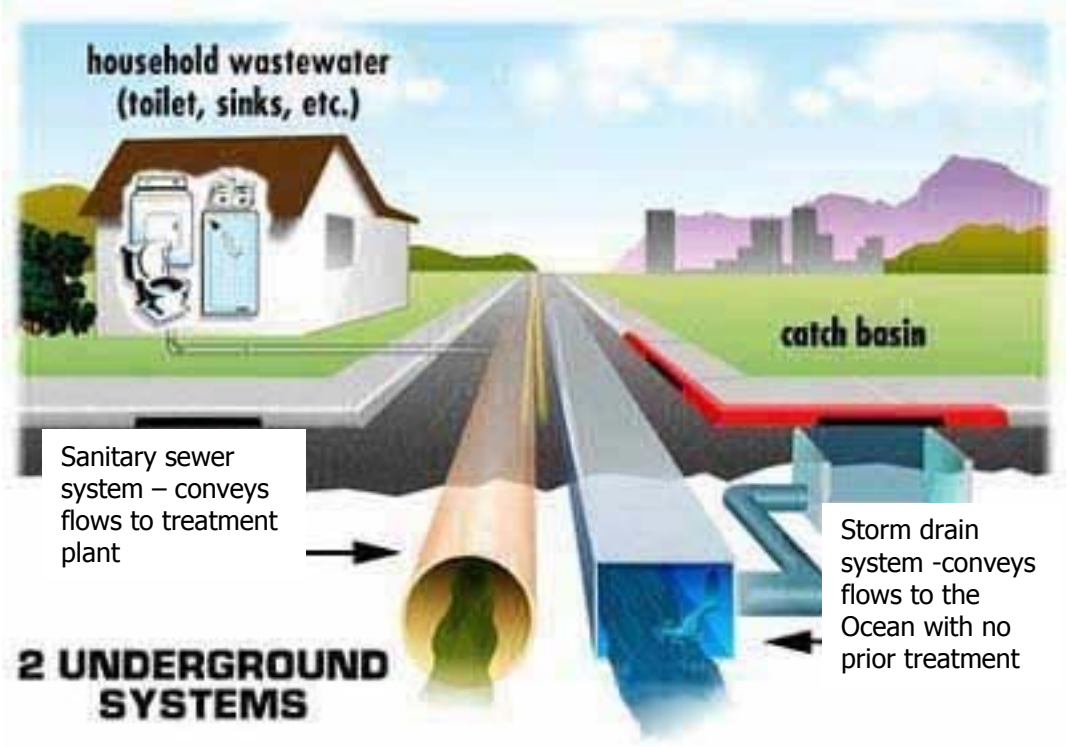

Figure 1-4. San Diego's Separate Wastewater And Storm Drain Systems.

Urban and storm water runoff potentially contain a host of pollutants like trash and debris, bacteria and viruses, oil and grease, sediments, nutrients, metals, and toxic chemicals. These contaminants can adversely affect receiving and coastal waters, associated wildlife, and public health. Water pollution associated with runoff is not only a problem during rainy seasons, but also year-round due to many types of water use activities that discharge runoff into the storm drain system.

All storm water management activities within the region are primarily focused on improving the quality of the region's *receiving waters* in order to protect their *beneficial uses*. This objective translates into two fundamental goals for municipal storm water programs:

- To eliminate the discharge of pollutants into San Diego waters to the maximum practicable extent; and,
- To achieve sustainable water quality levels that lead to fishable and swimmable waters.

1.2 REGULATORY FRAMEWORK

1.2.1 MUNICIPAL STORM WATER PERMIT

The principal law governing pollution of the nation's surface waters is the Federal Water Pollution Control Act, more commonly known as the Clean Water Act. The Clean Water Act set the goal of restoring and maintaining the chemical, physical, and biological integrity of the nation's waters. The federal Clean Water Act was amended in 1987 to address urban and storm water runoff. One requirement of the amendment was that many municipalities throughout the United States were obligated for the first time to obtain National Pollutant Discharge Elimination System (NPDES) permits for discharges from their storm water conveyance system. The National Pollutant Discharge Elimination System (NPDES) is a federal program established under the Clean Water Act to regulate discharges from any point source. A point source, as defined under the Clean Water Act is any "discernible, confined and discrete conveyance from which pollutants are or may be discharged." Discharge of urban and storm water runoff conveyed in the storm drain system is considered a point source. Section 402(p) of the Clean Water Act prohibits municipal storm water discharges without an NPDES permit. Discharge from any point source, except in compliance with an NPDES permit, is considered unlawful.

Residents, businesses and other uses within local jurisdictions contribute to discharges of storm water and urban runoff from their property into receiving waters of the San Diego region via municipal storm drain systems. These municipal storm water discharges are regulated under countywide requirements contained in Regional Board Order No. 2001-01. This Order serves as the NPDES Municipal Storm Water Permit (Municipal Permit) for the for the County of San Diego, the San Diego Unified Port District, and the 18 incorporated cities of San Diego County, referred to collectively as the *Copermittees*.

The Municipal Permit is granted and administered by the State Water Resources Control Board through the San Diego Regional Water Quality Control Board ("Regional Board"). The State Water Resources Control Board (SWRCB) and its nine Regional Boards have primary responsibility in California for the protection of water quality. This responsibility translates into preventing and reducing water pollution in our rivers, streams, lakes, beaches, bays, and groundwater.

Municipal Permits seek to ensure that the *beneficial uses* of receiving waters are protected. Beneficial uses are defined as the uses of water necessary for the survival or well being of people, plants, and wildlife. Beneficial uses include surfing at a local beach, fishing in a creek or stream, or just taking a pleasurable walk along a scenic waterfront. Municipal storm water NPDES permits contain requirements to achieve numeric and narrative *water quality objectives* that are established to protect beneficial uses. Water quality objectives are defined as constituent concentrations, levels, or narrative statements, representing a quality of water that supports the most sensitive beneficial uses that have been designated for a water body.

Each Copermittee is required to implement the requirements of the Municipal Permit across two broad levels of responsibility. Copermittees have responsibility for the water quality impacts of urbanization within (1) their jurisdiction and (2) their watershed(s). The Municipal Permit reflects these two broad levels of responsibility, in that it requires implementation of comprehensive urban runoff management programs, memorialized though Urban Runoff Management Plans, at both jurisdictional and watershed levels.

All Peñasquitos watershed jurisdictions have completed their jurisdictional Urban Runoff Management Plans. In general, these plans outline actions that each of these agencies will undertake in order to protect and improve the water quality of the Pacific Ocean, as well as rivers, creeks and bays in the region while achieving compliance with the Municipal Permit.

Additionally, Copermittees have adopted local regulations based on the Model Standard Urban Storm Water Mitigation Plan (SUSMP) developed cooperatively at the regional level and adopted by the Regional Board on June 12, 2002. The goal of the SUSMP and associated local regulations is to ensure that new development does not result in long term increases of pollutants from a project site once this is developed and operational.

1.2.2 WATERSHED URBAN RUNOFF MANAGEMENT PROGRAMS

The Municipal Permit requires the development and implementation of Watershed Urban Runoff Management Programs (Watershed URMPs) for each of nine watershed management areas as defined below (see Figure 1-2 above):

Table 1-1. Watershed Management Areas.

WATERSHED MANAGEMENT AREAS	RESPONSIBLE COPERMITTEE(S)	MAJOR RECEIVING WATER BODIES
Santa Margarita River	County of San Diego*	Santa Margarita River and Estuary, Pacific Ocean
San Luis Rey River	Escondido Oceanside* Vista County of San Diego	San Luis Rey River and Estuary, Pacific Ocean
Carlsbad	Carlsbad Encinitas* Escondido Oceanside San Marcos Solana Beach Vista County of San Diego	Batiquitos Lagoon, San Elijo Lagoon, Agua Hedionda Lagoon, Buena Vista Lagoon, Pacific Ocean
San Dieguito River	Del Mar Escondido Poway City of San Diego* Solana Beach County of San Diego	San Dieguito River and Estuary, Pacific Ocean

WATERSHED MANAGEMENT AREAS	RESPONSIBLE COPERMITTEE(S)	MAJOR RECEIVING WATER BODIES
Peñasquitos	Del Mar Poway City of San Diego* County of San Diego	Los Peñasquitos Creek, Los Peñasquitos Lagoon, Pacific Ocean
Mission Bay	City of San Diego*	Mission Bay, Pacific Ocean
San Diego River	El Cajon La Mesa Poway City of San Diego* Santee County of San Diego	San Diego River, Pacific Ocean
San Diego Bay	Chula Vista Coronado Imperial Beach La Mesa Lemon Grove National City City of San Diego San Diego Unified Port District* County of San Diego	San Diego Bay, Sweetwater River, Otay River, Pacific Ocean
Tijuana River	Imperial Beach* City of San Diego County of San Diego	Tijuana River and Estuary, Pacific Ocean

* Denotes *lead Copermittee*.

The City of San Diego is designated as the lead Copermittee for the Peñasquitos Watershed Urban Runoff Management Program. As such, the City is responsible for developing the Peñasquitos Urban Runoff Management Plan, producing associated documents, and coordinating overall implementation of the program. All Peñasquitos Watershed Copermittees are required to collaborate with other Copermittees within the watershed to "identify and mitigate the highest priority water quality issues/pollutants in the watersheds" (Municipal Permit, Section J1, pg 43). The Watershed Urban Runoff Management Program serves as the vehicle for this cross-jurisdictional collaborative effort. This document represents the plan the jurisdictions and stakeholders have prepared to implement the Program.

The Peñasquitos Watershed Urban Runoff Management Plan will be submitted to the Regional Board no later than January 31, 2003. Additionally, annual program reports will also be submitted to the Regional Board. Annual reports will include the following:

1. A comprehensive description of all activities conducted by the participating jurisdictions in accordance with the program;
2. An identification of water quality related improvements and/or degradation;
3. A description of the mechanism for public participation;
4. A description of the cross-jurisdictional watershed based land use planning efforts;
5. An assessment of program effectiveness;
6. Any proposed program revisions; and,

7. A summary of pertinent data not included in the annual monitoring report.

The first annual report will be submitted to the Regional Board by January 31, 2004. Subsequent annual reports are due every January 31st during the life of the current Municipal Permit, which expires on February 21st, 2006.

1.2.3 WATER QUALITY CONTROL PLAN FOR THE SAN DIEGO BASIN

The Water Quality Control Plan for the San Diego Region (more commonly referred to as the Basin Plan), was adopted by the Regional Board in 1994. This document serves to guide and coordinate the management of water quality within the region. According to the Basin Plan, "the most basic goal of the Regional Board is to preserve and enhance the quality of water resources in the San Diego Region for the benefit of present and future generations[4]." Specifically, the Basin Plan: (1) designates beneficial uses for inland surface waters, coastal waters, reservoirs and lakes, and ground water; (2) sets narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses; (3) describes implementation programs to protect the beneficial uses of all waters in the Region; and, (4) describes surveillance and monitoring activities to evaluate the effectiveness of the Basin Plan. The Basin Plan incorporates by reference all applicable State and Regional Board plans and policies. *Beneficial uses* applicable to the waters of the state of California include contact water recreation (such as swimming and surfing), provision of habitat for freshwater, marine and wildlife species, and water supply.

The Porter-Cologne Water Quality Control Act (Division 7 of the California Water Code) and the Federal Clean Water Act both mandate periodic review of water quality control plans. Section 303 (c)(1) of the Federal Clean Water Act requires, "… the water pollution control agency of such State shall from time to time (but at least once each three year period...) hold public hearings for the purpose of reviewing applicable water quality standards[5] and, as appropriate, modifying and adopting standards." Because the review mandated by the Clean Water Act takes place every three years, it is termed a "Triennial Review".

1.2.4 CLEAN WATER ACT SECTION 303(D) LISTED WATER BODIES

Section 303(d) of the federal Clean Water Act requires states to periodically identify all surface waters in the state that do not meet *water quality standards* as described in the Basin Plan. In California, the State Water Resources Control Board works with its Regional Boards to compile a draft list that is submitted to the U.S. Environmental Protection Agency for their review and approval. The list must include a description of the pollutants causing the violation of water quality objectives and a priority ranking of the water quality limited segments for the purpose of development of action plans aimed to improve their water quality. These action plans are referred to as *Total Maximum Daily Loads* (TMDLs).

[4] San Diego Regional Water Quality Control Board (SDRWQCB), 1994.
[5] *Water Quality Standards* refer to both numeric and narrative water quality objectives and beneficial uses.

The State's most recent Section 303(d) List was approved in 1998 and contains 509 water bodies, many listed due to multiple pollutants. The Los Peñasquitos Lagoon is identified as water quality limited due to sedimentation.

1.2.5 PROGRAM RESPONSIBILITIES

As described above, the Peñasquitos watershed falls within the boundaries of the Cities of San Diego, Del Mar, and Poway, as well as within unincorporated areas under the jurisdiction of the County of San Diego. While the City of San Diego has been identified as the program lead agency, all these local jurisdictions have participated in the development of this Watershed Urban Runoff Management Program and are responsible for its continued assessment and implementation.

The following section identifies which specific departments and/or divisions within each of the participating jurisdictions are responsible for storm water management activities as well as their primary functions and goals. Contact information for each agency is also provided.

CITY OF SAN DIEGO

Karen Henry - Deputy Director, (619) 525-8647
Watershed Programs: Drew Kleis – Storm Water Specialist, (619) 525-8623
Storm Water Hotline: (619) 235-1000

The City of San Diego Storm Water Pollution Prevention Program, housed within the General Services Department, is the lead office in the City's efforts to reduce pollutants in urban runoff and storm water. Additionally, the Storm Water Pollution Prevention Program is responsible for achieving compliance with the Municipal Permit.

The City's Program is focused on protecting and improving the water quality of rivers, bays and the ocean for the citizens of San Diego and future generations by eliminating and reducing pollutants in urban runoff and storm water in an efficient, effective and cost-effective manner. The City and the Storm Water Program have the additional goal of achieving a 50 percent reduction in the number of beach postings and closures resulting from contamination by the year 2004.

The City of San Diego Urban Runoff Management Plan (available for download in the City's web page, (www.sandiego.gov/stormwater) represents the blueprint for the actions that the City will take in order to achieve its goals.

The City believes the key to cleaner ocean waters is public education. That's why the "Think Blue" educational campaign was created. "Think Blue" (www.thinkbluesd.org) seeks to educate residents, business, and industry about the causes of storm water pollution and the pollution prevention behaviors everyone can adopt to protect our water resources for now and for future generations of San Diegans.

The City of San Diego Storm Water Pollution Prevention Program receives policy direction from the Mayor's Clean Water Task Force. The Task Force is co-chaired by Mayor Dick Murphy and Council Member Scott Peters and is comprised of distinguished members of public agencies as well as representatives from the business, environmental, and academic communities. The Storm Water Pollution Prevention Program is organized into six work sections. The Program Development / Watershed Coordination Section has primary responsibility for the City's watershed programs . This section is responsible for the front-line development and implementation of the City's watershed urban runoff management programs. The section also leads a citywide effort to retool and reconfigure existing policies, procedures and development regulations to incorporate pro-active storm water pollution prevention strategies.

CITY OF DEL MAR
Mikhail Ogawa – Storm Water Project Manager, *(760) 753-1120*

Del Mar means "by the sea" – highlighting the symbiotic relationship between the City and Pacific Ocean. The City of Del Mar is a coastal community in the northern section of San Diego County. The City is bounded by the cities of San Diego and Solana Beach, and by the Pacific Ocean. The City covers an area of approximately 2 square miles with a population of approximately 5,000 people. The main attraction of visitors is the beach and sunny weather. The annual Del Mar Fair and the well-known Del Mar Racetrack bring in people from the surrounding area and beyond.

Del Mar is continuing to implement the environmentally friendly policies and guidelines of its City Council and citizens'. The City developed and is implementing its Jurisdictional Urban Runoff Management Program in order to affect a change in water quality within the City's storm drain system, but also in one of its precious resources, the Pacific Ocean.

All of the City's departments are working closely to implement the Urban Runoff Program as effectively and efficiently as possible. The Engineering department has primary responsibility for developing and implementing the Program's many elements.

CITY OF POWAY
Dan Cannon - Public Works Operations Manager, (858) 679-5417

The City of Poway has a Storm Water Pollution Prevention Program in place to ensure compliance with the Municipal Storm Water Permit. The Program goals are to comply with Federal, State, and regional regulatory requirements. The City's Storm Water Program must ensure all public and private facilities, and existing and new development implement the City's Jurisdictional Urban Runoff Management Plan. The City of Poway Storm Water Program receives policy direction from the City Council. The administration of the Storm Water Pollution Prevention Program is shared by the Department of Public Works and the Department of Development Services.

The Department of Public Works is responsible for ongoing, enhanced maintenance of the City's storm drain system, illicit discharge detection and elimination, dry weather monitoring, and municipal and residential permit compliance. The Department of Development Services administers a vigorous Industrial and Commercial Inspection program to ensure the facilities and developers that operate in the City of Poway demonstrate compliance with the City's JURMP and Municipal Order 2001-01. The Department of Development Services Code Compliance Division investigates illegal discharges and illicit connections, maintains a database of compliance history for each facility, and enforces the Permit requirements. Both the Department of Public Works and the Department of Development Services create and conduct storm water pollution prevention education and outreach to the City's residents, municipal staff, businesses, and developers.

COUNTY OF SAN DIEGO

Don Steuer - Land Use and Environment Group Project Manager, (619) 685-2441

project clean water

The County of San Diego's Stormwater Management Program is designed to improve water quality through education, inspection, response and water monitoring. The objectives of the Stormwater Management Program are to provide guidance to the public on water quality issues and to act as a coordinating entity towards a cohesive regional storm water program. Several departments within the County's Land Use and Environment Group (LUEG) implement the Stormwater Management Program. The County believes that the individual departments within the County each have a core competency, which are briefly discussed below. A Program Manager is designated in three County Departments to ensure program implementation.

Land Use Planning: The Department of Planning and Land Use, Watershed Planning Section is the lead for land use and watershed planning issues, which includes the General Plan, Costa-Machado Water Act of 2000 – Proposition 13 Watershed Management Plan Grants and Watershed Urban Runoff Management Program (WURMP). The Program Manager for the Watershed Planning Section is *Jeff Murphy, Regional Planner (858/694-3691)*.

Science and Monitoring: Department of Environmental Health is the lead for water quality and watershed science and monitoring issues, which includes computerized modeling applications to support water quality and watershed program development and assessment. The Program Manager for the Department of Environmental Health is *Jon Van Rhyn (619/338-2203)*.

Structural Engineering: Department of Public Works is the lead on structural engineering aspects, including structural BMPs. The Program Manager for Department of Public Works is *Cid Tesoro, Senior Civil Engineer (858/694-3672).*

Business Compliance: The Department of Environmental Health Program Manager is the lead on all aspects of commercial and industrial business compliance, including inspections and requiring monitoring as necessary.

Overall coordination for storm water program implementation is coordinated through the regularly scheduled Water Issues Core Group. This Group, which meets every Tuesday, is chaired by the County's Deputy Chief Administrative Office for Land Use and Environment.

2 PEÑASQUITOS WATERSHED

2.1 GENERAL DESCRIPTION

The Peñasquitos watershed encompasses a land area of approximately 100 square miles, extending east to Iron Mountain and draining west to Los Peñasquitos Lagoon at the Pacific Ocean Coast. Runoff from the drainage basin enters the Lagoon via Soledad Canyon, Los Peñasquitos Canyon and Carmel Valley Creeks[6].

The watershed includes portions of the Cities of Del Mar, San Diego, and Poway as well as areas within the jurisdiction of the County of San Diego as shown below (see additional maps of the watershed in Appendix B).

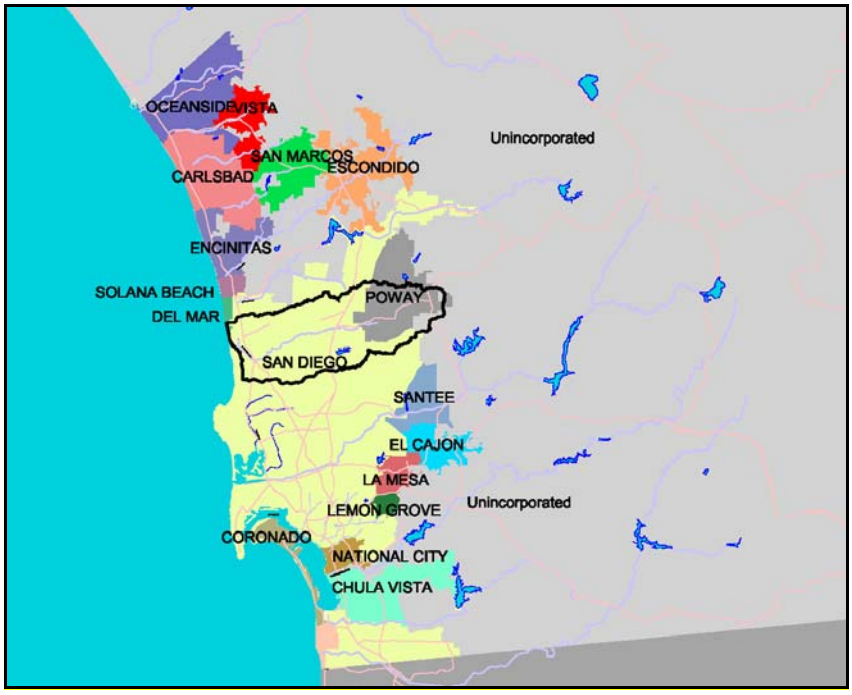

Figure 2-1. Peñasquitos Creek Watershed: Jurisdictional Boundaries.

The watershed provides a home to over 180 sensitive plant and animal species. Many of the species in the watershed are considered endangered under state and federal listings. Some of the species that can be found in the watershed include the Salt marsh daisy, Quino checkerspot butterfly, American peregrine falcon, California gnatcatcher, California least tern, Cooper's hawk, Orange-throated whiptail, Western spadefoot toad, and the San Diego black-tailed jackrabbit[7]. The Peñasquitos watershed is also a stopover location for migratory birds, and includes riparian wetlands, vernal pools, salt marshes, and open waters.

The Peñasquitos watershed is formed by the Miramar Reservoir (906.1) and Poway (906.2) hydrologic areas within the Peñasquitos hydrologic unit (see Figure 2-2). The remaining hydrologic areas (Scripps 906.3, Miramar 906.4, and Tecolote 906.5) are

[6] Mudie et al, 1974.
[7] Los Penasquitos Watershed Profile. California State Coastal Conservancy. Aug. 2001 http://eureka.regis.berkeley.edu/wrpinfo/watersheds/lp/.

aggregated to form the Mission Bay Watershed Management Area (considered under a separate urban runoff management program under the jurisdiction of the City of San Diego).

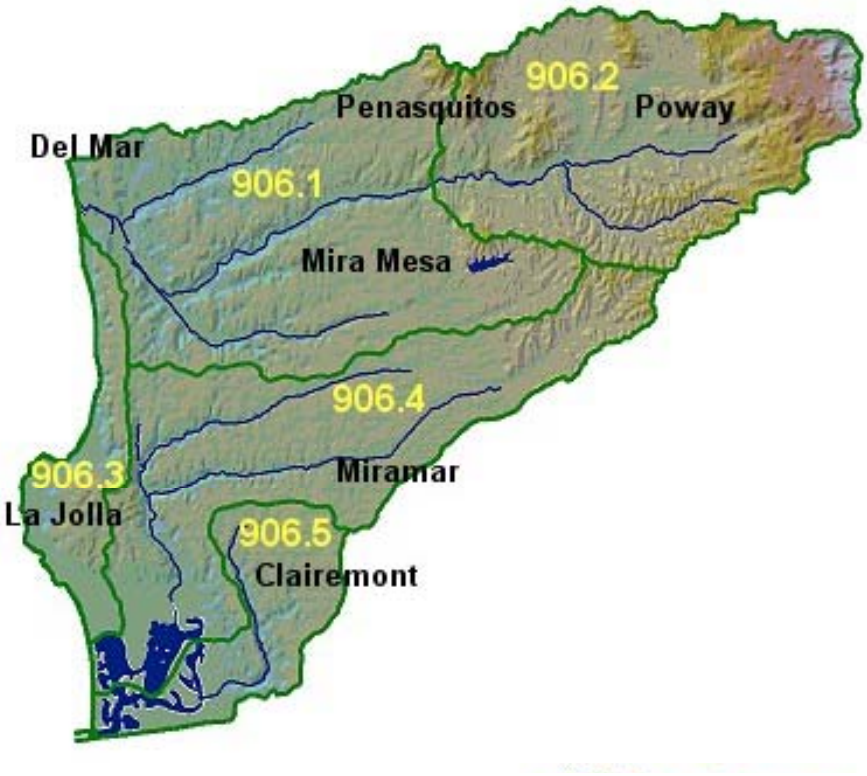

Figure 2-2. Peñasquitos Hydrologic Unit and Areas.

2.1.1 WATERSHED POPULATION CHARACTERISTICS

The population of the watershed was estimated at 237,116 for the year 2000. This base population is expected to increase by 35% (or approximately 80,000 new residents) by the year 2020.

The following tables identify acreage within each local jurisdiction as well as estimated watershed population trends through 2030.

Table 2-1. Peñasquitos Watershed: Acreage per Jurisdiction[8].

	LAND AREA (ACRES)	LAND AREA AS PERCENTAGE	POPULATION DENSITY (PERSONS/ACRE)
Del Mar	150.81	0.25	5.76
Poway	15,445.24	25.56	2.54
San Diego	42,970.72	71.11	4.58
Unincorporated	1,861.44	3.08	0.76
TOTAL	60,428.21	100	NA

Table 2-2. Peñasquitos Watershed - Population Estimates: Years 2000, 2010, 2020 and 2030.

	YEAR			
	2000	2010	2020	2030
Del Mar	868	960	1,006	1,030
Poway	39,170	42,872	45,436	45,809
San Diego	196,974	241,952	269,763	273,372
Unincorporated	104	665	925	930
TOTAL	237,116	286,449	317,103	321,141

Table 2-3. Peñasquitos Watershed: 2000 - 2030 Population Trends by Jurisdiction.

	PERCENT OF POPULATION CHANGE			
	1990 - 2000	2000 - 2010	2010 - 2020	2020-2030
Del Mar	-1.92	10.60	4.79	2.39
Poway	12.31	9.45	5.98	0.82
San Diego	40.99	22.83	11.49	1.34
Unincorporated	-31.13	539.42	39.10	0.54

2.1.2 LAND USE

Each of the watersheds in the San Diego region is unique in size, terrain, and development pattern. It is now well documented that as the amount of impervious pavement and rooftops increases in a watershed, the velocity and volume of surface water as well as pollutant loads are increased. There is a strong correlation between the amount of imperviousness in a watershed and the health of its receiving water bodies.

Impervious surfaces collect and accumulate pollutants deposited from the atmosphere, leaked from vehicles or derived from other sources. During storms, accumulated substances are quickly washed off and rapidly delivered to aquatic systems. Even

[8] All information in Tables 2.1-2.3 was generated by SANDAG staff as a courtesy to the San Diego copermittees. 2000 forecast data are derived from the 2000 Census but do not reflect data controlled to detailed Summary File 3 data for population. This forecast was accepted by the SANDAG Board of Directors in October 2002 for distribution, review, and use in planning and other studies. A final forecast will be prepared in fall 2003. This forecast may exceed the development potential of current general and community plans because it incorporates higher intensity and more mixed use development opportunities within smart growth areas identified by local agency staff. Smart growth areas were identified in part to support the expanded transit system envisioned for the region in the 2030 Regional Transportation Plan.

during extended periods of dry weather, constituents carried in water flows associated with landscape irrigation, car washing, hosing off sidewalks and driveways, and industrial discharges reach surface waters.

Research has shown that impervious surfaces, a consequence of development, have a direct impact upon stream water quality. A watershed with impervious surface coefficient less than 10% is considered a protected area, between 10% to 25% is considered an affected area, and higher than 25% is considered a degraded area[9]. The categories indicate a qualitative degree of stream deterioration due to urbanization, which is measured by the imperviousness coverage.

The increased influx of runoff from urbanization, due to the increase of impervious surfaces, can also change such things as peak flow rates and velocity within the watershed. Urbanization can be associated with activities such as urban runoff, sewage spills, dredging, landfill leachate, conversion of agriculture to urban uses, irrigation from agricultural activities, and catch basins that are not maintained within the watershed. All of these activities can pose major threats to the health of the watershed.

The lower portion of the Peñasquitos watershed is generally typical of urbanized coastal areas in Southern California. Principal land uses within the Peñasquitos Watershed are identified below:

Table 2-4. Peñasquitos Watershed: Land Uses Based on Year 2000 Data[10].

LAND USE DESCRIPTION	ACREAGE	AS PERCENTAGE OF THE WATERSHED
Residential	17,051	28.2%
Commercial and Office	1,816	3.0%
Industrial	4,616	7.6%
Public Facilities & Utilities	3,319	5.5%
Parks, Recreation & Open Space	11,767	19.5%
Agriculture	2,072	3.4%
Undeveloped	19,621	32.5%
Water Bodies	168	0.3%
Totals	60,430	100%

Different land uses impact watershed areas in different ways. Developed lands, whether residential or employment-related, result in increased runoff. Other uses, such as agriculture, may not affect runoff quantities or rates as significantly as more urban uses, but may generate pollutants like pesticides and fertilizers that flow through the watershed to other areas and water bodies.

According to *Watersheds of the San Diego Region* (Sandag 1998), approximately 18,189[11] acres within the watershed are not suitable for development due to local

[9] Schueler, 1994.
[10] Sources include SANDAG Year 2000 digital imagery and City of San Diego Water Utilities digital ortho photos, jurisdictional land use data and various secondary sources used to verity land use interpretations. Data tabulated by SANDAG as a courtesy to San Diego Copermittees.

policies and/or physical constraints. The majority of this undeveloped land is in the upper, eastern portion of the watershed. While a significant portion of the upper and eastern portion of the watershed remains undeveloped, the watershed faces considerable urbanization pressures typical of the Southern California region. The types of development that can be expected in the remaining developable acres in the watersheds include residential (5,932 acres), commercial and industrial (2,395 acres), public facilities and utilities (457 acres), and parks and recreation (119 acres).

2.1.3 LAND OWNERSHIP

A substantial amount of the Peñasquitos watershed is privately owned. It is estimated that 1.5% (917 acres) of the watershed is owned by federal, the state owns 4% (2,422 acres), and local agencies own 17.3% (10,463 acres). Approximately 77.2% of the watershed (46,628 acres) is in private ownership.[12]

2.1.4 WATERSHED DRAINAGE CHARACTERISTICS

The Peñasquitos watershed drains portions of the communities of Poway, Rancho Peñasquitos, Mira Mesa, and Del Mar. Presently, however, most of the flow is year-round due to urbanization within and around the watershed.

The watershed contains approximately 60,000 acres of drainage area which extends as far easterly as the Iron Mountains and drains west to the Los Peñasquitos Lagoon and finally into the Pacific Ocean. The watershed consists of three parallel canyons running inland toward the foothills with a peak elevation of 2900 feet[13].

Runoff in the watershed is closely related to the rainfall patterns, which is largely derived from winter storm systems. The annual precipitation ranges from less than 8 inches along the coast to 18 inches inland. The upper portion of the watershed includes topography that is relatively steep. Therefore, in this area there are stream channels that run through narrow and deep valleys. In the lower portion of the watershed, the topography is less steep resulting in stream channels that cut through relatively broad valleys. The three main water drainage areas include the Los Peñasquitos Creek, Carroll Creek, and Carmel Creek.

LOS PEÑASQUITOS CREEK

The Los Peñasquitos Creek flows through the entire length of the Los Peñasquitos Canyon. Beginning at the eastern end of the creek, there are three main drainages that initiate the flow. The three drainages are Beeper Canyon, Rattlesnake, and Poway Creeks. Los Peñasquitos Creek begins in the city of Poway in an area with land use that is characterized by vacant and undeveloped land along with single family residential and public services. After the initiation of the creek, the drainage flows west and collects water from Sabre Springs, the Preserve, the Los Peñasquitos Ranch house

[11] Data as tabulated by SANDAG in their 1998 *Watersheds of the San Diego Region* INFO bulletin based on the land use elements of local jurisdictions current at that time.
[12] Data tabulated by Sandag as a courtesy to the Copermittees based on Year 2000 land use data.
[13] Don Coppock, Los Peñasquitos Lagoon and Enhancement Plan and Program (State Coastal Conservancy, 1985)

spring, Lopez Creek, and adjacent tributary canyons[14]. The creek then crosses Interstate 15 and once it is on the west side, it flows through an area with vacant undeveloped land. There are also residential single family homes that are encroaching upon the vacant land and creek in this area. The creek then meanders in a southwest direction through Mira Mesa until it reaches Sorrento Valley. Los Peñasquitos Creek then flows near Interstate 5 and 805 and into areas where it is surrounded by light industrial land use. Next, the creek turns northward and once again flows through undeveloped vacant land until it enters and drains into the Los Peñasquitos Lagoon. There are two stretches in the western lower portions of the Los Peñasquitos Creek that are lined in concrete. This was done to minimize the effects of erosion.

CARROLL CREEK

Carroll Creek flows westward through the Carroll Canyon sub-basin, which is located along the southern edge of the watershed. The headwaters of the creek are located near the Miramar Reservoir. The initiation of the creek is located in an area of extractive industry and from there the creek flows west through areas of vacant and undeveloped land, public services, and parks until it reaches Interstate 805. At this location the creek begins to flow in a northwesterly direction and comes into contact with lands that are used for light industry and parks. Carroll creek then crosses Interstate 5 and joins Los Peñasquitos Creek in Sorrento Valley prior to discharging into the lagoon.

CARMEL CREEK

Carmel Creek also flows westward through the Carmel Valley sub-basin located within the northwestern portion of the watershed. The headwaters are on Black Mountain and begin in an agricultural area. The creek then continues west through areas of undeveloped vacant land, single family residential, and commercial recreational areas. It then carries on parallel to Carmel Valley Road until it crosses Interstate 5. From there the drainage flows to the Los Peñasquitos marsh area. A marsh is a tract of low wet land that is normally treeless and periodically inundated. The Los Peñasquitos salt marsh area has been converted to a cattail and riparian marsh due to sedimentation and increased freshwater flows.

LOS PEÑASQUITOS LAGOON

The flows that originate from the three drainage areas, and any other sources, enter into the Los Peñasquitos Lagoon along with eight storm drains. This drainage then discharges into the Pacific Ocean (the outlet of Peñasquitos Lagoon is shown in Figure 2-3, below). The lagoon was once a tidal estuary, but there are factors that have degraded the lagoon and have closed it to tidal action for long periods of time. Some factors that have degraded the lagoon are the construction of a railroad embankment that has cut off lagoon channels, increased sediment from changing land uses upstream, and the construction of North Torrey Pines Road that restricted the location of the lagoon mouth. The ocean inlet is restricted by the crossing of Highway 1 and, therefore, must be mechanically cleared to prevent sediment blockage for extended

[14] Los Peñasquitos Watershed Profile. California State Coastal Conservancy. Aug. 2001 http://eureka.regis.berkeley.edu/wrpinfo/watersheds/lp/.

periods of time. Nonetheless, when the mouth is open the railroad and sewer berms impede the tidal reach.

Figure 2-3. Los Peñasquitos Lagoon Ocean Outlet.

2.1.5 WATER SUPPLY RESOURCES

The history of San Diego region revolves around a never-ending search for a safe, reliable water supply in this arid area of Southern California. According to historian Kevin Starr, "Old Mission Dam was the first irrigation and domestic water system ever built by Europeans in the Far West[15]," (1990). Mission Dam, which still exists in Mission Trails Regional Park, was only the first water development project in San Diego County.

Figure 2-4. Old Mission Dam.

Beginning with the native Americans and later the Spanish missionaries and early settlers, local water supplies provided sufficient water for the county until World War II, when a vastly expanded military and industrial presence doubled the local population. When water shortages threatened the area's wartime mission, President Franklin Roosevelt directed the Navy to build the area's first aqueduct connecting the region to the newly completed Colorado River Aqueduct. Additionally, the Navy

[15] San Diego County Water Authority, 2002 (See www.sdcwa.org/about/who-history).

directed and funded the construction of the San Vicente reservoir (located on a tributary to the San Diego River) to serve as a terminus of the aqueduct.

Imported water now accounts for up to 95 percent of the total water used in the county each year. Local reservoirs store the imported water until it is needed. Local reservoirs owned and operated by the City of San Diego Water Department supply about 10 to 15 percent of total demand in the region. The amount of water runoff into local reservoirs varies greatly from year-to-year due to weather and hydrology. During wet periods, abundant rainfall and runoff lead to greater local water supply. During dry periods, when rainfall and runoff is minimal, local water supply is severely reduced.

Generally, the City of San Diego purchases 80 percent of its water from the San Diego County Water Authority (CWA) and the remaining 20 percent is obtained from local runoff. The region served by the CWA imports 90 percent of its supply and 10 percent from local sources. CWA is a wholesale water agency that sold approximately 600,000 acre-feet[16] of imported water to its 23 member agencies in San Diego County in calendar 2001. The City of San Diego represents approximately 40% of the total water delivered by CWA. CWA, in turn, purchases its imported water from the Metropolitan Water District (MWD) of Southern California, which is comprised of 26 public water agencies. MWD obtains its water from the Colorado River and from Northern California. In calendar 2001, MWD delivered approximately 2.3 million acre-feet of imported water to its wholesale customers.

The Peñasquitos watershed is home to the Miramar Reservoir. Miramar Reservoir is located approximately 18 miles north of downtown San Diego in the Scripps Ranch community. This lake is very popular for bicycling, jogging, walking, roller-blading, and picnicking. When full, the reservoir has 162 surface acres, a maximum water depth of 114 feet, and 4 shoreline miles. Water levels are monitored weekly.

It should be noted that total projected demand for water within the San Diego County Water Authority service area is anticipated to increase from 673,7000 acre-feet in 2001 to 813,000 acre-feet by 2020[17]. The Authority intends to diversify supplies as one of several strategies to meet the increased demand. As population grows, there will be increased pressure on groundwater and surface waters as drinking water resources. Groundwater and surface waters, which currently count for approximately 11 percent of the annual needs are expected to meet 17 percent of the year 2020 demand[18].

[16] A quantity of volume of water that covers one acre to a depth of one foot; equal to 43,560 cubic feet or 325,851 gallons. It is estimated that one acre-foot meets the yearly needs of two average families.
[17] Friehauf, 2002.
[18] Ibid.

3 WATER QUALITY ASSESSMENT

3.1 OVERVIEW

The first objective of the Peñasquitos Watershed Urban Runoff Management Program, as noted in the introduction section, is to "develop/expand methods to improve water quality within the watershed." Program components, as described in Chapters 3 and 4, have been developed in response to this objective.

The interpretation of water quality information is critical to understanding the ecology and potential beneficial use limitations in the Peñasquitos Creek watershed. This interpretation is the foundation of the water quality assessment for the Peñasquitos watershed. The challenge ahead includes integrating numerous water quality monitoring activities and related programs into a larger framework. Through this framework, Peñasquitos Watershed Copermittees will be able to analyze, accumulate, and manage watershed data. Potential data sources include water supply agencies, public health agencies, Copermittees, academia, and citizen monitoring groups. The effort is further complicated as the programs use a variety of methodologies to document the physical, chemical, and biological characteristics of streams, creeks, rivers, enclosed bays, lagoons, estuaries, and beaches. Peñasquitos Watershed Copermittees must have a good understanding of the conditions of the watershed, types of beneficial uses, land uses, and constituents of concerns in order to make effective recommendations on how to protect and improve the water quality of the Peñasquitos Creek and its tributaries. The process of assessing water quality data, prioritizing related issues, and identifying management actions provides an opportunity for each jurisdiction and other interested parties within the watershed to collaborate on these issues under the framework of the watershed program. It also provides an opportunity to focus limited resources in priority areas and ensure consistent approaches throughout the watershed.

This chapter is organized into four sections: Section 3.1 provides background information regarding the numerous monitoring programs being conducted by the Copermittees as well as other agencies and institutions within the region and denotes how these monitoring efforts complement one another. Sections 3.2 and 3.3 outline the framework for conducting the watershed-based water quality assessment in the future and denote limitations of the current efforts. Data sources and factors considered in the assessment are identified in these sections. Finally, Section 3.4 presents the data and analysis used in the assessment and leads to the identification of issues considered a priority in the 2002 watershed assessment.

3.1.1 BACKGROUND

Monitoring programs make use of a variety of methodologies to document the physical, chemical, and biological characteristic of streams, creeks, rivers, enclosed bays, lagoons, estuaries and beaches. Since 1993, the Copermittees have been required to implement a monitoring program to assess the effects of urban runoff on receiving waters. Copermittees developed this monitoring program under the first Municipal Permit issued in 1990.

The initial Copermittee monitoring program called for the collection, analysis and reporting of water quality data at the countywide level. The approach taken was consistent with other Phase I storm water programs. URS Corporation, an environmental consulting firm, implemented the countywide monitoring program on behalf of the Copermittees until 2000 when MEC Analytical Systems assumed this role. No sampling occurred within the Peñasquitos watershed under the initial monitoring program.

In 2001, the newly issued Municipal Permit brought about revisions to the countywide monitoring program. The current countywide monitoring program includes an assessment of the effects of urban runoff on receiving waters (as measured by water chemistry and toxicity tests) and the development of indicators of relative watershed health from an ecological perspective (rapid stream bioassessment). Peñasquitos Watershed Copermittees expect the monitoring program (i.e. collection, analysis, and reporting of water quality data) to transition during the five-year permit period from the current countywide approach to a watershed-based approach.

While this initial watershed-based water quality assessment includes data collected as part of the countywide monitoring program, it does not include data obtained by other monitoring programs conducted by individual Copermittees (such as the dry weather or the coastal outfall monitoring programs). Participating jurisdictions intend to develop this watershed based water quality assessment as the mechanism that will link all this information together in a weight of evidence approach. Future year assessments, as time and resources permit, will include a review of data and information from several different sources, including (but not limited to) Copermittee programs, as well as data collected by other public agencies, research institutions, citizen programs or other available information that may be useful in assessing watershed-wide conditions.

The water quality prioritization is flexible and adaptive because the process is iterative and will develop over time. For example, Peñasquitos Watershed Copermittees will evaluate constituents of concern and stressors on an annual basis. Data limitations will hinder initial assessments, however, the long-term goal is to integrate as much data as possible into the analysis. Over time, the monitoring program will strengthen the assessments as the data collected annually by participating jurisdictions begin to allow for trend analysis. The iterative nature of the WURMP process allows for the revision of issues and priorities, as Peñasquitos Watershed Copermittees obtain more data.

3.1.2 MONITORING PROGRAMS

Issues concerning watershed health and ecological diversity, including water quality of receiving waters, span a variety of spatial and chronological scales. Many questions related to these issues are governed under the Municipal Permit and fall within the realm of one of three categories of monitoring research programs as described below:

Regional Monitoring Programs encompass a large spatial area (e.g., Southern California Bight), and look at many elements potentially impacted by storm water runoff. This type of monitoring includes the Regional Monitoring Program conducted by the Southern California Coastal Waters Research Project (SCCWRP) once every 5 years, and takes a longer-term view of the ultimate receiving waters, the coastal bays, lagoons, and the ocean. Regional monitoring is designed to answer questions concerning the ecological health of the entire Southern California coastline and encompass numerous components, including water and sediment quality, fish, benthos, birds, etc.

Core Monitoring refers to several long-term monitoring activities conducted by the Copermittees on an annual (or more frequent) basis. This focused monitoring will concentrate on fewer parameters than Regional Monitoring efforts and will serve to provide data to assess long-term trends within and across watersheds. The Copermittees designed these monitoring programs under an adaptive strategy that is subject to review as warranted by new data or information.

Process Studies supplement both the Core and the Regional Monitoring activities described above. Process Studies are short-term evaluations designed to answer specific questions. Some examples of Process Studies include evaluation of the link between storm water discharges and Toxic Hot Spots, conducting DNA-ribotyping for bacterial source identification in a watershed, and source identification studies used for the development of Total Maximum Daily Loads (TMDLs) for 303(d) listed bodies of water. The Regional Board, Copermittees, educational institutions and other agencies generally collaborate in proving funding, management, and technical support for these types of focused investigations.

3.2 CORE MONITORING

Copermittees designed the Core Monitoring Program to achieve an understanding of the impacts of urban runoff on the water quality and ecological health of receiving waters within and across San Diego watersheds. Jurisdictions will achieve this goal through an evaluation of chemical, physical, and biological evidence.

The linkage between the components of the Core Program and the evaluation of these components allows for the long-term assessment of changes in water quality within the region. Components of the Core Program to be implemented during the life of the current Municipal Permit include:

1) Mass Loading Station Monitoring;
2) Urban Stream Bioassessment Monitoring;
3) Coastal Storm Drain Outfall Monitoring;
4) Dry Weather Monitoring;
5) Ambient Bay, Lagoon, and Coastal Receiving Water Monitoring; and,

The Core Monitoring program, currently conducted on a countywide basis, has been designed as a adaptive program and is scheduled to transition to a watershed-based program by the end of the life of the current Municipal Permit in early 2006.

3.2.1 CORE MONITORING PROGRAM: 2001-2002

The Core Monitoring Program implemented during 2001-2002 monitoring period included the following activities further described below:

Table 3-1. Copermittee Monitoring Program.

Monitoring Activities	*Where?*	*Season*	*Number of Sites Per Watershed*	*Analytes*
Mass Loading Monitoring	River/Creeks	Oct 1- April 30	1	Chemistry, Bacteria, Toxicity
Urban Stream Bioassessment	Creeks, Streams, Rivers	Spring and Fall	TBD	Chemistry, Biology
Coastal Storm Drain Monitoring	Coastal Storm Drains and Ocean	Year Round	TBD	Bacteria
Dry Weather Monitoring	Storm Drains	Summer	TBD	Chemistry, Bacteria
Bay, Lagoon, and Coastal Receiving Waters Monitoring	Bays and Lagoons	Summer	TBD	Chemistry, Bacteria

3.2.2 MASS LOADING STATION MONITORING

Copermittees scheduled monitoring for twelve regional mass loading stations (MLS) during the wet-weather season over three separate viable storm events. The monitoring program considers a viable storm event to be a minimum of 0.1 inches of rainfall. However, no viable storm event was recorded at the Otay River MLS and was therefore not sampled. In addition, Copermittees sampled the MLS on the Santa Margarita River, located on Camp Pendleton, during only one viable storm event due to security reasons.

The 12 regional MLS are located within the following streams (see Figure 2):

Santa Margarita River	Tecolote Creek
San Luis Rey River	San Diego River
Agua Hedionda Creek	Chollas Creek
Escondido Creek	Sweetwater River
San Dieguito Creek	Otay River
Peñasquitos Creek	Tijuana River

All sampling and analyses conducted for MLS was in accordance with applicable U.S. EPA regulations and Regional Board staff guidance. Copermittees collected one flow-weighted composite along with one grab sample at each station during each storm.

Copermittees analyzed the flow-weighted composite water samples for the following parameters:

1) *Inorganic chemicals* – Ammonia, Chemical Oxygen Demand (COD), total and dissolved phosphorus, nitrate, nitrite, total hardness, Total Kjedahl Nitrogen, Total Dissolved Solids, Total Suspended Solids, Turbidity, MBAS (detergents).
2) *Metals* (Total and Dissolved Metals) – Antimony, arsenic, cadmium, chromium, copper, lead, nickel, selenium, zinc.
3) *Organophosphate pesticides* – Diazinon, chlorpyrifos.
4) *Toxicity Testing* - At each station using *Ceriodaphnia dubia*, *Selenastrum capricornutum*, and *Hyalella azteca*.

The grab samples were analyzed for the following parameters: temperature; pH; specific conductance; biochemical oxygen demand (BOD); oil and grease; total coliform; fecal coliform; and *enterococcus.*

Additionally, storm water runoff samples collected at mass loading stations were also subject to toxicity tests. Copermittees perform toxicity testing to assess the potential impact of complex mixtures of unknown constituents on aquatic life according to U.S. EPA standards. Toxicity testing can provide information on potential short-term “acute” effects, as well as longer-term “chronic” effects.

MEC tested toxicity using flow weighted composite samples that characterize the runoff into the stream throughout the storm. Scientists placed laboratory test organisms in small containers of effluent sample. Scientists monitored these samples over time to compare the response of organisms placed in non-toxic control water to the organisms placed in the sample water. Acute, short-term effects, were tested using a freshwater amphipod (*Hyalella azteca*) and chronic, long term effects, were tested using both the freshwater cladoceran (*Ceriodaphnia dubia*) and algae *Selenastrum capricornutum.* These species represent aquatic life that is sensitive to constituent(s) of concern such as metals, pesticides, nutrients and organic compounds.

Persistent toxicity is defined as a recurring toxic response by the test organisms during each of the three storm events monitored. If persistent toxicity is detected, specialized toxicity identification evaluations (TIE) may be used to help characterize and identify constituent(s) causing toxicity.

3.2.3 RAPID STREAM BIOASSESSMENT MONITORING

Biological assessments evaluate the condition of water bodies using surveys and other direct measurements of resident biological organisms (such as macroinvertebrates, fish, and plants). Copermittees use biological assessment data to evaluate whether water bodies support survival and reproduction of desirable fish, shellfish, and other aquatic species (in other words, if the water bodies meet their designated aquatic-life beneficial uses).

Macroinvertebrate and fish communities are considered excellent indicators of water quality. The residents of a water body function as continual monitors of environmental quality. Biological, chemical and physical stresses imposed on an aquatic ecosystem manifest their impact on the biological organisms present in that ecosystem[19].

To date, MEC has sampled the rapid stream bioassessment sites in June and October of 2001 and May of 2002 as part of the Copermittee monitoring program. The assessment was undertaken using a protocol that samples and analyzes population of *benthic macroinvertebrates*[20]. 23 stream sites located throughout the County were assessed. Sampling and analysis of protocols followed the California Stream Bioassessment Procedure, as standardized procedure developed for California by the Department of Fish and Game. This approach yields an enumeration of a stream's benthic community and assesses the quality and condition of habitat. Over time, this information is useful to identify ecological trends.

Sampling of substrate samples for benthic infauna was conducted by MEC Analytical Systems (consultant team contracted by Copermittees) in June and October 2001 from each of 20 bioassessment monitoring stations and three reference stations (established in 2001) as shown in Figure 3-1 below. Reference sites serve to provide data representative of generally undisturbed habitat within the watershed.

Bioassessment data considered to date exclude the 2002 surveys. Analysis and findings from these data will be included in the 2002-2003 monitoring report. Field measures include pH, temperature, dissolved oxygen, conductivity, flow rate, percent gradient, sampling area physiography, and overall assessment of physical habitat (e.g., vegetative cover, bank stability) at each station.

[19] Fox and Ashber 2002.
[20] Bottom-dwelling (benthic) animals without backbones (invertebrate) that are visible with the naked eye (macro).

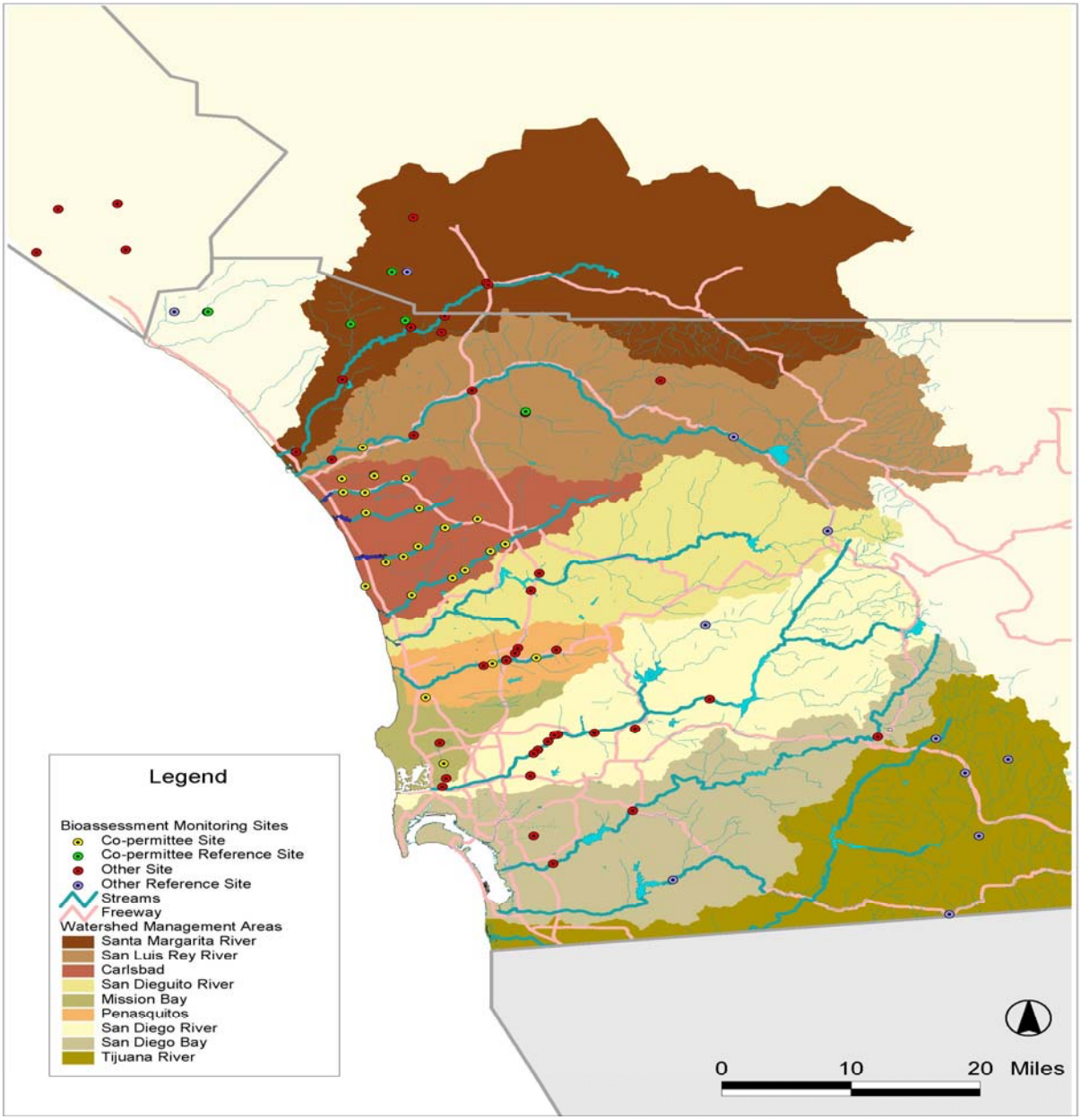

Figure 3-1. Bioassessment Monitoring Sites.

Sample data from all Rapid Stream Bioassessment Monitoring stations were analyzed to simultaneously evaluate all the populations of benthic invertebrates and develop a relative assessment of ecological health by comparing survey stations against pre-determined reference stations. MEC calculated a Benthic Macro Invertebrate (BMI) ranking score from varied metrics and then standardized to a zero point to allow for comparability among stations. A ranking score greater than zero indicates better stream health relative to the other streams sampled, whereas a score less than zero indicates deteriorated stream health. Streams are said to have an above average rating when the score is positive, that is, stream health is better than the average. Conversely, a rating below average is a relative indication of stream health degradation.

In order to provide a general characterization of benthic communities within each watershed, longer trend data sets than just the two surveys conducted by MEC in 2001are preferred. For this reason, Peñasquitos Watershed Copermittees reviewed historic information from prior California Department of Fish and Game (CDFG) surveys and summarized this information to prepare the benthic community assessment for each watershed. Surveyed considered included bioassessment monitoring results from CDFG surveys conducted between May 1998 and May 2001[21] and MEC surveys of June 2001 and October 2001, in order to assess overall health of benthic communities of watersheds in the San Diego region.

3.2.4 AMBIENT BAY AND LAGOON MONITORING PROGRAM

The Ambient Bay and Lagoon Monitoring Program (ABLM) has two main objectives. The first objective is to develop and implement environmental studies in order to assess the overall health of receiving bays and lagoons. The second objective is to monitor the impact of urban runoff on ambient water quality. The first step in fulfilling these objectives was to conduct a literature review to determine what information and data were available that could be used to design an appropriate Ambient Bay and Lagoon Monitoring Program. As such, activities during the 2001-2002 monitoring season in relation to the Ambient Bay and Lagoon Monitoring Program were limited to research and development of the program for subsequent monitoring seasons.

The Ambient Bay and Lagoon Monitoring Program consists of sediment chemistry, toxicity, and benthic assemblage characterizations of 12 bays and lagoons (13 outfalls) in San Diego County. This program may also contribute information to the Southern California Coastal Waters Research Project Bight 2003 coastal survey. The program has been designed to allow the prioritization of storm drains that empty into lagoons and bays for additional investigation in subsequent years.

The program is scheduled for implementation in the short term, during the life of the current Municipal Permit. Data specific to the Peñasquitos Lagoon will be collected as part of this program.

3.2.5 COASTAL STORM DRAIN MONITORING

The overall objective of the Coastal Storm Drain Monitoring Program is to assess the effects of storm drain runoff on coastal (beach) recreational contact (e.g., surfing and swimming) through prescriptive paired sampling. Paired sampling consists of collecting a water sample at select storm drain outlets and a second sample from the surf-zone 75-feet down current where runoff water and ocean waves meet and mix. Paired samples are collected twice monthly between April 1st and October 30th, and once monthly between Nov 1st and March 31st. MEC analyzed samples for three bacterial indicators: total coliform, fecal coliform, and enterococcus. If an exceedance of recreational use standards occurs, the coastal municipality contacts the County

[21] SDRWQCB 1999; SDRWQCB 2001; CDFG unpublished data.

Department of Environmental Health so that a sign can be posted on the beach notifying bathers that the ocean water near the mixing zone does not meet applicable standards (as required under State Assembly Bill 411).

3.2.6 DRY WEATHER MONITORING

The overall objectives of the dry weather monitoring program are to identify sources of pollution reaching the municipal storm drain systems and abate them through strategic monitoring, sampling, and data collection. In an effort to find pollution sources, the dry weather monitoring program focuses on collecting samples at actual storm drain outlets and internal underground structures rather than collecting samples at creeks, streams, or receiving waters where pollutants are generally diluted and more difficult to track.

Dry weather monitoring is conducted between May 1st and September 30th during non-rainy periods when storm water runoff is negligible and sources of water are likely of typical urban origin (i.e. washing, hosing, irrigation). Additional information and data collected from monitoring activities provide baseline runoff characteristics over extensive spatial and temporal scales.

Data monitored and sampled include:

1) General observations such as color, clarity, odor, floatables, discharge (flow), and atmospheric conditions;
2) Field screening for pH, electrical conductivity, nitrate, phosphate, ammonia, temperature, and turbidity; and,
3) Analytical laboratory analysis for metals (cadmium, copper, lead, and zinc), grease and oil, detergents (MBAS), and pesticides (diazinon and chlorpyrifos).

3.3 WATER QUALITY ASSESSMENT

The current countywide monitoring program includes an assessment of the effects of urban runoff on receiving waters (as measured by water chemistry data and toxicity tests) and the development of indicators of relative watershed health from an ecological perspective (rapid stream bioassessment).

While this initial watershed-based water quality assessment includes data collected as part of the countywide monitoring program, other monitoring programs conducted by individual jurisdictions (such as the dry weather or the coastal outfall monitoring programs) are yet to be considered. Participating jurisdictions intend to develop this watershed-based water quality assessment as the mechanism that will link all this information together in a weight of evidence approach.

There are limitations in the 2001-2002 water quality assessment. First, there is a limited wet weather monitoring data set in many of the watersheds because the 2001-2002 wet weather monitoring was the first of the countywide monitoring program that incorporated a mass loading station at 11 locations throughout the County (historical data from mass

loading stations are only available for the Mission Bay, San Diego, and Carlsbad watersheds). Secondly, the stream bioassessment data are also limited in time. Given limitations on this initial assessment, additional data gathered in the next and subsequent years may support or refute early findings. This year's water quality assessment provides a framework and a guideline for the assessment of water quality in future years as Peñasquitos Watershed Copermittees collect and integrate more data into the process.

Future year assessments, as time and resources permit, will include a review of data and information from several different sources, including (but not limited to) Copermittee programs, as well as data collected by other public agencies, research institutions, citizen programs or other available information that may be useful in assessing watershed-wide conditions.

3.3.1 WATER QUALITY ASSESSMENT STRATEGY

As part of the watershed-based water quality assessment, the following steps are generally taken in the data evaluation and analysis:

1) Identify constituents of concern which have been found to exceed administrative water quality standards/objectives as well as the frequency, magnitude and duration of such exceedances;
2) Isolate constituents of concern shown to exceed applicable water quality standards and/or objectives in a persistent and/or recurrent manner;
3) As data permits, evaluate whether there are any potential effects which could be a result of co-mingling and/or bioaccumulation effects of recorded constituents and pertinent data/analysis related to source identification investigations or related efforts;
4) Examine how any of the constituents of concern identified in step (2) above, may contribute to water quality degradation which would negatively impact designated beneficial uses; and,
5) The development of a longer historical record over multiple years of monitoring, allows Copermittees to assess constituent of concern data to see if there are any increasing or decreasing trends through time applying statistical analysis.

The triad of data (storm water chemistry, storm water toxicity and rapid stream bioassessment data) collected under the Core Monitoring program is also evaluated using the triad decision matrix. This triad of monitoring data is utilized in a 'weight of evidence' approach. Storm water chemistry and storm water toxicity data provide an indication of the pollutant loads during a storm event and potential aquatic impacts during storm events to organisms. The stream bioassessment provides information related to the ecological health of the watershed and an indication of stream health effects from urban runoff. Stream bioassessment data not only provide information about the benthic invertebrate community present in the watershed, but also information about the quality and condition of the physical habitat.

The intention of the triad decision matrix is to direct changes in the monitoring program using a consistent and scientific approach. Copermittees use the triad decision matrix as one step in the process of identifying additional monitoring needs, such as performing a Toxicity Identification and Elimination (TIE) study to identify the constituents causing toxicity.

Two constituents of concern not considered in the triad approach are fecal coliform and total dissolved solids (TDS). The bacteria parameters are not considered in the triad because they are not believed to influence toxicity responses in bioassay test organisms. Human health objectives for water contact recreation or non-water contact recreation are the water quality objectives for bacterial indicators. Total dissolved solids are not considered because, while this parameter may exceed water quality objectives in the Basin Plan, the objectives were set for municipal drinking water supply and not ecological impacts.

The Regional Board considers bacterial indicators and TDS constituents of concern and assesses these parameters by looking at all applicable factors (303(d) listings, beneficial uses, public health considerations, jurisdictional goals, economic impact, etc.). Bacterial indicators and TDS are then included as appropriate in the prioritized strategy. Bacterial indicators and TDS may not have the benefit of the added evidence of benthic community and toxicity, yet they may lead to watershed activities when considered with all other stressors and constituents of concern in the watershed and their potential impact on beneficial uses.

3.3.2 HISTORICAL DATA TREND ASSESSMENT

Where longer-term data are obtained from the monitoring program, data can be evaluated for trends over time. The assessment of a long-term data set can be accomplished through two statistical tools, regression and power analyses. Because analytical data sets are inherently variable, determining if concentrations of a potential constituent of concern are significantly decreasing or increasing in a watershed requires statistical analysis of the data.

Linear regression analysis can be performed after applying appropriate data transformations to the data. This regression analysis determines the slope of the trend line to assess either a decreasing or an increasing trend. Care must be taken to examine each data set for outliers or influential data points that unduly influence the results of the analysis.

In addition to determining whether there are significant trends for each of the potential constituents of concern, it is also important to know the power of the regression line, or in other words, the confidence one has in the regression results based on the slope of the regression and the number of data points (times) in the analysis. Typically, power estimates of 80% or greater (at an alpha level [error] of 0.05) are desired to be able to make strong statements about statistical results.

Future water quality assessments are expected to rely more on a historical record that allows for trends analysis using numerous data sources instead of individual seasonal data sets. In most watersheds, including the Peñasquitos watershed, data collected and considered to date represent a snap shot in time and limit the analysis that can be performed.

The statistical methods that may be used in future analysis may vary depending on the question or issue at hand. Scatter plots and trend analysis graphs of pertinent analytes can be used as a starting point when comparing levels in different watersheds. It is anticipated that in future years, as the historical record for each mass loading station is built, Copermittees will transition to using these and similar tools to assess water quality issues.

3.3.3 DATA SOURCES

Two comprehensive reports provided most of the water quality data and related information that was evaluated as part of this watershed assessment:

1) San Diego Regional Previous Storm Water Monitoring Review and Future Recommendations Report (MEC Draft August 20, 2001): This report contains a summary of significant findings from Copermittee monitoring programs implemented from 1993 to 2000. However, this report contains data and analysis pertinent to the historic monitoring sites (Chollas Creek, Tecolote Creek and Agua Hedionda Creek) and therefore only applies to the San Diego Bay Watershed, Mission Bay Watershed, and Carlsbad Watershed.

2) Urban Runoff Monitoring Report (MEC, October 2002): This report summarizes all data and findings associated with mass loading station and rapid stream bioassessment monitoring activities conducted during the 2001-2002 season. (This report applies to all watersheds.)

Additionally, the most current (Year 1998) and proposed (Year 2002) Clean Water Act Section 303(d) Lists of Water Quality Limited Segments and associated list of constituents of concern in the watershed were considered as data sources[22].

Peñasquitos Watershed Copermittees identified salient constituents of concern from the data sources listed above and evaluated these against water quality objectives and designated beneficial uses as identified under the San Diego Basin Plan (as described in Section 3.2.1).

3.3.4 STRATEGY FOR PRIORITIZING WATER QUALITY ISSUES

As noted earlier, until the program evolves, only limited data will be available. The data set considered to date may be too limited to draw strong conclusions about high priority water quality issues and associated actions. Developing an effective list of activities

[22] SDRWQCB, 2002.

that properly identifies and addresses significant water quality issues will require additional validation. Copermittees pursue validation through the yearly watershed-based water quality assessment and program evaluation process that are part of this plan.

Once the Copermittees identify constituents of concern, the high priority water quality issues are identified using a qualitative process that considers watershed-specific conditions using the weight of the evidence approach as well as best professional judgment to interpret the relationships between exceedances, regulatory mechanisms, and beneficial uses. Factors considered include:

1) Availability of sufficient qualified data (may include detection levels, number of sample(s), spatial and temporal characteristics);
2) Opportunity to protect and preserve healthy water bodies;
3) Need to integrate additional data;
4) Ability to determine conditions at the sub-watershed level;
5) Current related concerns and/or priorities expressed by local jurisdictions;
6) Stakeholder input;
7) Grant funding opportunities; and,
8) Human and ecological health considerations.

Copermittees address priority water quality issues by implementing actions that are designated as short and/or long-term activities. Short-term actions are completed within the life of the current Municipal Permit (years 2003-2005). Long-term actions extend beyond the life of the current permit (years 2006 and beyond). The high priority issues as well as other salient constituents of concern are tracked and reassessed through the yearly assessment and reporting process.

3.4 PEÑASQUITOS WATERSHED DATA REVIEW

3.4.1 OBSERVATIONS BASED ON THE BENTHIC BIOASSESSMENT

Analysis to date, which included data collected from 1997 through 2001 by California Department of Fish and Game in bioassessment monitoring sites within the Peñasquitos watershed yielded Benthic Macro Invertebrate (BMI) ranking scores that were from above average to moderately below average compared to reference stations in the region based on the conclusions in the 2001-2002 Monitoring Report. Overall bioassessment results for Los Peñasquitos Creek indicate that the benthic communities range from slightly to moderately impacted.

3.4.2 OBSERBATIONS BASED ON MASS LOADING MONITORING

As noted earlier, the mass loading station data set for the Los Peñasquitos Creek watershed is very limited in the number of events monitored (three storms), and represents an unusual storm year in which rainfall was significantly below average for the San Diego Region.

The mass loading station for the Los Peñasquitos Watershed is located in the Peñasquitos Creek in the City of San Diego, at the North end of Sorrento Valley Court, under the Sorrento Valley Court Bridge (See Figure 3-2). This creek has an earthen bottom, and rip-rap along the sides of the channel. The contributing runoff area consists of over 36,700 acres and comprises approximately 60 percent of Los Peñasquitos, as shown below in Figure 3-3. The two major land uses within the contributing runoff area are open space (59%) and residential (29%). The contributing runoff area is representative of the entire watershed, which is characterized by open space (52%) and residential (25%) land uses. Los Peñasquitos Creek flows into Los Peñasquitos Lagoon.

Figure 3-2. Los Peñasquitos Creek Mass Loading Station.

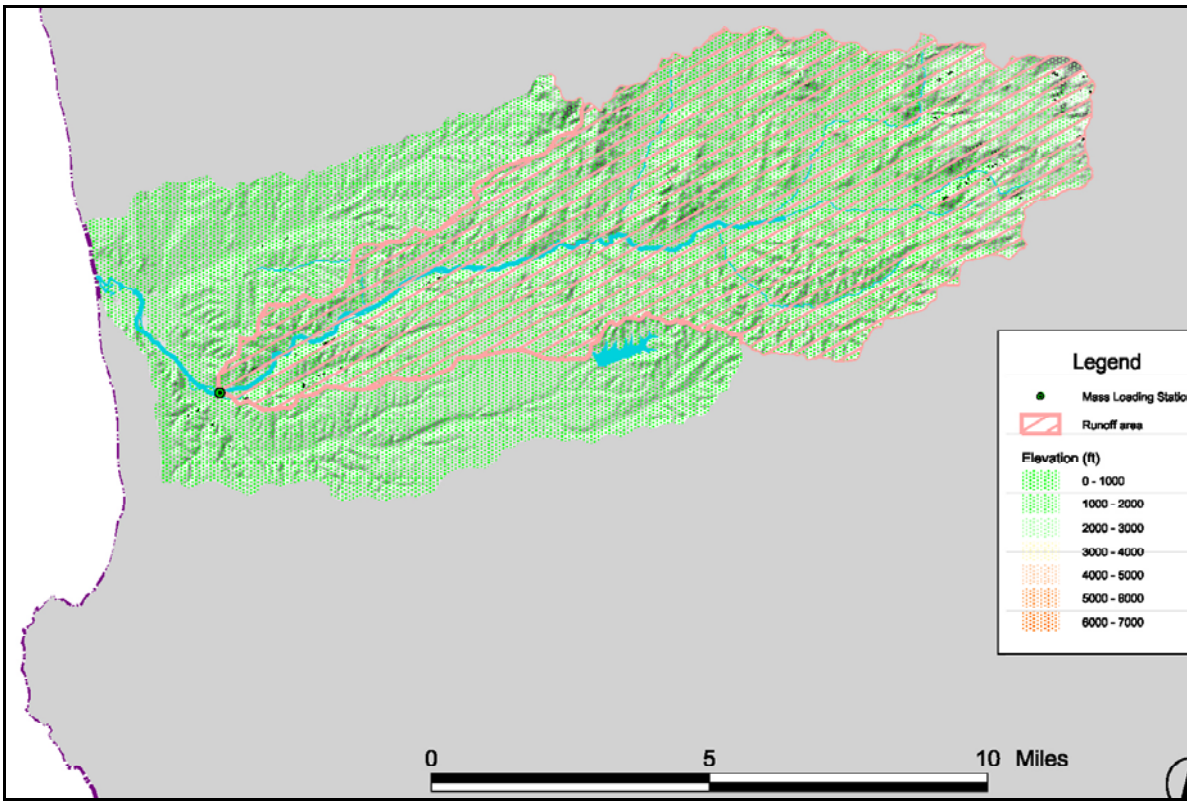

Figure 3-3. Peñasquitos Watershed Mass Loading Station And Associated Runoff Area.

While Copermittees have collected wet-weather data in the Peñasquitos watershed in prior years, the previous location of the mass loading station is not considered

representative of the watershed. As such, the data collected at the Los Peñasquitos Creek mass loading station during the 2001-2002 season is considered the first set of wet weather data representative of watershed conditions collected under the Core monitoring program conducted by the local jurisdictions.

This mass loading station was monitored on November 29, 2001, February 17 and March 17, 2002. Data was reviewed to identify constituents of concern and subsequently compared to water quality objectives in the San Diego Basin Plan or similar water quality standard (Table 3-2). Shaded cells denote parameter(s) that exhibit exceedance(s) of water quality objectives.

Table 3-2. Mass Loading Station Data Collected in the Peñasquitos Watershed.

ANALYTE	UNITS	REFERENCE STANDARD	SOURCE	LOS PEÑASQUITOS CREEK		
				11/29/01	02/17/02	03/17/02
General / Physical / Organic						
Electrical Conductivity	umhos/cm			2640	2700	1590
Oil And Grease[23]	mg/L	15	USEPA Multi-Sector General Permit	<1	1	<1
pH	pH Units	6.5-8.5	Basin Plan	7.7	7.8	7.5
Bacteriological						
Enterococci	MPN/100 mL	NA	NA	500	1,700	3,000
Fecal Coliform	MPN/100 mL	400	Basin Plan	130	**500**	300
Total Coliform	MPN/100 mL	NA	NA	1,700	3,000	500
Wet Chemistry						
Ammonia As N	mg/L	0.025 (a)	Basin Plan	0.2	<0.1	<0.1
Biochemical Oxygen Demand (BOD)	mg/L	30	USEPA Multi-Sector General Permit	3.1	5.6	21.3
Chemical Oxygen Demand (COD)	mg/L	120	USEPA Multi-Sector General Permit	<25	50	54
Dissolved Phosphorus	mg/L	2	USEPA Multi-Sector General Permit	0.9	<0.05	0.15
Nitrate As N[24]	mg/L	45	Basin Plan	0.2	0.3	0.3
Nitrite As N	mg/L	1	Basin Plan	<0.05	<0.05	<0.05
Surfactants (MBAS)	mg/L	0.5	Basin Plan	<0.5	<0.5	<0.5
Total Dissolved Solids	mg/L	500	Basin Plan by watershed	**1580**	**1590**	**1010**
Total Kjeldahl Nitrogen	mg/L			1.7	1	1.2
Total Phosphorus	mg/L	2	USEPA Multi-Sector General Permit	0.1	0.15	0.23
Total Suspended Solids	mg/L	100	USEPA Multi-Sector General Permit	<20	<20	<20

[23] The standards identified in the USEPA Multi-Sector General Permit are discharge-quality objectives rather than in-stream water quality standards. These reference values are included for comparison and do not necessarily constitute a violation.

[24] The underlying water quality objective in the Basin Plan is "Inland surface waters…shall not contain biostimulatory substances in concentrations that promote aquatic growth to the extent that such growths cause nuisance or adversely affect beneficial uses." The Basin Plan also states a goal of 0.1 mg/L for total phosphorous to support this objective. The reference value for nitrogen/nitrates in this table entry is derived from this phosphorous goal, using a ratio suggested by RWQCB staff. This reference value is not a Basin Plan water quality objective.

ANALYTE	UNITS	REFERENCE STANDARD	SOURCE	LOS PEÑASQUITOS CREEK		
				11/29/01	02/17/02	03/17/02
Turbidity	NTU	20	Basin Plan	3.8	3.33	5.05
Pesticides						
Chlorpyrifos	µg/L	0.02	CA Dept. of Fish & Game	<0.03	<0.03	<0.03
Diazinon	µg/L	0.08	CA Dept. of Fish & Game	**0.12**	0.06	**0.13**
Hardness						
Total Hardness	mg $CaCO_3$/L	NA	NA	808	815	551
Total Metals						
Antimony	mg/L	0.006	Basin Plan	<0.002	<0.002	<0.002
Arsenic	mg/L	0.34/0.05	40 CFR 131/ Basin Plan	0.002	0.002	0.003
Cadmium	mg/L	0.0046	40 CFR 131	<0.001	<0.001	<0.001
Chromium	mg/L	0.016	CTR (Cr VI)	<0.005	<0.005	<0.005
Copper	mg/L	0.0135	40 CFR 131	<0.005	<0.005	0.008
Lead	mg/L	0.082	40 CFR 131	<0.002	<0.002	0.003
Nickel	mg/L	0.47/0.1	40 CFR 131/ Basin Plan	<0.002	<0.002	<0.002
Selenium	mg/L	0.02	40 CFR 131	<0.002	<0.002	<0.002
Zinc	mg/L	0.122	40 CFR 131	<0.02	<0.02	0.02
Dissolved Metals						
Antimony	mg/L	(e)	40 CFR 131	<0.002	<0.002	<0.002
Arsenic	mg/L	0.34 (c)	40 CFR 131	0.002	<0.001	0.003
Cadmium	mg/L	(b)	40 CFR 131	<0.001	<0.001	<0.001
Chromium	mg/L	(b)	40 CFR 131	<0.005	<0.005	<0.005
Copper	mg/L	(b)	40 CFR 131	<0.005	<0.005	<0.005
Lead	mg/L	(b)	40 CFR 131	<0.002	<0.002	<0.002
Nickel	mg/L	(b)	40 CFR 131	<0.002	0.003	<0.002
Selenium	mg/L	0.2 (d)	40 CFR 131	<0.002	<0.002	<0.002
Zinc	mg/L	(b)	40 CFR 131	<0.02	<0.02	<0.02
Toxicity						
Ceriodaphnia 96-hr	LC_{50} (%)	100		>100	>100	>100
Ceriodaphnia 7-day survival/reproduction	NOEC (%)	100		100/100	100/100	100/100
Hyalella 96-hr	NOEC (%)	100		100	100	100
Selenastrum 96-hr	NOEC (%)	100		100	100	100

NOTES

(a) Water Quality Objective is for unionized ammonia; insufficient information is available to calculate unionized ammonia.

(b) Standards applied to dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000.

(c) Standard applied to dissolved metal fractions are based on water effects ratios (WER) and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000.

(d) Standard is based on the total recoverable form as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000.

(e) USEPA has not published an aquatic life criterion value

[a] Exceeds the acute aquatic life criterion.

[b] Exceeds the chronic aquatic life criterion.

N/A: Not applicable. No water quality objective is applicable for this parameter in the watershed.

Sources:
USEPA National Pollutant Discharge Elimination System (NPDES) Storm Water Multi-Sector General Permit for Industrial Activities, 65 Federal Register (FR) 64746, Final Reissuance, October 30, 2000.

California Department of Fish and Game. Office of Spill Prevention and Emergency Response, Hazard Assessment and Water

ANALYTE	UNITS	REFERENCE STANDARD	SOURCE	LOS PEÑASQUITOS CREEK		
				11/29/01	02/17/02	03/17/02
Quality Criteria documents for pesticides (various dates).						
San Diego Regional Water Quality Control Board Basin Plan Water Quality Objectives.						
USEPA National Pollutant Discharge Elimination System (NPDES) Storm Water Multi-Sector General Permit for Industrial Activities, 65 Federal Register (FR) 64746, Final Reissuance, October 30, 2000.						
USEPA Federal Register Document 40 CFR Part 131, May 18, 2000.						

This initial data set shows levels of Diazinon in two out of the three storm events above the California Department of Fish and Game level of 0.08µg/L on November 29, 2001 and March 17, 2002 with 0.12 and 0.13µg/L, respectively.

Bacteriological constituents of concern were not consistently above the Basin Plan water quality objective of 400 MPN/100ml with only one exceedance for Fecal Coliform at 500 MPN/100ml detected on February 17, 2002. Overall, the levels of Total Coliform and *Enterococci* bacteria were notably low.

The Basin Plan Objective of 500 mg/L for Total Dissolved Solids was exceeded during all three 2001-2002 storm events monitored. The Peñasquitos Watershed is one of five watersheds with TDS levels above the Basin Plan Water quality objective. The other watersheds are: San Luis Rey, Carlsbad, San Dieguito and Sweetwater. The TDS objective is set for protection of the Beneficial Use of municipal and domestic water supply and not ecological impacts.

In contrast to other San Diego county watersheds, noteworthy findings in 2001-2002 wet-weather monitoring season for Los Peñasquitos Creek, include low concentrations of total suspended solids, ammonia, oil and grease and metals. To a lesser extent, because of one minor exceedance of fecal coliform, the levels of bacteriological indicators are amongst the lowest in the region.

In contrast to other watersheds in the region, Los Peñasquitos Creek storm water runoff in 2001-2002 did not register toxicity to any of the three test species. Data collected to date indicate that the Los Peñasquitos Creek storm water runoff has amongst the highest survival rates for the three species.

3.4.2.1 TRIAD DECISION MATRIX

The bioassessment data, chemical analysis and toxicity testing are combined in the triad decision matrix. That is, Copermittees evaluate these data to determine whether the evidence suggests the need for additional monitoring efforts, such as development and implementation of a Toxicity Identification and Elimination (TIE) study to identify the constituents causing toxicity.

As shown below, the triad decision matrix for the Peñasquitos watershed indicates that a TIE would not provide useful information at this time.

Table 3-3. Decision Matrix for the Peñasquitos Watershed, Year 2002.

Chemistry Data	*Toxicity Testing*	*Benthic Community*	*Comments*
Mass loading station data indicate no persistent exceedances of water quality objectives for constituents of concern considered under triad approach.	Mass loading station data do not show evidence of persistent toxicity (defined as 3 out of 3 events monitored).	Indication of slight to moderate impacts.	1) TIE would not provide useful information if there is no evidence of persistent toxicity 2) Continue monitoring and periodic review of related findings

3.4.3 CLEAN WATER ACT 303(D) LIST

The 1998 303(d) list identifies the Los Peñasquitos Lagoon as water quality limited due to siltation and sedimentation. In 2002, the Regional Board proposes to increase the areal extent of this impact from the 385 acres delineated in 1998 to 487 acres. Details of the existing (1998) and proposed (2002) 303(d) listings are shown in Tables 3-4 and 3-5, below.

Table 3-4. 1998 303(d) List of Impaired Water Bodies in the Peñasquitos Watershed[25].

WATER BODY NAME	HYDROLOGIC SUB AREA (HSA)	HSA #	POLLUTANT/STRESSOR	ESTIMATED AREA/SIZE OR LOCATION	YEAR LISTED
Los Peñasquitos Lagoon	Miramar Reservoir	906.10	Sedimentation/Siltation	385 acres	1998

Table 3-5. 2002 303(d) Proposed List of Impaired Water Bodies in the Peñasquitos Watershed[26].

WATER BODY NAME	HYDROLOGIC SUB AREA (HSA)	HSA #	POLLUTANT/STRESSOR	ESTIMATED AREA/SIZE OR LOCATION	YEAR PROPOSED
Los Peñasquitos Lagoon	Miramar Reservoir	906.10	Sedimentation/Siltation	487 acres	2002

[25] SDRWQCB, 2002.
[26] Ibid.

Lastly, this watershed is on the "watch" list for potential constituents of concern that may further define areas in which to focus future efforts as data from monitoring efforts becomes available. The "watch" list of constituents of concern is provided to assist Copermittees in long range planning efforts.

Table 3-6. Watch List by Hydrologic Sub-Area.

WATER BODY NAME	HYDROLOGIC SUB AREA (HSA)	HSA #	POLLUTANT/STRESSOR
Miramar Reservoir	Miramar	906.10	Bromodichloromethane, chloroform, chlorodibromomethane, total dissolved solids

Based on information reviewed from the approved 1998 and proposed 2002 303(d) listings, sedimentation and siltation are identified as the issues to consider.

3.4.4 BENEFICIAL USES

As stated earlier, beneficial use designations describe existing or potential beneficial uses of water bodies. Beneficial uses take into consideration the use and value of water for many purposes, including recreation in and on the water, protection and propagation of aquatic life and public water supplies. It is essential to review the beneficial uses identified within the watershed as part of the water quality assessment effort.

The beneficial uses designated for the entire watershed are summarized in Table 3-7. It should be noted that beneficial uses may be defined more specifically for each water body segment or sub-watershed in the San Diego Basin Plan. The beneficial uses for the watershed can be affected when water quality is limited or altered by a variety of factors.

Table 3-7. Summary of Beneficial Uses within the Peñasquitos Watershed[27].

BENEFICIAL USES	INLAND SURFACE WATERS	COASTAL WATERS	RESERVOIRS AND LAKES	GROUND WATERS
Municipal and Domestic Supply			●	●
Agricultural Supply	●			●
Industrial Service Supply	●		●	●
Industrial Process Supply				
Hydropower Generation			●	
Navigation				
Contact Water Recreation	●	●	●	
Non-Contact Water Recreation	●	●	●	

[27] SDRWCB, 1994.

BENEFICIAL USES	INLAND SURFACE WATERS	COASTAL WATERS	RESERVOIRS AND LAKES	GROUND WATERS
Commercial and Sport Fishing				
Warm Freshwater Habitat	●		●	
Cold Freshwater Habitat	●			
Biological Habitats of Special Significance		●		
Estuarine Habitat		●		
Wildlife Habitat	●	●	●	
Rare, Threatened, or Endangered Species	●	●		
Marine Habitat		●		
Migration of Aquatic Organisms		●		
Shellfish Harvesting		●		

The beneficial uses in this watershed that have the strongest link to potential constituents of concern identified in this assessment are associated with recreational activities, and provision of wildlife habitat.

3.4.5 DATA ANALYSIS SUMMARY

In this section, constituents of concern are framed in terms of their potential impact on beneficial uses. These constituents are then evaluated to determine actions to be implemented in an effort to improve or sustain water quality and beneficial uses.

Beneficial uses provide the context under which water quality issues are assessed. Under this framework, a single constituent of concern may lead to the identification of a water quality issue (limited recreation opportunities due to bacterial levels which exceed health standards); one or more constituents of concern may be associated with the same beneficial use or various beneficial uses. The assessment provided here is related to a beneficial use for which attainment of sustainable water quality is the ultimate goal.

Overall bioassessment results for Los Peñasquitos Creek indicate that the benthic communities are slightly to moderately impacted based on data reviewed which cover a 3-year span.

The mass loading station data for 2001-2002 represented by three storm events identifies total dissolved solids as a potential constituent of concern with three exceedances of water quality objectives. Total dissolved solids can affect drinking water supplies, but pose no threat to natural habitat, fish or wildlife. There are no drinking water reservoirs in the Peñasquitos watershed that capture water from runoff (Miramar Reservoir receives all of it's water supply from water transfers) for drinking water. Therefore, the presence of total dissolved solids would not pose a threat to any beneficial uses within the watershed, and is not considered a high priority constituent of concern. Peñasquitos Watershed Copermittees found diazinon levels above the water quality standards during two storm events. Due to this fact, Peñasquitos Watershed

Copermittees consider diazinon a potential constituent of concern. Fecal coliform was slightly above the Basin Plan standard during one storm event and is not considered a significant constituent of concern based on data considered to date.

The Clean Water Act 303(d) listings yield sedimentation and siltation as potential constituents of concern. However, the analytical data available at the mass loading station showed very low levels of suspended solids in all three storm events yielding less than 20 mg/L (the detection limit for the test). Similarly, turbidity levels were found to be low at the MLS with readings between 3.3 and 5.0 NTUs. Looking at this limited number of data points, it appears that storm water runoff upstream of the mass loading station did not significantly contribute to sedimentation and siltation in the lagoon during the 2001-2002 wet weather season. However, rainfall totals for the 2002 wet weather season were lower than normal and may at least partially account for lower measurements of suspended solids. This issue can be verified in upcoming years as more data is collected and integrated into the analysis. In addition, data collected from dry weather program monitoring and other programs may assist in determining source(s) or cause(s) of sedimentation and siltation, as measured by total suspended solids and turbidity, or other appropriate methods. For this year's assessment, total suspended solids, or sedimentation and siltation, are listed as a high priority issue, which may be amended as future year's data yields more information.

The evaluation of identified constituents of concern in the watershed based on the data analyzed to date is presented in Table 3-8. Management actions are described in detail in the next section.

Table 3-8. Summary of Evaluation of Stressors and/or Constituents of Concern – Year 1 (2002)

POTENTIAL WATER QUALITY ISSUE(S)	CONSTITUENTS OR CONDITIONS OF CONCERN	HIGH PRIORITY?	COMMENTS AND PROPOSED MANAGEMENT ACTIONS
Limiting habitat value of marine and estuarine habitat	Sedimentation Siltation	Yes	Total suspended solids and turbidity were found at very low levels in the mass loading station (MLS) in 2001-2002. However, rainfall totals were very low during the 2002 rainy season, which may have contributed to the low measurements of total suspended solids. In addition, Los Peñasquitos Lagoon is listed for sedimentation and siltation in the 1998 303(d) list. This listing is proposed to be expanded in areal extent in 2002. No correlation was found between the 303(d) listing and the MLS levels for total suspended solids and turbidity. Comprehensive evaluation of data and other existing information may address need to develop understanding of sedimentation sources and appropriate remedial actions (including integration of this effort with others intended to protect and enhance the Lagoon such as those of the Los Peñasquitos Lagoon Foundation). *Activities:* *SUSMP Implementation (Section 4.2.1);* *Implementation of the Erosion Control Measures for North City Areas Draining Into Los Peñasquitos or San Dieguito Lagoons (City of San Diego Clerk Document No. 00-17068) (Section 4.2.5);* *Ambient Bay and Lagoon Monitoring Program (Section 4.2.2);* *Data Collection and Analysis (Section 4.2.3);* *Watershed Management Plan (Section 4.2.4).*
Potential Impact on Municipal and Domestic Water Supply.	Total Dissolved Solids	No	Municipal and domestic water supplies can be compromised by a variety of factors that include urban runoff, imported water sources, naturally occurring salinity and minerals. However, there are no drinking water reservoirs in the Peñasquitos watershed that receive urban runoff. Therefore, the total dissolved solids in the watershed would not significantly impact drinking water supplies. To address the issue regionally, the City of San Diego's Water Department is integrating efforts with other partners in order to develop a better understanding of the constituents of concern to water supply issues. *Activities:* *Data Collection and Analysis (Section 4.2.3);* *Source Water Protection Guidelines Project (Section 4.2.7);* *Watershed Management Plan (Section 4.2.4).*
Limitation to habitat value of water bodies	Diazinon	No	Diazinon levels were exceeded on two occasions in the first season of testing at the mass loading station. Based on the data collected in other watersheds, Copermittees have considered addressing the use of pesticides in the region as an important component of proactive storm water runoff management activities. *Activity: Integrated Pest Management Campaign (Section 4.2.6)*

POTENTIAL WATER QUALITY ISSUE(S)	CONSTITUENTS OR CONDITIONS OF CONCERN	HIGH PRIORITY?	COMMENTS AND PROPOSED MANAGEMENT ACTIONS
Limitation to habitat value of water bodies	Benthic Community Degradation	No	Benthic communities are an indication of ecological trends and aid the evaluation of the appropriateness of watershed programs. The current assessment indicates moderately to substantially impacted conditions to be used as a baseline from which trends can be developed and the impact of watershed programs assessed. *Activities: Data Collection and Analysis (Section 4.2.3); Watershed Management Plan (Section 4.2.4).*

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4 ACTIONS PLANNED IN RESPONSE TO ASSESSMENT

4.1 ACTIONS SELECTION PROCESS

Based on the yearly watershed assessment, participating jurisdictions will work together to address the issues that they have identified through this process.

As the water quality assessment is refined, water quality issues may be identified at several levels: the jurisdictional (municipal, county or other governmental entity), cross-jurisdictional (watershed-wide), or regional levels (cross-watersheds). In most cases, a water quality problem that is determined to be specific to a jurisdiction would be referred to the source agency and addressed through their existing program or Jurisdictional Urban Runoff Management Plan (Jurisdictional URMP). In other cases, the source(s) may be found to originate from two or more jurisdictions, in which case the problem would be addressed as part of the watershed based program. Lastly, the issue may be found at regional levels (impacting more than one watershed) and would be referred to the appropriate regional technical committee (Monitoring, Outreach, Budget, etc.) for their assessment and recommendations.

Peñasquitos Watershed Copermittees will submit updates to this program as part of the annual report and will include the annual evaluation of water quality issues at the watershed level as well as pertinent revisions to the action plan.

Many of the activities addressing water quality problems across the watershed may be similar and applicable across jurisdictions. The watershed partners will likely work within their current programs (Jurisdictional URMPs) rather than creating a new program. The watershed-based program can focus efforts and bring consistency to jurisdiction specific approaches. Copermittees anticipate that program actions will be developed and implemented at the jurisdictional, cross-jurisdictional, and regional levels. Participating agencies and partners will seek to maximize opportunities for regional cooperation and ensure that limited resources are allocated in the most cost effective manner. As time and resources permit, grant funding will be pursued wherever possible.

The general steps used to identify and implement activities to address water quality issues vary significantly but may include the following as time and resources permit:

- Determining the extent of each water quality problem (spatial, temporal and magnitude) and identify unknowns.
- Determining the need for additional data or studies when data or information gaps are identified.
- Identifying existing activities in the watershed related to water quality issue and assessing extent and efficacy of current efforts

- Identifying potential mechanisms to reduce pollutant load and its concentration (structural and non-structural Best Management Practices including education and outreach).
- Assessing, as appropriate, the efficacy, economical impact, benefit to cost ratios, and technical feasibility of potential corrective actions.
- Identifying funding sources for actions under consideration.

The process of planning actual implementation and scheduling of corrective actions will be iterative, cooperative and likely to change over the course of time as the program develops.

The list of pertinent actions and implementation schedules will be updated and refined through the annual program reporting process. Short and long-term activities may be designated for consideration in future years and labeled as tentative projects. To facilitate implementation, short-term activities may in some cases be scheduled within a year or two, but staggered to allow for ease of project and workload management.

As the program develops, participants will use and refine the approach described above to proceed with planning and implementation efforts.

4.2 PLANNED ACTIONS

The water quality assessment of the first year of this program, as described in the previous chapter, leads to four actions as described below. The responsible parties are identified in italics below.

4.2.1 SUSMP IMPLEMENTATION

All Jurisdictions

The Cities of San Diego, Del Mar, Poway as well as the County of San Diego have recently adopted stringent water quality development requirements which apply to most future development projects both during the construction and operation (”use”) phases. The main objective of the new regulations is to reduce (to the maximum extent practicable), the negative impacts to receiving waters (e.g. our beaches and bays and lagoons) associated with pollutants in runoff from new development and redevelopment.

Local jurisdictions based the recently adopted new standards on the *model* SUSMP developed at the regional level in cooperation with all local jurisdictions (including the Port of San Diego and the County of San Diego), in conformance with the requirements of the Municipal Permit. The San Diego Regional Water Quality Control Board adopted the model SUSMP in June 12th of this year.

The new regulations must be incorporated in most development proposals by December 10th of this year. Peñasquitos Watershed Copermittees anticipate that the

new requirements will assist in ameliorating the siltation and sedimentation associated with development activities within the Peñasquitos Lagoon basin.

4.2.2 AMBIENT BAY AND LAGOON MONITORING PROGRAM

All Jurisdictions

As already noted, the Ambient Bay and Lagoon Monitoring Program has two main objectives: (1) to develop and implement environmental studies in order to assess the overall health of receiving bays and lagoons; and, (2) to monitor the impact of urban runoff on ambient water quality. While activities to date in relation to this program have been limited to research and development of the program for subsequent monitoring seasons, program is scheduled for implementation in the short term, during the life of the current Municipal Permit.

The Ambient Bay and Lagoon Monitoring Program consists of sediment chemistry, toxicity, and benthic assemblage characterizations of 12 bays and lagoons (including the Los Peñasquitos Lagoon) in San Diego County.

Peñasquitos Watershed Copermittees anticipate that the implementation of this monitoring program will allow participating jurisdictions to develop a better understanding of sedimentation issues in Los Peñasquitos Lagoon as well as their effect on benthic communities.

4.2.3 DATA COLLECTION AND ANALYSIS

All Jurisdictions

Comprehensive evaluation of data and other existing information may address need to develop a better understanding of sedimentation sources and appropriate remedial actions (including integration of this effort with other existing efforts to protect and enhance Lagoon such as those of the Los Peñasquitos Lagoon Foundation). Further, as described earlier, Copermittees need to incorporate additional data into the yearly watershed based assessment.

As additional data from a variety of jurisdictional programs and other monitoring efforts becomes available, it will be imperative to review the results and conclusions from these efforts to provide the most complete assessment possible of water quality related issues at the watershed level. The data generated from varied sources will be easier to manage if collected using pre-established protocols developed for the region at large. While this data collection standardization task may be fulfilled by existing efforts in the region, it will still require coordination at the watershed level. Data may be centralized for ease of management and analysis in the future.

Complementary programs generating significant amounts of data and information that may be used in the future (as time and resources permit) to achieve a more complete

evaluation of watershed water quality in order to track or augment future review and assessment of water quality include:

- Copermittee dry weather monitoring reports;
- Lagoon and coastal outfall monitoring data;
- Special Copermittee studies or monitoring information;
- Water quality related data collected by other agencies;
- Citizen monitoring programs; and,
- Research conducted by educational institutions.

A long-term benefit of centralized data collection and management is the identification of potential temporal and spatial data gaps for the watershed.

The County of San Diego has proposed to act as a countywide data repository for monitoring information. The Project Clean Water Monitoring Workgroup is working to establish a uniform reporting criteria for dry weather data so that information may be delivered to the County in a consistent format for data management and, ultimately, data assessment. This database can be combined with the wet weather monitoring data that is managed electronically by the monitoring consultant. Data stored in a common system would allow data to be extracted on a watershed basis for a variety of purposes. Common data storage would allow for flexibility in data evaluation and manipulation for statistical tests, including trend and relationship analyses.

It is anticipated that a regional data management system (with the ability to respond to queries at the watershed level) will be developed over the long term. Over the short term, participating jurisdictions are committed to working on identifying data management needs, developing a plan of implementation and seeking funding for this action. Copermittees may coordinate these actions through the Project Clean Water Monitoring and Data Management Workgroups.

4.2.4 PEÑASQUITOS WATERSHED MANAGEMENT PLAN

City of San Diego

The City of San Diego has been awarded grant funding under Proposition 13 to develop a Watershed Management Plan for the Los Peñasquitos Watershed. This plan will provide a comprehensive analysis of existing conditions within the watershed including those related to habitat protection, water resources, land uses, and demographic characteristics, as well as identify data gaps and prioritize opportunities for the protection and enhancement of resources at the watershed scale.

Other local jurisdictions within the watershed (City of Del Mar, County of San Diego and City of Poway) are active participants in the development and subsequent implementation of the plan. Where appropriate, this watershed-based urban runoff management program will integrate its efforts within the larger context that will be

considered as part of the development and subsequent implementation of the comprehensive watershed management plan.

4.2.5 EROSION CONTROL MEASURES

City of San Diego

The City of San Diego requires erosion control measures to be implemented for land development at all properties within the Coastal Zone which drain into Los Peñasquitos or San Dieguito Lagoons. This requirement is part of the Local Coastal Program pursuant to the Coastal Act of 1976. Erosion control measures required under this City Ordinance include a grading plan that incorporates runoff controls, including the installation of sediment basins, to minimize sediment transport into the lagoon areas. This requirement addresses the sedimentation and siltation water quality problem potentially caused by excessive solids (total and/or suspended) discharged to the receiving waters. This activity will result in benefits to water quality through reduction of sedimentation and siltation in the lagoon areas. Reduction of sedimentation relates directly to habitat quality for the benthic community, in addition to reducing the potential pollutant load of constituents of concern that tend to associate with fine sediment particles (such as metals, bacteria, and organics).

4.2.6 REGIONAL INTEGRATED PEST CONTROL MANAGEMENT CAMPAIGN

All Jurisdictions

The San Diego Regional Water Quality Control Board has identified education as the single most effective best management practice (BMP) to address water quality degradation related to pesticide use[28]. While organophosphate pesticides regularly exceed water quality objectives in several watersheds throughout the region, education efforts in relation to pesticide use will focus on promoting responsible practices in irrigation and use of pesticides as well as providing information about alternative pest-control techniques.

A Pest Management Guide (such as the one produced by the City of Modesto Storm Water Program in cooperation with the University of California Statewide Integrated Pest Management Project) will be produced for use within San Diego County at the regional level at many diverse outreach events. Additionally, other targeted outreach opportunities such as Point of Purchase campaigns will be explored and integrated with existing and planned efforts as appropriate. The guide along with other general educational materials will be widely distributed to residents and businesses within the region regardless of jurisdictional boundaries. As part of the campaign, outreach efforts will be implemented through a series of public workshops and/or visits and presentations to existing stakeholders' meetings.

[28] SDRWQCB 2002b.

Copermittees anticipate that the Pest Management Guide will be produced within the short term as a regional effort. Distribution and outreach is expected to occur over the long run and beyond the life of the current Municipal Permit. The County of San Diego will lead and coordinate development and implementation of the regional campaign in cooperation with interested stakeholders.

4.2.7 SOURCE WATER PROTECTION GUIDELINES PROJECT

City of San Diego

The City of San Diego has nine raw drinking water reservoirs. These reservoirs capture local rainwater and runoff to supply up to 20 percent of the City's water. The reservoirs also store imported water that is piped into the region through aqueducts. The reservoirs are critical components of the regional water supply system. However, the quality of water stored in these reservoirs is at risk because of pollutant loads associated with urbanization within the reservoirs' basins. Recent studies have identified runoff from urban land uses, construction projects, and related development activities in the watersheds as the largest sources of pollution to the reservoirs.

Currently, the City of San Diego Water Department evaluates and comments on developments proposed within the sub-watersheds that also house reservoirs on a case-by-case basis without the benefit of an overall strategy or guidance. The purpose of the Guidelines is to ensure that development within affected basins occurs in ways that protect the local source waters. City staff and possibly other local agencies will use the Guidelines as part of the development review, comment, and consideration process. Land developers may use the Guidelines in conceiving and designing projects located within basins that have the potential to affect water reservoirs. The County of San Diego is an active partner in this project, currently represented in the Technical Advisory Committee formed to guide this project.

The Guidelines will build upon existing land use, zoning, and building code regulations. The primary goal of the Guidelines is to identify water quality control measures that would specifically address potential sources of pollution associated with urban runoff within the basins of local raw drinking water reservoirs. The Guidelines will also include recommendations for the long-term maintenance of the control measures and effective monitoring techniques. Project implementation includes outreach and education components.

In order to develop a better understanding of pollutants of concern (associated with runoff) to local reservoirs, the project team will rely primarily on the experience of the San Diego Water Department staff, including water treatment plant operators, existing studies and reports on the reservoirs and associated sub-watersheds (e.g., Watershed Sanitary Surveys and 2001 Update), as well as other related water quality data. Other information to be considered include findings from a land use sensitivity model, scientific research and literature reviews, recreational use of the reservoirs, existing and planned future land use activities, as well as physical characteristics of the basins (e.g., topography, vegetation and soils).

Protecting existing local water sources is a critical, though often overlooked, component of planning for regional water supply reliability. Planning for drinking water protection by creating the Source Water Protection Guidelines will provide a road map for sensible development, will increase the reliability of the water supply system, and will likely reduce the cost of drinking water treatment.

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5 LAND USE PLANNING

The second objective of the Peñasquitos Watershed Urban Runoff Management Program, as noted in the introduction section, is to "integrate watershed principles into land use planning." Program components, as described in this chapter, have been developed in response to this objective.

5.1 PLANNING CONTEXT

The California Government Code gives local governments the authority and the responsibility to exercise local land use planning and associated regulatory functions. Because they ultimately control the types and intensities of particular activities that may be allowed within specified geographic areas, land use decisions play a critical role in addressing *point and nonpoint sources* of pollution.

Cities and counties have traditionally exercised their land use authority independently, with limited consideration of the chemical, biological, and physical processes that govern the generation, transport, and fate of contaminants and stressors at the watershed scale. Land use policies of individual municipalities have the potential to affect water quality in water bodies well beyond their jurisdictional boundaries.

State law requires that each jurisdiction adopt a comprehensive, long-term General Plan to guide its physical development. The General Plan is the official document that outlines the long-term plans and policies regarding the location of housing, business, industry, roads, parks, and other land uses. Additionally, the General Plan addresses broad issues such as provision of infrastructure and conservation of natural resources. The legislative body of each city (the city council) and each county (board of supervisors) adopts zoning, subdivision and other ordinances to regulate land uses and to carry out the policies of its General Plan. The General Plan can be described as the blueprint for future development. It represents the community's view of its future; a constitution made up of goals and policies upon which local decision makers (hearing officers, planning commissions, city councils and county board of supervisors) base their land use decisions.

California planning law establishes the minimum contents and scope of local general plans. State law requires planning agencies to "prepare, periodically review, and revise, as necessary, the general plan." Keeping the general plan current is important for good planning. State law gives counties and cities wide latitude in how they put a General Plan together, but there are fundamental requirements that must be met. These requirements include seven mandatory elements as described below:

Land Use Element: The land use element dedicates lands to particular purposes. It outlines how the jurisdiction will designate and separate various uses such as commercial, industrial, and residential. Natural resource, agriculture, timber production,

and flood plain areas must also be delineated. A major intent of this element is to design areas for development that are compatible with one another.

Housing Element: This element required local governments to adequately plan to meet the existing and projected housing needs of all economic segments of the community.

Circulation: This element identifies the general location of existing and planned transportation routes and public utilities. It is actually an infrastructure plan that concerns itself with the circulation of people, goods, energy, water, sewage, storm drainage, and communications. Its provisions support the goals, objectives, policies and proposals of the land use element.

Conservation: This element describes how the jurisdiction intends to protect and conserve its natural resources. The element covers water resources, soils, forest, wildlife, and fisheries.

Open Space: This element designates areas for preservation and managed production of natural resources, outdoor recreation, and public health and safety. The Open Space element is related to the conservation element in some ways, and designated lands in either element could be actually or nearly the same. The important difference between the two elements is the very specific inclusion of the consideration of public health and safety concerns in open space zoning.

Safety Element: The safety element defines community protection measures in relation to fires, seismic hazards, and geological hazards. It must include provisions for evacuation routes, water supply, minimum road widths, and clearances around structures.

Noise Element: This element is designed to address overall levels of noise in the community by identifying the sources of noise, assessing its effects and establishing policies, criteria and standards to reduce excessive noise to acceptable limits.

5.2 CURRENT PLANNING EFFORTS

Cities and counties "plan" in order to identify important community issues, project future demand for services, anticipate potential problems, and establish goals and policies for directing and managing growth. Individual jurisdictions use a variety of tools in the planning process including the general plan and a number of different ordinances (e.g. zoning, subdivision, grading etc.) and departmental policies.

It should be noted that the County and City of San Diego are currently updating their General Plans through a highly participatory process in collaboration with many local and state agencies. The City and County are incorporating watershed protection principles in these efforts and intend to continue to pursue creative partnerships for the benefit of the region. The following provides a brief description of these local projects.

5.2.1 CITY OF SAN DIEGO

The City of San Diego's Progress Guide and General Plan, which was adopted on February 26, 1979, contains 13 elements, addressing the following issues: housing, transportation, commercial, industrial, public facilities, services, and safety, open space, recreation, redevelopment, conservation, energy conservation, cultural resources management, seismic safety, and urban design. The basic goal of the plan is the "fostering of a physical environment in San Diego that will be most congenial to healthy human development." In relation to water quality, a stated sub-goal of the general plan is the "conservation of an urban environment that is in harmony with nature and retains strong linkages with it." The City's Progress Guide and General Plan is in the process of being amended to include increased emphasis on water quality, as discussed below.

The City of San Diego has recently adopted the Strategic Framework Element, which constitutes the first step in comprehensively updating the City's General Plan since 1979. Several factors that influenced the timing of this update include:

- The City's population is anticipated to continue to increase in the near future;
- Less than 10 percent of the City's land is vacant and available for new development, meaning the City must shift from developing vacant land to reinvesting in existing communities;
- The City faces a significant shortfall in public facilities and services;
- The City needs to address traffic congestion and other quality of life concerns; and,
- Housing is increasingly unaffordable and unavailable.

The Strategic Framework Element provides the overall structure to guide the General Plan update, including future community plan amendments and implementation of a Five-Year Action Plan. The Strategic Framework Element contains a strategy called the City of Villages to direct future growth as San Diego shifts from an era of building upon abundant open land to one of reinvesting in existing communities. It represents the City's new approach for shaping how the City will grow while preserving the character of its communities and its most treasured natural resources and amenities. The development of the Strategic Framework Element represents a partnership between City staff, other agencies, the Strategic Framework Citizen Committee, and many interested citizen groups and City residents.

The Five-Year Action Plan is a companion document to the Strategic Framework Element. It outlines the work program proposed to implement the City of Villages strategy with its major policy recommendations regarding urban form, neighborhood quality, public facilities and infrastructure, conservation and the environment, economic prosperity and affordable housing. The Action Plan is the guide to how, when, and who is responsible for implementing the goals. The Action Plan identifies actions to be taken, the "Lead Department(s)" to further the action, whether staff funding is available to work on the action, potential public and private sector partners who should be involved, and a monitoring program to assess progress in implementing the strategy. An important

activity in the Five-Year Action Plan is the adoption of a new conservation element to the Progress Guide and General Plan with significant policies devoted to water resources and habitat protection. A key goal of this effort is to "take an active leadership role in promoting rural and open space preservation throughout the region."

The City of Villages strategy is designed to complement and support long-range growth management strategies throughout the region. The City coordinates and works closely with regional planning entities including the County, San Diego Association of Governments (SANDAG) and the Metropolitan Transit Development Board (MTDB). Two examples of the benefits of the regional coordination associated with the City of Villages are: 1) the real potential to limit sprawl in outlying areas of the county, and 2) a significantly superior transit system that can provide more choices for San Diegans to move about the City.

While the development of the Strategic Framework Element has been closely coordinated with many other local agencies, the City of San Diego continues to play a leading role in regional planning. This role includes working with other cities and agencies in refining the regional arterial transportation network, expanding transit services, developing a long-term airport solution for the region, assuring availability of adequate sources of water and utilities for urban needs, and achieving goals for a regional open space network. The City of San Diego is currently participating in the preparation of a Regional Comprehensive Plan (RCP), a countywide effort to identify and support smart growth development patterns, with all of the SANDAG member agencies.

5.2.2 COUNTY OF SAN DIEGO

The Regional Land Use Element of the County of San Diego's existing General Plan sets as its overall goal a the requirement that planning in the County will "accommodate population growth and influence its distribution" in such a way as to "protect and use scarce resources wisely" and to "preserve the natural environment." The County's Regional Land Use Element also states that one of its Government Structure Goals (Goal 5.4) is to "coordinate planning efforts within the cities of the region… to develop compatible land use strategies."

Portions of the San Diego River Watershed lie within the Ramona and Lakeside Community Planning Areas. After reviewing the community plans for these areas, it was found that while the existing plans had references to jurisdictional collaboration, water quality, watershed protection, and storm water pollution principles, they were scattered throughout the documents. In addition, the language was not standardized, and was included in some community plans, but not others. As such, efforts are currently underway to modify the General Plan (GP2020) to improve upon this jurisdictional collaboration to make the language more standardized and consistent. The proposed work plan with associated estimated due dates are included in the County's Jurisdictional URMP.

As part of the GP2020 update, the County of San Diego is developing land use goals and policies that are intended to maintain a built environment that is compatible with and sensitive to its natural setting and retains communities and country towns of unique local character. Appropriately sited land uses should enhance the community and protect natural resources as well as, enhance, serve, and contribute to an existing communities character with public safety and the protection of public and private property maintained.

Proposed developments are to be consistent with a community's character and meet the needs for a wide range of ages, income groups, abilities and diverse lifestyles. Watersheds, ground-water resources, dark skies, cultural and historical resources, greenbelts, agriculture, natural floodplains, wetlands, environmentally sensitive lands, and natural resources, air quality, water quality, and wildlife corridors are to be protected and integrated into the overall development of the County. Also, in regard to natural resources, the County of San Diego's goals and polices are intended to preserve open spaces for conservation of natural resources, recreational and educational activities.

The ultimate goal of the County of San Diego's General Plan update is to allow for efficient, economical, coordinated, and timely provision of public facilities and services for water, sewer, roads, drainage and storm-water runoff, schools, parks, libraries, police, fire protection, and emergency medical.

As part of the update, the County is considering a Village Core concept, which is intended for existing and proposed community focal points, higher-density settlements, and retail or employment locations that serve the needs of the surrounding village. The village core should be pedestrian oriented and where appropriate, serve as a transit node for the village. Village Support areas are designated for medium-density development around the Village Core to support commercial and business districts.

Semi-Rural lands serve as a transition area between Village development and Rural Lands. Policies would discourage the expansion of Semi-Rural Estates Regional Category west of County Water Authority Line (CWA) and prohibit their expansion east of CWA. Rural Lands consist of large, reasonably contiguous areas of land that contain biological resources, physical constraints, community buffers, and prime agricultural land. Rural Lands include areas that lack infrastructure to support development and/or are slated for backcountry preservation. Land use policies would prohibit the conversion of Rural Lands east of CWA within the life of GP2020.

5.3 CURRENT INTER-JURISDICTIONAL PLANNING EFFORTS

While there are ongoing collaborative efforts that cross jurisdictional boundaries in the region, State law requires that local governments hold public hearings prior to taking discretionary actions. At the hearing, generally staff and applicants present the proposal (whether a development proposal, ordinance amendment or general plan

update), and the decision makers consider it in light of local regulations and environmental effects, and listen to testimony from interested parties.

Jurisdictions (as well as the public at large) have the opportunity to comment on and to participate in hearings relating to land use development and planning process. As part of the development process, and before a project can be approved by a jurisdiction, all discretionary projects require some form of environmental compliance pursuant to the California Environmental Quality Act (CEQA), with related public notice and comment opportunities. The consideration of projects by any of the jurisdiction's hearing bodies involves public hearing and notification procedures.

As part of many of the individual jurisdiction's Standard Urban Storm Water Management Plan (SUSMP), discretionary projects are required to fully and adequately characterize the project site's existing water quality, analyze the drainage, develop effective post-construction storm water Best Management Practices (BMPs) and ensure the effectiveness of the BMPs through proper maintenance and long-term fiscal responsibility. Prior to being approved by a hearing body, the environmental documents that are prepared for the project will be available to interested members of the public and adjacent jurisdictions for review and comment on development-related storm water issues.

5.4 WATERSHED-BASED LAND USE PLANNING MECHANISMS

While there are many cooperative planning efforts at work, the Peñasquitos watershed jurisdictions will utilize a combination of practices to facilitate the integration of watershed data and information into their land use decision-making processes in order to ensure the protection of the watershed and receiving water bodies.

The mechanisms used to facilitate cross-jurisdictional land use planning to ensure consideration of the health of the watershed are described below. The degree to which each will be used will be determined as appropriate based on the specific characteristic of each jurisdiction within the watershed.

5.4.1 WATER QUALITY ASSESSMENT

As illustrated in the figure below, the annual watershed-based water quality assessment conducted collaboratively across jurisdictions will form the informational basis for all watershed activities and programs later initiated by jurisdictions, including land use planning. Jurisdictional storm water programs will consider the role of land use planning during the development of their overall control strategies for specific issues and problems identified as priorities for the watershed. On an annual basis, as appropriate, specific data, information, and/or recommendations will be developed or compiled during the water quality assessment process and distributed to each jurisdiction's respective planning departments for consideration by land use planners and other decision makers to ensure adequate consideration of watershed-level problems and solutions.

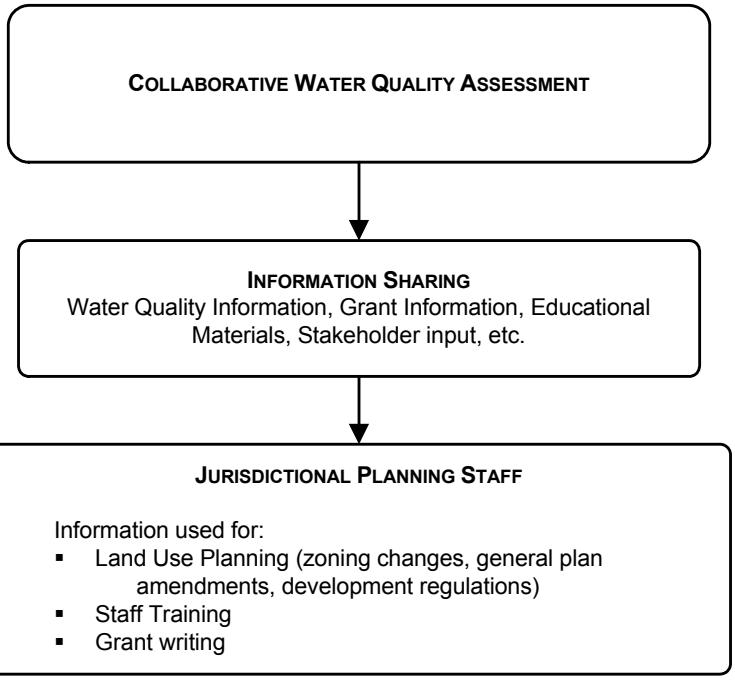

Figure 5-1. Watershed Based Land Use Planning Mechanism.

5.4.2 INFORMATION SHARING

For watershed issues to be successfully integrated into the land use planning process, effective dialogue must be established between the jurisdiction's storm water programs, planning staff, and other stakeholders. To this end, participation jurisdictions will establish mechanisms, such as meetings, as they determine necessary to ensure effective communication with planning staff both jurisdictionally and on a watershed basis. In both instances, the purpose of the meetings will be to facilitate the exchange of pertinent watershed-specific information and to explore the collaborative development of planning strategies between storm water managers and planners. The meetings will provide a general forum for discussions regarding projects that may impact water quality within other watershed jurisdictions, as well as collaborative opportunities for grant fund applications, coordination of natural resource planning, and mitigation within watersheds. Watershed land-use planning groups will periodically evaluate the effectiveness of these and other mechanisms of collaborative land-use planning to enhance their effectiveness.

Continued collaboration on the development of Watershed Urban Runoff Management Plans will necessarily result in the identification and/or generation of various written and/or electronic forms of data and information (data, reports, etc.) relevant to land use planning. As appropriate, participants will ensure that such materials are shared with land use planning staff within their individual jurisdictions as well as other jurisdictions within a particular watershed.

Examples of relevant information, materials, or work products that may be shared periodically include grant proposals, restoration or BMP development projects, approvals for unique (such as projects approved with SUSMP waivers) or large development projects, monthly meeting notices, and information on various other activities such as mitigation or structural BMP efforts, educational activities, and grant proposals. Where appropriate, Peñasquitos Watershed Copermittees will consider the development of standardized materials such as worksheets or letters that can be distributed to other watershed jurisdictions directly or via the Lead Copermittee.

5.4.3 JURISDICTIONAL PLANNING

As additional watershed information and data is shared with each jurisdiction's planning department, planning staff will meet with their jurisdiction's storm water program staff to discuss potential land use planning changes, training and grant opportunities that may be appropriate for the issues identified in the water quality assessment. For example, in addition to providing general education on water quality and watershed issues during their existing training programs for staff with land use planning and project approval responsibilities, information gathered during the water quality assessment phase described above will form the basis of watershed-specific training elements developed either individually or collaboratively by the jurisdictions. Planning staff may also be encouraged to participate in grant writing and program development and implementation with watershed stakeholders. In addition, relevant water quality data and findings generated through the water quality assessment may be used to determine whether new development regulations, zoning regulations, or land use policies are needed to address specific water quality issues.

Additionally, the jurisdictions within the Peñasquitos watershed have now assembled the Peñasquitos Watershed Urban Runoff Management Program Workgroup. The group, which consists of representatives from the of the Cities of San Diego, Del Mar, Poway as well as County of San Diego is currently tasked with developing this program. Once the document has been submitted to the Regional Board, the group will continue to meet on a periodic basis and communicate via e-mail to coordinate the implementation of the short and long term strategies outlined in this document.

5.5 THE PEÑASQUITOS WATERSHED MANAGEMENT PLAN

The City of San Diego has been awarded grant funding under Proposition 13 to develop a Watershed Management Plan for the Los Peñasquitos Watershed. This plan will provide a comprehensive analysis of existing conditions within the watershed including those related to habitat protection, water resources, land uses, and demographic characteristics, as well as identify data gaps and prioritize opportunities for the protection and enhancement of resources at the watershed scale.

Other local jurisdictions within the watershed (City of Del Mar, County of San Diego and City of Poway) are active participants in the development and subsequent implementation of the plan. Peñasquitos Watershed Copermittees will coordinate the

development and implementation of the watershed management plan with their respective community planning groups and planning departments within the watershed to ensure that the community helps develop and accepts the plan's goals, objectives, and recommended actions. In addition, this coordination with local planning activities will help ensure that the watershed management plan is integrated with other planning efforts in the watershed.

Where appropriate, this watershed-based urban runoff management program will integrate its efforts within the larger context that will be considered as part of the development and subsequent implementation of the comprehensive watershed management plan.

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6 WATERSHED BASED EDUCATION

The third objective of the Peñasquitos Watershed Urban Runoff Management Program, as noted in the introduction section, is to "enhance public understanding of sources of water pollution." Program components, as described in this chapter, have been developed in response to this objective.

Participating jurisdictions recognize that due to the very nature of nonpoint source pollution, public education is an essential strategy to protect every watershed. In order to reduce pollution, all those who live, visit and conduct business within our watersheds must become informed and involved.

Making all San Diegans aware of the importance of individual actions in protecting our water resources and promoting watershed stewardship are crucial components for the success of this program.

6.1 CURRENT EDUCATION ACTIVITIES

Currently, storm water education activities within the region are conducted on two levels: the countywide and the jurisdictional levels. Some examples of ongoing educational activities at each of these levels are identified in below:

Table 6-1. Current Storm Water Education Activities.

Target Audience	Activity (Participating Agencies)	Comments
Countywide	Project Clean Water (All jurisdictions)	County initiated effort provides the forum for information sharing to promote regional collaboration and consistency in outreach. The Education and Resource Development Technical Advisory Committee (TAC) has been meeting since November 1, 2000. This TAC, which broadly encompasses a variety of outreach topics, works closely with the Copermittees' Education Technical Workgroup on the development and implementation of storm water and urban runoff outreach activities.
	Think Blue Media Campaign (City of San Diego, Port of San Diego, County of San Diego, and Caltrans District 11)	Bilingual (English/Spanish) television and radio Public Service Announcement advertising campaign airing on 32 local broadcast outlets throughout the region. Campaign developed and administered by the City of San Diego with financial support from the County and Port of San Diego as well as California Department of Transportation (Caltrans) – District 11.

	Industrial/Commercial Workshops (All jurisdictions)	Series of industry specific workshops scheduled throughout the region under the leadership of the County of San Diego Department of Environmental Health. Featured speakers and panelists provide attendees with the most up-to-date information about storm water requirements and Best Management Practices. To date, automotive, landscaping and restaurant industries have been targeted.
Jurisdictional	Storm Water Public Presentations (Participating jurisdictions)	Presentations are made on a regular basis to community planning groups and other interested groups. Presentation content consists of general information about the municipal storm drain system, sources of non-point pollution as well as good housekeeping practices.
	Other Public Presentations (Participating Jurisdictions)	Presentations are made on a regular basis to community business associations and other community and industry based groups. Copermittees tailor presentation content to meet the needs of the audience, and identify specific Best Management Practices.
	San Diego School District – Water Cycle Curriculum Integration (City of San Diego)	City of San Diego is working with the San Diego School District to develop a K-12th grade water cycle education module for integration into the schools curriculum. The goal of this effort if to foster stewardship of San Diego's unique marine environment among school age children.
	School Presentations (County of San Diego)	Bilingual (English/Spanish) water quality educational program for grades K-6. Participation at the High School level is accomplished through presentations made in school-wide Environmental Wellness Fairs

6.1.1 REGIONAL AND JURISDICTIONAL EDUCATION STRATEGY

Education practices within the region are generally coordinated among jurisdictions to ensure that the messages are consistent and no conflicting information reaches the public. Additionally, an aggressive program to educate municipal staff has been undertaken by each jurisdiction in the region.

The main objective of the education strategy is to capture audience attention, impart messages that are understood, retained, and ultimately prompt behavioral changes. Establishing key messages – or succinct, attention grabbing, easily understandable and motivational information – is crucial to program success. It is important to note that successful communication campaigns begin with key, core messages, which are repeated often and given time to become "common knowledge" with target audiences. As time evolves, these core messages are built upon with new and more detailed information. In this manner, multiple messages are not disseminated into the public arena simultaneously, possibly causing confusion and resulting in a lack of attention and recognition. This staged approach will be particularly important under the watershed based program given the extensive amount of information required to be

covered and the long term need to address watershed-specific issues as the program evolves.

While core program messages remain consistent throughout all communication vehicles, where appropriate, these messages are tailored for individual target audiences. For example, an overall message to "identify and isolate potential flows to a storm drain" is refined for homeowners to identify typical flow sources around the house. For the business community, the message is focused on typical commercial and industrial activities that result in potential flow to storm drains. These messages provide a baseline from which watershed concepts can be threaded into current educational efforts as appropriate.

A strong watershed stewardship element will be important in the long term for establishing ownership in the minds of the target audience. Residents are more likely to respond to education when they understand the impacts of upstream activities on downstream areas. Participating jurisdictions will refine current baseline education programs to integrate watershed-based components as described below.

6.2 WATERSHED EDUCATION STRATEGY

Watershed education will be generally focused in order to meet the needs of different sub-regions and associated land uses within the watershed. For example, the areas within the Peñasquitos watershed under the jurisdiction of the County of San Diego contain primarily very low density residential development with limited industrial and commercial uses. Meanwhile, areas within the cities of San Diego, Poway and Del Mar are generally more intensely developed with a wide variety of land uses. As such, the County will generally focus its efforts in order to address rural areas and associated very low density residential communities within the watershed. On the other hand, the Cities of San Diego, Poway and Del Mar would target all land uses by incorporating watershed specific principles into their existing jurisdictional education programs.

It should be noted that in a recent Storm Water Pollution residential survey conducted within the City of San Diego, two-thirds of respondents (68 percent) said they were not familiar with the concept of a watershed. Further, less than one third (28.2 percent) said that they live in a watershed[29]. As such, over the short and long terms, the watershed education strategy will focus on three basic principles:

- What is a watershed?
- We all live in a watershed
- Watershed stewardship (all individual actions within our watersheds add up in a cumulative way to influence the health of our water resources)

Suitable Best Management Practices (BMPs) will be incorporated into the education efforts as determined appropriate to the target audience. Additionally, it is widely recognized that California creeks and rivers are being contaminated with pesticides,

[29] JD Franz Research Inc., 2002.

primarily *diazinon* and *chlorpyrifos*. Within the San Diego region, available data indicates that pesticide pollution is a widespread challenge and will be addressed under the watershed education strategy at the regional level.

In the future, the watershed message may be further developed to address other specific constituents of concern within the watershed based on the yearly water quality assessment performed as part of the annual reports associated with the overall program. The watershed education strategy will be built as a multi-phased approach that is driven by achievement of milestones as determined through the annual assessment.

6.2.1 ACTION PLAN

The following table identifies the actions that participating jurisdictions will undertake over the short and long term in order to further develop and implement their education programs to include watershed principles:

Table 6-2. Watershed Education – Action Plan.

Tasks	Description	Target Audience(s)	Responsible Party	Schedule[30]
Public Presentations and Media – Watershed Element	Incorporate general watershed concepts and principles into jurisdictional education activities including public presentations and media opportunities. Where appropriate incorporate watershed specific components including identification of receiving waters.	General public including residents and business community	All jurisdictions[31]	ongoing
San Diego School District – San Diego Watersheds	Incorporate watershed principles including hands on activities in local waterways into water cycle element being developed for integration into the San Diego School District curriculum.	K – 12th children	City of San Diego	Sep 02 – Jan 05
Integrated Pest Management Campaign	Educational materials will be developed and widely distributed. Additional, other targeted outreach opportunities such as Point of Purchase campaigns will be explored and integrated with existing efforts as appropriate.	Single family homes and related businesses (landscaping, nurseries, agriculture)	All jurisdictions	7/03 – 12/05 (guide development) Distribution would be a subsequent, ongoing task
Which is my watershed?	Develop region-wide poster that identifies watersheds and receiving waters to be used in outreach events.	General public; children in particular	All jurisdictions	Jan 04 – Jan 05

[30] All proposed activities are subject to change based on budgetary and staffing constraints - Proposed activities will be reviewed as needed on an annual basis.
[31] Within this context, "all jurisdictions" refer the jurisdictions participating in this program.

Tasks	Description	Target Audience(s)	Responsible Party	Schedule[30]
Watershed brochure	Tailor watershed messages based upon data/information gathered from water quality assessment, surveys and feedback, and create (or, where available replicate) a unified information piece, such as a brochure that includes a map and highlights targeted messages. Jurisdictions can highlight programs, services, and regular activities as well as identify appropriate every-day practices that address the most critical needs in receiving waters associated with the watershed.	General Public	All jurisdictions	2004 - beyond (Brochure development) Distribution would be a subsequent and ongoing task
Project Clean Water	Expand and further develop the regional website to include bulletin boards for each watershed that provide up to date information about the region's watersheds and related activities including volunteering opportunities.	General Public	County of San Diego assisted by all jurisdictions.	2004 - beyond
Partners in Clean Water	Identify and evaluate efforts by others in the region which support the goals of the storm water program (e.g., water conservation, citizen monitoring efforts, clean-up events) and pursue partnerships for educational opportunities as appropriate.	General Public	County of San Diego and City of San Diego	2004 – Beyond

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7 PUBLIC PARTICIPATION STRATEGY

The fourth objective of the Peñasquitos Watershed Urban Runoff Management Program, as noted in the introduction section, is to "encourage and develop stakeholder participation." Program components, as described in this chapter, have been developed in response to this objective.

Broad participation is critical to the success, further development and implementation of the watershed program. While participating jurisdictions aim to improve coordination among their own agencies, the watershed approach calls upon these agencies to engage diverse stakeholders in this process, including other regulatory agencies, environmental groups, educational institutions, landowners, and private citizens. Further, the participating jurisdictions recognize that no single agency has the capacity to address water quality issues on its own and broad partnerships are essential to positively affect the water resources in our region. It is only through a collaborative approach that we will develop a better understanding of the issues and processes affecting water quality in our watersheds and subsequently select and address priorities.

7.1 PUBLIC PARTICIPATION TO DATE

The current watershed program, as described in this document, has been developed based on a set of model guidelines that were produced with public input. All San Diego Copermittees held a series of meetings which were open to the public and noticed through the County of San Diego Project Clean Water website beginning in early 2002. Additional notice was also provided by the County of San Diego and all other Copermittees via e-mail and personal communication to numerous stakeholders. The County has provided leadership in outreach efforts by compiling a list of interested stakeholders which currently contains over 700 names. All other jurisdictions have also identified other stakeholders and submitted contact information to County staff for inclusion in their master distribution list. To further encourage public participation, related meeting agendas and minutes were also promptly made available through the County's website. Lastly, the model guidelines were also posted online in early August of 2002 along with contact information for each watershed.

To ensure further participation during program development, the draft watershed plans have also been made available for public review for a period of 21 days through the County's web site. Notice of their availability has taken place via e-mail communication (using the County's master distribution list) as well as through other numerous means, including announcements at public meetings and personal phone calls.

7.2 FUTURE PUBLIC PARTICIPATION

Participating jurisdictions will continue to pursue a strategy to actively encourage the participation and input of diverse stakeholders. The County's Project Clean Water has been identified as the principal forum for future public participation. Other mechanisms

identified to foster public participation include public meetings and community workshops as well as regular interaction with stakeholders as described below.

7.2.1 PROJECT CLEAN WATER

Project Clean Water, initiated in July 2000, established a framework for the broad-based and collaborative development of solutions to local water quality problems. The relationship of Project Clean Water objectives to permit compliance is important. An underlying tenet of this effort is that Permit compliance alone cannot achieve clean water. As such, Project Clean Water seeks to actively involve a multitude of stakeholders in exploring water quality problems, their causes, and their solutions. This significantly broadens the base of stakeholder input available to consider issues directly related to Permit compliance. As with Copermittee meetings, all Project Clean Water meetings are open to the public and participation is encouraged through a variety of means including a website, electronic notifications and personal phone calls.

Project Clean Water is generally organized according to two types of working bodies, Technical Advisory Committees (TACs) and Technical Workgroups[32]. Technical Advisory Committees are responsible for the overall coordination and exploration of four broad subject areas crucial to water quality management; (1) Comprehensive Planning, (2) Legislative and Regulatory Issues, (3) Science and Technology, and (4) Education and Resource Development. Each TAC compiled a baseline inventory and initial assessment of activities and issues for its respective subject area during the first phase of the project and is now conducting a more intensive issues characterization and implementing specific action items identified in the June 2001 Clean Water Strategic Plan. Technical Workgroups generally explore more focused issues. During 2001, Technical Workgroups emphasized storm water permit compliance and developed a model program guidance and other work products intended to ensure public input during the development of these programs. Technical Workgroups will continue to deal with specific focused issues.

To provide information on meetings (including agendas and meetings' minutes), work products, and other valuable links to the public and interested parties, a Project Clean Water website (www.projectcleanwater.org) was launched in January 2001. To date, interested parties have extensively utilized the site to post various work products for review and comment. It is the goal of the program to establish this site as a centralized source of water quality information for the San Diego region.

In November 2002, a draft copy of the Peñasquitos Watershed Urban Runoff Management Plan was placed on the website. Stakeholders were notified via e-mail, announcements at public meeting and through other means of the availability of the draft document and were encouraged to review and provide comments. Peñasquitos Watershed Copermittees will continue to use Project Clean Water as a main vehicle to

[32] During 2001, all Copermittees and SDRWQCB staff participated in one or more Project Clean Water TACs or Technical Workgroups.

update stakeholders and encourage feedback as the workgroup continues to develop and implement the program and other watershed related management plans.

Technical Advisory Committees and Technical Workgroups of particular interest to those interested in the watershed- and/or jurisdictional-based urban runoff management programs are listed below:

7.2.1.1 Monitoring Workgroup

This workgroup is responsible for the regular assessment and implementation of the Copermittee Monitoring Program including overseeing the compilation of annual reports. This group also provides a forum for the collaborative development of standards and/or programs for monitoring activities. The group may also consider and recommend the funding of special studies not explicitly required under the Municipal Permit.

7.2.1.2 Education and Outreach Committee

This group is responsible for providing to the Budget Subcommittee a recommended annual budget and scope-of-work for shared regional outreach activities and programs. Additionally, this group provides coordination of outreach activities, which are jointly conducted by the Copermittees. Examples of activities that may be addressed include workshops and informational materials for businesses, measurement of program effectiveness, and the development of consistent outreach themes and training tools. The purpose of this group is generally to oversee educational programs conducted at cross-jurisdictional scales and ensure that associated activities and messages are consistent and effective. This committee also provides an ongoing forum for identification of opportunities for shared resources, creative partnerships and the development of collaborative programs.

7.2.1.3 Watershed Urban Runoff Management Workgroup

This workgroup began meeting in January 2002 and was originally tasked with developing guidance documents to ensure consistency in the development of individual watershed urban runoff management programs. While its original task has generally been completed, the workgroup will continue to meet to serve as an ad hoc forum for the future development, evolution and assessment of the watershed based programs.

7.2.2 CITY OF SAN DIEGO CLEAN WATER TASK FORCE

In April 2001, the *City of San Diego Clean Water Task Force* was established by City of San Diego Mayor Dick Murphy to advise the Mayor and City Council on water quality issues. “Cleaning up our beaches and bays” is one of the Mayor’s top ten goals. The Task Force, co-chaired by Mayor Murphy and San Diego City Councilmember Scott Peters, consists of elected officials (including the County and Port of San Diego), academics, environmentalists, business interests, professionals, John Robertus, Executive Director of the Regional Board, and other agency representatives.
The Task Force meets routinely and will provide ample opportunities to obtain input

from community stakeholders and government agencies. Thus far, the Clean Water Task Force has reviewed and provided input in the updated City of San Diego Storm Water Ordinance (and related revisions to the Land Development Code), the Model Standard Urban Storm Water Mitigation Plan (SUSMP), and various water quality projects. The Task Force has also advocated for state funding for specific water quality projects.

7.2.3 CROSS-JURISDICTIONAL COLLABORATION

The Peñasquitos Watershed Urban Runoff Management Program workgroup, which consists of representatives from the Regional Board, City of San Diego, County of San Diego, Poway, and Del Mar, will collaborate as needed to foster public input and participation in activities related to the watershed program.

In addition, an annual workshop may be held to present updates, revisions, and/or solicit comments in order to actively engage stakeholders affected or potentially affected by program development and its implementation.

7.2.4 INTEGRATION AND PARTICIPATION IN LOCAL PLANNING ACTIVITIES

Planning at the watershed scale has become an issue of increasing importance over the past few years. As part of the watershed program, jurisdictions will participate in and support associated efforts which provide opportunities to learn about concerns raised by the public and publicize efforts related to this program. Development and subsequent implementation of the Peñasquitos Watershed Management Plan is an important example of a complimentary effort.

7.2.5 DIRECT INTERACTION

In addition to those methods already described, participating jurisdictions rely heavily on the interaction of their staff with members of the public during their job duties. This facet of jurisdictional programs will provide an additional avenue for obtaining direct feedback from watershed stakeholders.

8 PROGRAM EFFECTIVENESS ASSESSMENT STRATEGY

In order for a plan to be successful, clear goals and objectives must first be established, agreed to and implemented. Otherwise, program activities and tasks are adopted without an understandable purpose or clear direction. As discussed in Section 1 and echoed throughout the body of the document, participating jurisdictions have identified a program goal and four underlying objectives that will guide decision-making as the watershed program is developed and implemented.

To reiterate, the primary goal of this inter-jurisdictional effort is to positively affect the water resources of the Peñasquitos watershed while balancing economic, social and environmental constraints. The following objectives have been identified in order to achieve the program goal:

1) Develop/expand methods to assess and improve water quality within the watershed;
2) Integrate watershed principles into land use planning;
3) Enhance public understanding of sources of water pollution; and,
4) Encourage and develop stakeholder participation.

The purpose of this section is to establish an evaluation strategy to determine the effectiveness of these objectives.

8.1 EVALUATION STRATEGY

The strategy to evaluate the effectiveness of the watershed program includes developing objectives that are measurable, have an expected outcome, and an established preliminary performance standard as an indicator of meeting or exceeding expectations. According to the Environmental Protection Agency, "for a watershed management plan to be effective, it should have measurable goals describing desired outcomes and methods for achieving those goals"[33]. Therefore, on an annual basis, participating jurisdiction will assess data collected for each of the objectives listed above to assist in the annual watershed program assessment.

In addition, annual results from the water quality assessment will be integrated into the program as appropriate as well as program effectiveness evaluation where practical. This will provide meaningful feedback to the participating jurisdictions as to whether or not programmatic activities are useful in meeting the overriding goal of the program– to positively affect the water resources of the watershed.

In each future year, the program effectiveness evaluation strategy will consider linkages between water quality and programmatic activities, and the results will be used to alter program delivery, operations, goals, objectives, expected outcomes or other programmatic actions where possible. As the water quality assessment is expanded,

[33] Environmental Protection Agency, 1993.

the results will be used to develop targeted remedial actions and may also result in a revision of stated objectives, where and when appropriate. Therefore, the objectives outlined herein are considered to be dynamic and may be updated in subsequent iterations. It must be noted that the ability of the Cities of San Diego, Del Mar, and Poway and the County of San Diego to meet or exceed stated objectives, activities, and performance indicators does not in itself suggest that the program is effective. Rather, the question that must ultimately be answered in evaluating the effectiveness of the program is *"Are program activities an effective method to improve water quality?"*

In order to answer that question, water quality monitoring data must be collected over a long period of time- longer than the life of the current Municipal Permit. Although the stated purpose of the program effectiveness evaluation strategy is to address the long-term effectiveness of selected program activities and elements; intermediate, or short-term activities will also be tracked and assessed. This will provide important feedback on more frequent intervals, allowing participating jurisdictions to make adjustments each year as warranted. For this reason, both short-term and long-term activities are discussed together throughout the remainder of this section.

The long-term goal of the program effectiveness evaluation will be to develop and refine programmatic activities that have a positive affect on improving water quality. However, the first few years of the program effectiveness evaluation strategy will examine several key "first steps" (short-term activities) toward meeting this long-term goal. Thereafter, objectives and activities will be assessed annually and modified when linkages to water quality are developed or when modification is appropriate.

The short-term activities will be addressed in each annual report and will answer the following questions:

1. Are the participating jurisdictions able to develop and implement new methods for working together as a watershed group?

2. Are the participating jurisdictions able to implement an outreach program and facilitate a mechanism for broad participation?

3. Are the participating jurisdictions able to determine the effect, if any, of programmatic activities on water quality?

The answers to these questions, coupled with the water quality assessment, will provide one way to assess the program through a continuous feedback-loop of implementation, assessment, and evaluation.

Other direct and indirect assessment measures considered for programmatic evaluation are more fully discussed below:

Direct measures: Direct measures are those that focus on characterizing the quality of water bodies receiving discharges from the storm drain system or on assessing other parameters with an immediate or well-established nexus to changes in the quality of

receiving waters. Examples of direct measurement include receiving waters monitoring, estimation of pollutant loadings from specified areas (catchments, municipalities, watersheds, etc.), and focused evaluations of structural Best Management Practices (BMPs). Direct measures generally include actual measurement or quantification of pollutants (e.g., reductions in concentrations of chemicals of concern, etc.) or of the amount of materials extracted or diverted by a BMP (e.g., through household hazardous waste collection, etc.).

Indirect measures: Because direct measures can be difficult and expensive to obtain and often require long assessment periods, a variety of indirect measures are generally used to evaluate storm water program effectiveness. Indirect measures are based on the assumption that specific program activities are effective in decreasing storm water pollution and therefore in protecting water quality. They are typically used to assess the performance of non-structural source control BMPs such as storm drain stenciling and public education programs. Indirect measures typically focus on degrees of implementation or comparison to standards or goals rather than actual water quality assessment or measures of pollutant loading. By measuring the degree or success of implementation of these types of BMPs, it may therefore be possible to make *inferences* about water quality benefits. Inferences, however, are assumptions and should not be given the same weight as direct measures, which provide direct-impact data. Indirect measures should be pursued in combination with more broadly focused direct measures to allow participating jurisdictions to prioritize limited resources, conduct meaningful assessments on intermediate time frames, and focus their efforts on particular management actions and program elements.

Whether using direct or indirect measures of effectiveness, baseline conditions must be defined. All future comparisons showing improvements could then be made relative to these baseline conditions. In the absence of a well-defined baseline, improvements cannot be adequately measured. A suite of measures that allows for assessment on a variety of levels and time frames will be developed if resources and time permit.

Because program requirements are being implemented and the effectiveness strategies formulated prior to the establishment of a nexus between expected outcome (improved water quality) and program activities, measures of program effectiveness during the first few years will be limited to an accounting of program implementation.

It is expected that the program objectives and management actions will be revised as the program evolves and matures. The objectives outlined in this section represent the first attempt to establish a feedback-loop program evaluation process that addresses both Municipal Permit-compliance and water quality impacts at this very early stage of program evaluation.

In summary, the best measure of program effectiveness is improvement in the quality of receiving waters. Where possible, measurement of such changes will be pursued. However, three important limitations should be acknowledged here.

1) Measuring the "quality" of any receiving water is not a straightforward exercise. In many cases, baseline conditions have yet to be reliably established, and considerably more time may be required to do so;
2) Water quality changes in response to program implementation are likely to be very slow and not measurable within this or other near-term Municipal Permit cycle; and,
3) Establishing a nexus between targeted program activities and water quality conditions as documented by field data is difficult working at the geographic scale covered by this program.

The following sections describe the objectives and expected outcomes (based on program elements and actions) for the first annual program effectiveness strategy in an effort to evaluate the effectiveness of their program on water bodies within the watershed.

8.2 REVIEW OF GOAL AND OBJECTIVES

Each objective, the justification for selecting the objective, how the objective ties back to the program goal and the expected outcome is discussed in more detail below.

Annually, each objective and the ability of the participating jurisdictions to meet the stated activities/tasks that were assigned to each objective will be evaluated for effectiveness in terms of impact on water quality when data for the assessment is available and reliable. This will allow a mechanism for review and improvement of the program.

The process for assessing program effectiveness will be a multivariate approach integrating direct and indirect measures, jurisdictional activities, statistical analysis (when data are available) and performance measures. The overall effectiveness of the entire program will be addressed in the annual report using all relevant information and examining the ability of the participating jurisdictions to meet or exceed the stated goals and performance indicators. It is not likely that direct measures of the watershed program effectiveness on water quality will be available within the life of this permit cycle; however, the participating jurisdictions remain hopeful that the program as developed will move the evaluation a step closer with each annual assessment.

OBJECTIVE #1: Develop/expand methods to improve water quality within the watershed.

Justification

The justification for this objective is obvious in that the purpose of a jurisdictional or watershed storm water program is to ultimately improve the quality of the water in the watershed. In order to accomplish this, we must expand upon existing methods or

develop new methods to improve our understanding of the processes and issues that affect receiving waters. By developing and expanding methods to improve water quality, stakeholders will be able to validate preliminary water quality concerns and identify constituents of concern within the watershed.

Expected Outcome

Over time, the expected outcome of this objective will be multi-faceted:

1) Develop an understanding (characterization) of water bodies within the watershed;
2) Identify and/or verify constituents of concern and/or stressors within the watershed;
3) Prioritize the constituents of concern and/or stressors within the watershed;
4) Develop an action plan to mitigate harmful effects of constituents of concern and/or stressors;
5) Transition to watershed-based monitoring program; and,
6) Using the *weight of evidence* approach, measure changes on water quality.

Performance Measure

It cannot be overstated that direct measures are the most definitive way of determining an objective's (as well as program's) overall effectiveness. However, as echoed previously, establishing useful direct measures may not be feasible at this time.

As noted earlier, much of the relevant water quality information has yet to be collected and/or reviewed as part of this program. Several activities are proposed to obtain this additional water quality data and validate this initial assessment. Once more data are gradually integrated into the watershed program, a baseline can be established. This baseline characterization will support the long term goal of achieving meaningful measures of program effectiveness.

OBJECTIVE #2: Integrate watershed principles into land use planning.

Justification

Urban runoff does not follow jurisdictional boundaries and often travels through many jurisdictions while flowing to receiving waters. Land use policies of individual municipalities have the potential to affect water quality in water bodies well beyond jurisdictional boundaries. One of the overriding purposes of program is to ensure that watershed protection principles are integrated into long-range land use planning activities in a consistent and cost-effective manner.

Expected Outcome

The expected outcome of this objective and related tasks is to improve collaborative efforts among participating jurisdictions. While this outcome is not expected to measurably improve water quality in the near term, increased cross-jurisdictional coordination within watersheds will likely have a synergistic effect on water quality efforts, thereby indirectly making positive contributions towards water quality.

Performance Measure

As discussed in Section 6, several activities and tasks have been established for this objective. However, trying to measure program effectiveness on activities or tasks that are not easily quantifiable is virtually impossible. As such, participating jurisdictions will track and report as part of the annual reporting process the various activities/tasks that have been identified for this objective.

OBJECTIVE #3: Enhance public understanding of sources of water pollution within the watershed.

Justification

Education is the foundation of an effective urban runoff management program and the basis for changes in behavior at the individual and societal levels. Storm water quality topics can be very focused (identification of the types of source control BMPs) or general (answering the question: What is a watershed?) and can target many audiences to inform them of how individual actions impact water quality and how these impacts can be avoided.

Expected Outcome

The long-term outcome expected from this objective is to improve water quality through a change in human behavior and increased knowledge among San Diego residents and business owners. The short-term expected outcome is the delivery of a consistent message regarding watershed concepts, urban runoff and pollutant-causing activities with the assumption that (over time) the educational program will produce a change in human behavior which leads to sustainable clean waters.

Performance Measure

Surveys are an effective performance measure to determine a population's knowledge or understanding of water quality issues. Under this approach, however, an inference must be made that an increase in awareness translates into a change in public behavior. Through the use of surveys, the effectiveness of program activities can be assessed within a shorter period of time (2-3 years), allowing the Peñasquitos

Watershed Copermittees to adjust the activities/tasks accordingly to maximize program effectiveness. The Peñasquitos Watershed Copermittees will conduct a baseline assessment that targets the residential population. A survey or other measurement tool will assess current levels of knowledge relating to water pollution issues within the watershed.

Participating jurisdictions have also established an extensive list of activities/tasks that are to be completed as part of this objective. An inference must be made that completing the activities/tasks will indirectly impact water quality within the watershed. , Implementation of the various activities/tasks that have been identified to meet this objective will be tracked and reported as part of the annual reporting process.

OBJECTIVE #4: Encourage and enhance stakeholder involvement within the watershed.

Justification

In order to develop an effective plan, the importance of stakeholder input cannot be overstated. There are three important reasons for the need of stakeholder involvement.

1) Stakeholders can a different perspective on watershed issues. Because stakeholders have varying backgrounds and experience levels, they are sometimes able to identify issues and solutions not previously identified by jurisdictions.
2) Water quality data is collected by a number of different stakeholders for a number of different reasons. Participating jurisdictions can work with stakeholders to pull their data together in an attempt to develop a useful water quality database that helps identify and validate water quality problems as well as possible solutions.
3) It is a prudent planning principle to involve the public in comprehensive plan development as a watershed plan ultimately impacts stakeholders. As such, it is imperative that stakeholders are clear on the intent and purpose of the plan as well as the activities being identified.

Expected Outcome

The short-term expected outcome is to increase the amount of current stakeholder involvement in watershed related issues. It is assumed that an increase in stakeholder involvement will ultimately lead to improved water quality, which is the long-term expected outcome for this objective. While we will be able to measure the short-term outcomes, the long-term outcome will be difficult, as measurable changes in water quality are not expected within the life of the Permit.

Performance Measure

As discussed in Section 7, several activities and tasks have been established for this objective. To measure this objective, an inference must be made that completing the activities and tasks will indirectly impact water quality within the watershed. Participating jurisdictions will track and report on an annual basis the various activities/tasks that have been identified for this objective.

8.2.1 PERFORMANCE INDICATORS

Standard performance indicators for achieving the objectives would commonly include percent-changes in pollutant loading, water quality field data, community knowledge, etc. Performance indicators are typically established based upon baseline level data, which is not available at this time. Without baseline data, it would be premature to set the performance markers at this time. However, participating jurisdictions have agreed on the following standard performance indicators:

By the end of 2003:

1) Year 2 assessment completion incorporation of dry weather data collected in 2002 and other data as time and resources permit;
2) Evaluation of prioritization of constituents of concern and/or watershed stressors as outlined in initial Year 1 assessment; and,
3) Implementation of planned actions as presented.

2003 and on-going:

4) Use of iterative method for evaluation of objectives and management actions;
5) Continued watershed workgroup meetings and increased public participation in process,
6) A measurably and statistically significant change by the year 2005 regarding San Diegan's general knowledge of what a watershed is.

CONCLUSION

Participating jurisdictions consider this watershed based effort to be in its infancy and expect this program will be refined and augmented over the long term as we develop a better understanding of the complex issues affecting our watersheds and learn to identify and pursue joint opportunities to positively affect the water resources in the Peñasquitos watershed and the region.

In order to further build on this initial watershed program, the program has been developed as an iterative process of watershed assessment, priority setting, monitoring, and implementation. At the conclusion of each yearly cycle, the process begins anew, allowing participants to respond to changing conditions or adjust strategies that have not performed as anticipated. This framework establishes mechanisms for the participants to evaluate priorities, improve coordination, assess program goals, and allocate finite budgetary resources in a cost-effective manner.

Adaptive management is a key requirement for the process to work. Adaptive management allows adjustments in the management direction as new information becomes available. The combination of natural variability in the hydrologic cycle and the uncertainty associated with a complex system requires that watershed managers be flexible enough to modify implementation approaches based on progress and available information. Watershed characteristics, sources of pollutants, and management approaches are unique, and therefore, management efforts may not proceed exactly as planned. Adaptive management does not mean that the watershed's water quality goals would be modified based upon lack of progress, but that the results would be used to modify management policies, strategies, practices, and operation and maintenance procedures to reach goals.

Even though priorities will be targeted in a focused manner, it will take time for management activities to produce a quantifiable improvement in water quality. As such, the program includes performance measures and a review mechanism. Performance data collected in subsequent cycles will be used to determine the effectiveness of previous management activities.

As already stated, the Peñasquitos Urban Runoff Management Program signifies the beginning of long-term efforts to protect and enhance the water quality of the river and its tributaries under a cross-jurisdictional approach. The Program was developed with stakeholder participation and will integrate as appropriate with other projects such as the Peñasquitos Watershed Management Plan. In addition to obtaining additional understanding of the ecosystem, there is a desire to locate storm water Best Management Practices within the creek and drainage channel sections where appropriate downstream of existing urbanized areas because of the long-term water quality benefits. Using the watershed approach, the cities of San Diego, Del Mar, and Poway as well as the County of San Diego aim to protect and enhance aquatic resources in a cost effective, environmentally sensitive, and collaborative manner.

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APPENDIX A – GLOSSARY

Aquifer - A permeable geological stratum or formation that can both store and transmit groundwater in significant quantities.

Beneficial Uses - The uses of water necessary for the survival or well being of man, plants, and wildlife. These uses of water serve to promote the tangible and intangible economic, social, and environmental goals. "Beneficial Uses" of the waters of the State that may be protected against pollution include, but are not limited to, domestic, municipal, agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves. Existing beneficial uses are uses that were attained in the surface or ground water on or after November 28, 1975; and potential beneficial uses are uses that would probably develop in future years through the implementation of various control measures. "Beneficial Uses" are equivalent to "Designated Uses" under federal law. [California Water Code Section 13050(f)].

Table A-1: California Waters Beneficial Uses and Definitions

Beneficial Uses	Description
Contact Water Recreation	Recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and SCUBA diving, surfing, white water activities, fishing, or use of natural hot springs
Non-contact Water Recreation	Recreational activities involving proximity to water, but not normally involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.
Warm Freshwater Habitat	Warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish or wildlife, including invertebrates.
Cold Freshwater Habitat	Cold water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish or wildlife, including invertebrates.
Inland Saline Water Habitat	Inland saline water ecosystems including, but not limited to, preservation or enhancement of aquatic saline habitats, vegetation, fish, or wildlife, including invertebrates.
Estuarine Habitat	Estuarine ecosystems including, but not limited to, preservation or enhancement of estuarine habitats, vegetation, fish, shellfish, or wildlife (e.g., estuarine mammals, waterfowl, shorebirds).

Beneficial Uses	Description
Marine Habitat	Marine ecosystems including, but not limited to, preservation or enhancement of marine habitats, vegetation such as kelp, fish, shellfish, or wildlife (e.g. marine mammals, shorebirds) MAR Marine Habitat.
Wildlife Habitat	Terrestrial ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats, vegetation, wildlife (e.g. mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food resources.
Preservation of Biological Habitats of Special Significance	Designated areas or habitats such as established refuges, parks, sanctuaries, ecological reserves, or Areas of Special Biological Significance (ASBS), where the preservation or enhancement of natural resources requires special protection.
Rare, Threatened, or Endangered Species	Habitats necessary, at least in part, for the survival and successful maintenance of plant and animal species established under state or federal law as rare, threatened, or endangered.
Migration of Aquatic Organisms	Habitats necessary for migration, acclimatization between fresh and salt water, or other temporary activities by aquatic organisms, such as anadromous fish.
Spawning, Reproduction and/or Early Development	High quality habitats suitable for reproduction and early development of fish. This use is applicable only for the protection of anadromous fish.
Shellfish Harvesting	Habitats suitable for the collection of filter-feeding shellfish (e.g. clams, oysters, and mussels) for human consumption, commercial, or sport purposes.
Municipal and Domestic Supply	Community, military, or individual water supply systems including, but not limited to, drinking water supply.
Agricultural Supply	Farming, horticulture, or ranching including, but not limited to, irrigation, stock watering, or support of vegetation for range grazing.
Industrial Process Supply	Industrial activities that depend primarily on water quality.
Industrial Service Supply	Industrial activities that do not depend primarily on water quality including, but not limited to mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, or oil well re-pressurization.
Groundwater Recharge	Natural or artificial recharge of ground water for purposes of future extraction, maintenance of water quality, or halting of saltwater intrusion into freshwater aquifers.
Freshwater Replenishment	Natural or artificial maintenance of surface water quantity or quality (e.g. salinity).
Navigation	Shipping, travel, or other transportation by private, military, or commercial vessels.

Beneficial Uses	Description
Hydropower Generation	Hydropower generation.
Commercial and Sportfishing	Commercial or recreational collection of fish, shellfish, or other organisms including, but not limited to, uses involving organisms intended for human consumption or bait purposes.
Aquaculture	Aquaculture or mariculture operations including, but not limited to, propagation, cultivation, maintenance, or harvesting of aquatic plants and animals for human consumption or bait purposes

Source: Water Quality Control Plan for the San Diego Basin, California Regional Water Quality Control Board, San Diego Region, 1994.

Benthic Infauna - Benthic animals are those associated with the bottom of seas, rivers, lakes, etc. Infauna describes animals found buried within the sediment. Macrofauna is larger and meiofauna smaller.

Best Management Practices - Best Management Practices (BMPs) are defined in 40 CFR 122.2 as schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States. BMPs also include treatment requirements, operating procedures and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. In the case of municipal storm water permits, BMPs are typically used in place of numeric effluent limits.

Bioassessment - The use of biological community information to evaluate the biological integrity of a water body and its watershed. With respect to aquatic ecosystems, bioassessment is the collection and analysis of samples of the benthic macroinvertebrate community together with physical/habitat quality measurements associated with the sampling site and the watershed to evaluate the biological condition (i.e. biological integrity) of a water body.

Biota – The flora and fauna specific to a region.

California Environmental Quality Act (CEQA) – Environmental policy in California with the overarching goal of developing and maintaining a high-quality environment now and in the future, while the specific goals of CEQA are for California's public agencies to identify the significant environmental effects of their actions; and, either avoid those significant environmental effects or mitigate those significant environmental effects, as feasible.

Catchments – A structure or land area that catches and contains water. Stormwater managers often use this term to refer to a watershed or BMP.

Chlorpyrifos – also known as Lorsban for agricultural uses and Dursban for home and urban applications, is the most heavily used insecticide in the United States. It is used on agricultural crops and against termites, cockroaches and other insect pests in

homes, apartment buildings, schools and other structures. EPA's risk assessment for chlorpyrifos cites a recent Minnesota study that found the chlorpyrifos metabolite TCP in the urine of over 90 percent of tested children.

Clean Water Act (Section 303(d)) - Under section 303(d) of the 1972 Clean Water Act, states, territories, and authorized tribes are required to develop lists of impaired waters. These impaired waters do not meet water quality standards that states, territories, and authorized tribes have set for them, even after point sources of pollution have installed the minimum required levels of pollution control technology. The law requires that these jurisdictions establish priority rankings for waters on the lists and develop TMDLs for these waters.

Constituents of Concern (COC) – Different pollutants that result from the land activities in a watershed. One finds these constituents in water sampled from mass loading stations in each watershed.

Constructed Wetland - A vegetated area that has been deliberately modified to provide or enhance habitat, to provide water quality benefits, or to moderate water flow rates or velocities, that is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions, commonly known as hydrophytic vegetation.

Copermittees – Jurisdiction which owns or operates a municipal separate storm sewer system (MS4), through which it discharges urban runoff into waters of the United States within the San Diego Region. These MS4s fall into one or more of the following categories: (1) a medium or large MS4 that services a population of greater than 100,000 or 250,000 respectively; or (2) a small MS4 that is "interrelated" to a medium or large MS4; or (3) an MS4 which contributes to a violation of a water quality standard; or (4) an MS4 which is a significant contributor of pollutants to waters of the United States. There are 20 Copermittees (see table below) responsible for implementing NPDES NO. CAS0108758.

Table A-2: Municipal Copermittees

1.	City of Carlsbad	11.	City of National City
2.	City of Chula Vista	12.	City of Oceanside
3.	City of Coronado	13.	City of Poway
4.	City of Del Mar	14.	City of San Diego
5.	City of El Cajon	15.	City of San Marcos
6.	City of Encinitas	16.	City of Santee
7.	City of Escondido	17.	City of Solana Beach
8.	City of Imperial Beach	18.	City of Vista
9.	City of La Mesa	19.	County of San Diego
10.	City of Lemon Grove	20.	San Diego Unified Port District

Diazinon - Diazinon is an organophosphate insecticide; common trade names include SpectracideTM, KnoxoutTM, BasudinTM. It is the fifth most commonly used pesticide used by homeowners, with two to four million pounds applied annually.

Ecosystems - Community of organisms interacting with one another and with the chemical and physical factors making up their environment. The chemical and physical factors include sunlight, rainfall, soil nutrients, climate, salinity, etc.

Enterococcus - Bacteria normally found in the intestine of warm-blooded animals; often used as an indicator of fecal contamination; may cause illness when found in other parts of the body.

Estuaries – Semi-enclosed bodies of water where seawater mixes with fresh water.

Eutrophication - The process of surface water nutrient enrichment causing a water body to fill with aquatic plants and algae. The increase in plant life reduces the oxygen content of the water. Eutrophic water bodies are often not suitable for recreation and may not support normal fish populations.

Event Mean Concentration – A calculation for determining the pollutant concentration during storm events. The calculation is total pollutant load divided by the total runoff volume per storm event.

Fecal Coliform Bacteria - Bacteria found in the intestinal tracts of mammals and, therefore in, fecal matter. Their presence in water is an indicator of pollution and possible contamination by pathogens.

Impervious Cover or Impervious Surface - means constructed or modified surfaces that cannot effectively infiltrate rainfall. The term includes but is not limited to building rooftops, pavement, sidewalks, and driveways.

Impervious Surface Area - means the ground area covered or sheltered by an impervious surface, measured in plan view (i.e., as if from directly above). For example, the “impervious surface area” for a pitched roof is equal to the ground area it shelters, rather than the surface area of the roof itself.

Jurisdictional Urban Runoff Management Plan (JURMP)– Document designed to establish a programmatic framework for the continued development and implementation of specific programs and activities to meet or exceed the regulatory obligations established in sections F and H of Order No. 2001-01, NPDES No. CAS0108758. Each of the 20 Copermittees is required to have its own specific JURMP under NPDES No. CAS0108758.

Mass Loading Stations – Water sampling sites selected to directly measure pollutant loading in a watershed for a typical storm event.

Mitigation - Any action taken to permanently eliminate or reduce the long-term risk to human life, property, and ecological function from hazards.

Municipal Storm Drain Systems (MS4s) - MS4 is an acronym for Municipal Separate Storm Sewer System. A Municipal Separate Storm Sewer System is a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, natural drainage features or channels, modified natural channels, man-made channels, or storm drains): (i) Owned or operated by a State, city town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or designated and approved management agency under section 208 of the CWA that discharges to waters of the United States; (ii) Designated or used for collecting or conveying storm water; (iii) Which is not a combined sewer; (iv) Which is not part of the Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.

Historic and current development makes use of natural drainage patterns and features as conveyances for urban runoff. Urban streams used in this manner are part of the municipalities MS4 regardless of whether they are natural, man-made, or partially modified features. In these cases, the urban stream is both an MS4 and a receiving water.

Multivariate Assemblage Analysis – A statistical data analysis technique that looks at the pattern of relationships between several variables simultaneously.

Nonpoint Source Pollution - Nonpoint source (NPS) pollution comes from many diffuse sources and is caused by rainfall, irrigation, street and sidewalk washing, or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into lakes, rivers, wetlands, coastal waters, and even our underground sources of drinking water. These pollutants include:

- Excess fertilizers, herbicides, and insecticides from agricultural lands and residential areas;
- Oil, grease, and toxic chemicals from urban runoff and energy production;
- Sediment from improperly managed construction sites, crop and forest lands, and eroding stream banks;
- Salt from irrigation practices and acid drainage from abandoned mines; and,
- Bacteria and nutrients from livestock, pet wastes, and faulty septic systems.

Atmospheric deposition and hydromodification are also sources of nonpoint source pollution.

Nonpoint source refers to diffuse, widespread sources of pollution. These sources may be large or small, but are generally numerous throughout a watershed. Nonpoint sources include but are not limited to urban, agricultural, or industrial areas, roads, highways, construction sites, communities served by septic systems, recreational boating activities, timber harvesting, mining, livestock grazing, as well as physical changes to stream channels, and habitat degradation. NPS pollution can occur year round any time rainfall, snowmelt, irrigation, or any other source of water runs over land or through the ground, picks up pollutants from these numerous, diffuse sources and deposits them into rivers, lakes, and coastal waters or introduces them into ground water.

Physiography – Physical geography or geography that deals with the exterior physical features and changes of the earth.

Point Source - Any discernible, confined, and discrete conveyance, including, but not limited to; industrial discharge pipes, publicly owned treatment works discharge pipes, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operations, landfill leachate collection systems, vessel, or other floating craft from which pollutants are or may be discharged.

Pollution - As defined in the Porter-Cologne Water Quality Control Act, pollution is “the alteration of the quality of the waters of the State by waste, to a degree that unreasonably affects the either of the following: (1) The waters for beneficial uses; or (2) Facilities that serve these beneficial uses.” Pollution may include contamination.

Pollutant - A pollutant is broadly defined as any agent that may cause or contribute to the degradation of water quality such that a condition of pollution or contamination is created or aggravated.

Pollution Prevention - Pollution prevention is defined as practices and processes that reduce or eliminate the generation of pollutants, in contrast to source control, treatment, or disposal.

Receiving Waters - means all waters that are “Waters of the State” within the scope of the State Water Code, including but not limited to natural streams, creeks, rivers, reservoirs, lakes, ponds, water in vernal pools, lagoons, estuaries, bays, the Pacific Ocean, and ground water.

Riparian - Relating to or living or located on the bank of a natural watercourse (as a river) or sometimes of a lake or a tidewater area.

Runoff - Runoff is precipitation or water originating from other sources and activities (such as irrigation and car washing) that does not infiltrate but flows over the land surface toward a surface drain, eventually making its way to a river, lake or an ocean.

Source Identification – Any type of process used to locate the cause of a particular pollutant or stream of pollutants in a water body.

Standard Urban Stormwater Mitigation Plan (SUSMP) – Plan to reduce pollutants and runoff flows from all new development and significant redevelopment projects falling under the priority project categories or locations. Significant redevelopment is defined as the creation or addition of at least 5,000 square feet of impervious surfaces on an already developed site. Significant redevelopment includes, but is not limited to: the expansion of a building footprint or addition or replacement of a structure; structural development including an increase in gross floor area and/or exterior construction or remodeling; replacement of impervious surface that is not part of a routine maintenance activity; and land disturbing activities related with structural or impervious surfaces. Within 180 days of approval of the model SUSMP in the public process by the SDRWQCB, each Copermittee shall adopt its own local SUSMP, and amended ordinances consistent with the approved model SUSMP, and shall submit both (local SUSMP and amended ordinances) to the SDRWQCB.

Stormwater Management Plan - means a plan, submitted in connection with an application for permit or other municipal approval, identifying the measures that storm water managers will use for runoff management during the permitted activity.

Substrate - Any combination of materials that provide support, water retention, aeration, or nutrient retention for plant growth.

Total Dissolved Solids (TDS) – Minerals dissolved in waters that may consist of carbonates, bicarbonates, sulfates, phosphates, nitrates, magnesium, sodium, iron, manganese, or other substances. Water imported into San Diego County often contains high levels of TDS.

Total Maximum Daily Loads (TMDL) - A TMDL specifies the maximum amount of a pollutant that a water body can receive and still meet water quality standards, and allocates pollutant loadings among point and nonpoint pollutant sources. By law, EPA must approve or disapprove 303(d) lists and TMDLs established by states, territories, and authorized tribes. If a state, territory, or authorized tribe submission is inadequate, EPA must establish the list or the TMDL. EPA issued regulations in 1985 and 1992 that implement section 303(d) of the Clean Water Act - the TMDL provisions. In California, the state's Porter Cologne Water Control Act requires that the Regional Boards adopt TMDL's as basin plan amendments.

Water Quality Objectives - Numerical or narrative limits on constituents or characteristics of water designed to protect designated beneficial uses of the water. [California Water Code Section 13050 (h)]. California's water quality objectives are established by the State and Regional Water Boards in the Water Quality Control Plans.

As stated in the Porter-Cologne Requirements for discharge (CWC 13263): "(Waste discharge) requirements shall implement any relevant water quality control plans that

have been adopted, and shall take into consideration the beneficial uses to be protected, the water objectives reasonably required for that purpose, other waste discharges, the need to prevent nuisance, and the provisions of Section 13241."

A more comprehensive list of legal authority containing water quality objectives applicable to this Order can be found in Finding 37 and in Section VII Directives Discussion Underlying Broad Legal Authority for Order 2001-01 pp. 61-63.

Numeric or narrative limits for pollutants or characteristics of water designed to protect the beneficial uses of the water. In other words, a water quality objective is the maximum concentration of a pollutant that can exist in receiving waters and still generally ensure that the beneficial uses of the receiving water remain protected (i.e., not impaired). Since water quality objectives are designed specifically to protect the beneficial uses, when the objectives are violated the beneficial uses are, by definition, no longer protected and become impaired. This is a fundamental concept under the Porter Cologne Act. Equally fundamental is Porter Cologne's definition of pollution. A condition of pollution exists when the water quality needed to support designated beneficial uses has become unreasonably affected or impaired; in other words, when the water quality objectives have been violated. These underlying definitions (regarding beneficial use protection) are the reason why all waste discharge requirements implementing the federal NPDES regulations require compliance with water quality objectives.

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APPENDIX B – PEÑASQUITOS WATERSHED MAPS