II. REGIONAL WATER RESOURCES

A. WATERSHEDS

San Diego County encompasses an area of over 4000 square miles in the southwest corner of California. The County is bounded on the north by Orange and Riverside counties, on the east by Imperial County, on the south by Mexico, and on the west by the Pacific Ocean (map: Figure II-1). The northwest to southeast trending Peninsular Range, the most prominent topographic feature in the region divides the County into the San Diego and Colorado hydrologic regions. The Peninsular Range includes the Santa Ana, Agua Tibia, Palomar, Hot Springs, Aguanga, Volcan, Cuyamaca, and Laguna Mountain systems and attains a maximum elevation of over 6,500 feet above mean sea level.

The climate in coastal San Diego County is generally mild with temperatures averaging about 65 degrees Fahrenheit and annual rainfall totaling 10-14 inches. Proceeding inland from the coast, diurnal and seasonal temperatures fluctuate to a greater degree and annual rainfall amounts typically increase. The foothills west of the Peninsular Range average 16 – 20 inches of annual rainfall and the western slope of the Peninsular Range receives as much as 45 inches of annual precipitation. The region has a distinct rainy season with the vast majority of precipitation occurring during the period October – April.

There are a total of 11 hydrologic units (HUs) in the San Diego Hydrologic Region (SDHR), encompassing a land area of nearly 3,000 square miles. 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 (Table II-1). In addition, there are three HUs whose headwaters are located between the Peninsular Range and the Pacific Ocean. These include the Carlsbad, Los Penasquitos, and Pueblo San Diego units.

Spanish missionaries constructed the first dam in San Diego County across the San Diego River in the 18th century and by 1923 every major drainage system in the County included at least one reservoir. Today, numerous water reservoirs capture and store surface flows throughout San Diego County however; the County is unable to meet its water supply requirements solely through the storage of local runoff. In 1947 the newly constructed San Vicente Reservoir was the first facility to store water from the Colorado River. Today, the State Water Project also brings water from Northern California rivers to San Diego County via a network of large-diameter pipelines.

The population of San Diego County grew slowly until the later part of the 19th century when several regional water development projects and a railroad were completed. The County population, which was less than 50,000 at the turn of the 20th century, reached 200,000 by 1940 and passed 1 million in the late 1950's. The present population of San Diego County is approximately 2.7 million residents. The San Diego HU is the County's most populous with over 500,000 residents. The most densely populated HUs in the

County are the Pueblo San Diego, Penasquitos, and Carlsbad units with 13.09, 4.27, and 3.49 persons per acre, respectively.

Residential, agricultural and undeveloped land uses are generally the most important in terms of area in the SDHR with substantial variations occurring between the 11 hydrologic units (Table II-2). Approximately 50% of the land area west of the Peninsular Range is currently undeveloped. Of this vacant land, 40% is planned for future development, mainly for residential use. The current land use distribution in the SDHR also includes residential (15%), commercial/ industrial (5%), parks/ open space (10%), freeways/ roads (6%), and agriculture (13%). The activities associated with these land uses generate a variety of water pollutants (Table II-3).

The surface water, coastal, and groundwater resources of the SDHR support numerous economic, water supply, recreational, and habitat-related beneficial uses (Table II-4). San Diego County is also host to a diverse array of natural habitats including montane forests, chaparral covered hillsides, coastal sage scrub, riparian woodlands, freshwater wetlands, coastal salt and brackish marshes, vernal pools, lagoons, enclosed bays, tide pools, and open ocean. These areas support numerous unique and sensitive biological habitats and are home to rare, threatened, and endangered animal and plant species like the California gnatcatcher, the arroyo toad, the southwestern pond turtle, the salt marsh daisy, and the Otay Mesa mint.

The region's rapid economic development and urbanization has resulted in many of the water bodies in the SDHR being identified as impaired on the California 303(d) list for a host of conditions including elevated coliform bacteria and trace metals, aquatic and sediment toxicity, nutrient enrichment, and sedimentation. Several water bodies are impaired for multiple stressors including Mission Bay, Chollas Creek, and the Tijuana River (Table II-5, Figure II-3, and Figure II-4). Mitigating the widespread impairments to beneficial uses and protecting and restoring the ecological integrity of the County's diverse habitats will be among the region's most important future challenges.

B. WATERSHED / PROJECT MAP

Fig II-1

C. TABLES OF POLLUTANTS, AREA, POPULATION, LAND USES, RECEIVING WATERS & JURIDSICTIONS by WATERSHED

Table II-1

Hydrologic Unit	HU #	Hydrologic Area	HA #
San Juan	901.00	Laguna	901.10
		Mission Viejo	901.20
		San Clemente	901.30
		San Mateo Canyon	901.40
		San Onofre	901.50
Santa Margarita	902.00	Ysidora	902.10
		DeLuz	902.20
		Murrieta	902.30
		Auld	902.40
		Pechanga	902.50
		Wilson	902.60
		Cave Rocks	902.70
		Aguanga	902.80
		Oakgrove	902.90
San Luis Rey	903.00	Lower San Luis	903.10
		Monserate	903.20
		Warner Valley	903.30
Carlsbad	904.00	Loma Alta	904.10
		Buena Vista Creek	904.20
		Agua Hedionda	904.30
		Encinas	904.40
		San Marcos	904.50
		Escondido Creek	904.60
San Dieguito	905.00	Solana Beach	905.10
		Hodges	905.20
		San Pasqual	905.30
		Santa Maria Valley	905.40
		Santa Isabel	905.50
Penasquitos	906.00	Miramar Reservoir	906.10
		Poway	906.20
		Scripps	906.30
		Miramar	906.40
		Tecolote	906.50
San Diego	907.00	Lower San Diego	907.10
		San Vincente	907.20
		El Capitan	907.30
		Boulder Creek	907.40
Pueblo San Diego	908.00	Point Loma	908.10
		San Diego Mesa	908.20
		National City	908.30
Sweetwater	909.00	Lower Sweetwater	909.10
		Middle Sweetwater	909.20
		Upper Sweetwater	909.30
Otay	910.00	Coronado	910.10
		Otay Valley	910.20
		Dulzura	910.30
Tijuana	911.00	Tijuana Valley	911.10
		Potrero	911.20
		Barrett Lake	911.30
		Monument	911.40
		Morena	911.50
		Cottonwood	911.60
		Cameron	911.70
		Campo	911.80

Table II-2

Land Use in Square Miles and % of Watershed Total

Watershed (HU)	Population[2]	Jurisdictions	Area (acres)	Area (mi^2)	% of Watershed	Residen-tial	Comm./ Industr.	Schools	Comm. Recreat.	Freeway/ Road	Parks/ Open	Agri-culture	Vacant/ Undev.
San Juan	TBD	Unincorporated	96,664	151.0	30.5	**To Be Determined**							
		Orange County	164,349	256.8	51.8								
		Riverside County	56,390	88.1	17.8								
		Total	317,403	495.9	100.0								
Santa Margarita	TBD	Unincorporated	125,622	196.3	26.5	**To Be Determined**							
		Oceanside	155	0.2	0.0								
		Riverside County	348,194	544.1	73.5								
		Total	473,971	740.6	100.0								
San Luis Rey	134,482	Unincorporated	342,566	535.3	95.2	39.5	19.3	0.7	3.4	19.8	36.0	133.7	309.0
		Escondido	52	0.1	0.0								
		Oceanside	15,883	24.8	4.4								
		Vista	743	1.2	0.2	7.0%	3.4%	0.1%	0.6%	3.5%	6.4%	23.8%	55.0%
		Riverside County	649	1.0	0.2								
		Total	359,893	562.3	100.0								
Carlsbad	472,334	Unincorporated	42,299	66.1	31.3	62.3	13.1	2.5	3.2	24.5	12.9	24.5	68.5
		Carlsbad	25,013	39.1	18.5								
		Encinitas	12,396	19.4	9.2								
		Escondido	17,460	27.3	12.9								
		Oceanside	10,946	17.1	8.1	29.5%	6.2%	1.2%	1.5%	11.6%	6.1%	11.6%	32.4%
		San Marcos	15,459	24.2	11.4								
		Solana Beach	588	0.9	0.4								
		Vista	11,161	17.4	8.2								
		Total	135,322	211.4	100.0								
San Dieguito	126,237	Unincorporated	176,691	276.1	79.8	39.7	4.5	0.6	3.6	13.0	24.4	74.3	185.6
		Del Mar	991	1.5	0.4								
		Escondido	5,659	8.8	2.6								
		Poway	9,016	14.1	4.1	11.5%	1.3%	0.2%	1.0%	3.8%	7.1%	21.5%	53.7%
		San Diego	27,345	42.7	12.4								
		Solana Beach	1,605	2.5	0.7								
		Total	221,307	345.8	100.0								
Penasquitos	442,731	Unincorporated	1,861	2.9	1.8	40.2	18.4	4.2	2.6	20.9	27.5	5.7	42.5
		Del Mar	151	0.2	0.1								
		Poway	15,450	24.1	14.9								
		San Diego	86,250	134.8	83.2	24.8%	11.4%	2.6%	1.6%	12.9%	17.0%	3.5%	26.2%
		Total	103,712	162.1	100.0								

Watershed (HU)	Population[2]	Jurisdictions	Area (acres)	Area (mi^2)	% of Watershed	Residen-tial	Comm./ Industr.	Schools	Comm. Recreat.	Freeway/ Road	Parks/ Open	Agri-culture	Vacant/ Undev.
		Unincorporated	207,334	324.0	74.7								
		El Cajon	9,245	14.4	3.3								
		La Mesa	3,031	4.7	1.1								
San Diego	506,420	Poway	587	0.9	0.2	64.4	18.0	3.1	2.8	23.9	57.6	10.6	253.3
		San Diego	46,765	73.1	16.8	14.9%	4.2%	0.7%	0.6%	5.5%	13.3%	2.5%	58.4%
		Santee	10,581	16.5	3.8								
		Total	277,543	433.7	100.0								
		Unincorporated	121	0.2	0.3								
		La Mesa	1,613	2.5	4.5								
Pueblo San Diego	472,204	Lemon Grove	1,646	2.6	4.6	23.2	9.9	1.7	0.6	14.4	3.2	0.02	3.3
		National City	2,535	4.0	7.0	41.1%	17.6%	3.0%	1.0%	25.6%	5.8%	0.04%	5.9%
		San Diego	30,146	47.1	83.6								
		Total	36,061	56.3	100.0								
		Unincorporated	128,463	200.7	86.8								
		Chula Vista	13,406	20.9	9.1								
		La Mesa	1,136	1.8	0.8								
Sweetwater	295,270	Lemon Grove	857	1.3	0.6	42.4	5.3	2.1	2.7	13.8	40.6	9.5	114.8
		National City	2,130	3.3	1.4	18.3%	2.3%	0.9%	1.2%	6.0%	17.6%	4.1%	49.7%
		San Diego	2,046	3.2	1.4								
		Total	148,038	231.3	100.0								
		Unincorporated	68,653	107.3	69.7								
		Chula Vista	17,331	27.1	17.6								
		Coronado	5,105	8.0	5.2								
Otay	143,916	Imperial Beach	721	1.1	0.7	13.1	10.1	0.8	1.1	5.5	5.7	15.3	102.4
		National City	127	0.2	0.1	8.5%	6.6%	0.5%	0.7%	3.6%	3.7%	9.9%	66.5%
		San Diego	6,596	10.3	6.7								
		Total	98,533	154.0	100.0								
		Unincorporated	282,902	442.0	25.7								
		Imperial Beach	2,119	3.3	0.2								
Tijuana	TBD	San Diego	13,981	21.8	1.3	**To Be Determined**							
		Mexico	801,829	1,252.9	72.8								
		Total	1,100,831	1,720.0	100.0								

[1] Data from SANDAG Info, Watersheds of the San Diego Region, 1998.

[2] 1997 SANDAG population estimate

TBD - data to be determined after further research

Table II-3

Constituent Category	Example Constituents	Sources/ Activities
Nutrients	nitrate ammonia phosphate	residential fertilization, septic systems, agriculture, treatment plant effluent
Minerals	chloride sulfate iron	excessive irrigation or soil amendment, natural mineral deposits
Sediment	total suspended solids turbidity	construction sites, burn areas, agricultural fields
Bacteria and viruses	fecal coliform bacteria enterococcus bacteria enterovirus	sewage spills, pet and wildlife waste, organic soil amendments
Trace Metals	copper lead zinc	roadways, plating shops, industrial processes
Trash and Floatables	plastics paper	littering and other improper disposal practices
Oils and Greases	food wastes animal fats petroleum products	restuarants, industrial processes
Volatile Organic Chemicals	trichloroethylene benzene vinyl chloride	commercial and industrial processes, gasoline, solvents
Gasoline and Diesel Fuels	hydrocarbons	leaking fuel tanks, automotive maintenance and refueling, spills
Polyaromatic Hydrocarbons	napthalene pyrene acrolein	refineries, diesel fuel breakdown products, combustion
Pesticides and Herbicides	chlordane chlorpyrifos diazanon	agricultural and residential application, spillage, illegal dumping
Phenols	2-chlorophenol 2-nitrophenol pentachlorophenol	landfills, industrial effluents
Organic Debris	landscape waste food waste	landscape maintenance

Table II-4

Summary of Beneficial Use Designations[1]

Beneficial Use	Abbreviation	Definition
Municipal and Domestic Supply	MUN	Community, military, or individual water supply systems including, but not limited to, drinking water supply
Agricultural Supply	AGR	Farming, horticulture, or ranching including, but not limited to, irrigation, stock watering, or support of vegetation for range grazing
Industrial Process Supply	PROC	Industrial activities that depend primarily on water quality
Industrial Service Supply	IND	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
Ground Water Recharge	GWR	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	FRSH	Natural or artificial maintenance of surface water quantity or quality (e.g. salinity)
Navigation	NAV	Shipping, travel, or other transportation by private, military, or commercial vessels
Hydropower Generation	POW	Hydropower generation
Contact Water Recreation	REC-1	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	REC-2	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
Commercial and Sport Fishing	COMM	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

Beneficial Use	Abbreviation	Definition
Aquaculture	AQUA	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
Warm Freshwater Habitat	WARM	Warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish or wildlife, including invertebrates
Cold Freshwater Habitat	COLD	Cold water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish or wildlife, including invertebrates
Inland Saline Water Habitat	SAL	Inland saline water ecosystems including, but not limited to, preservation or enhancement of aquatic saline habitats, vegetation, fish, or wildlife, including invertebrates
Estuarine Habitat	EST	Estuarine ecosystems including, but not limited to, preservation or enhancement of esturarine habitats, vegetation, fish, shellfish, or wildlife (e.g., estuarine mammals, waterfowl, shorebirds)
Marine Habitat	MAR	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)
Wildlife Habitat	WILD	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	BIOL	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	RARE	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	MIGR	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	SPWN	High quality habitats suitable for reproduction and early development of fish. This use is applicable only for the protection of anadromous fish
Shellfish Harvesting	SHELL	Habitats suitable for the collection of filter-feeding shellfish (e.g. clams, oysters, and mussels) for human consumption, commercial, or sport puposes

[1] California Regional Water Quality Control Board, San Diego Region, 1994. Water Quality Control Plan for the San Diego Basin (9), Page 2.3 - 2.5.

Table II-5 **1998 CALIFORNIA 303(d) LIST AND PRIORITY SCHEDULE (REGION 9)**

Hydrologic Unit	Watershed	Major Water Bodies	Waterbody Type	Pollutant/Stressor	Sources	Impaired Beneficial Uses	TMDL Priority
900.00	San Diego Bay	San Diego Bay; Shelter Island Yacht Basin (900.00)	B	Copper	Point/ Nonpoint	Aquatic life	High
		San Diego Bay; Near Sub Base (900.00)	B	Benthic Comm. Effects, Sediment Toxicity	Point/ Nonpoint	Aquatic life	High
		San Diego Bay; Near Grape Street (900.00)	B	Benthic Comm. Effects, Sediment Toxicity	Point/ Nonpoint	Aquatic life	High
		San Diego Bay; Downtown Piers (900.00)	B	Benthic Comm. Effects, Sediment Toxicity	Point/ Nonpoint	Aquatic life	High
		San Diego Bay; Near Switzer Creek (900.00)	B	Benthic Comm. Effects, Sediment Toxicity	Point/ Nonpoint	Aquatic life	High
		San Diego Bay; Near Coronado Bridge (900.00)	B	Benthic Comm. Effects, Sediment Toxicity	Point/ Nonpoint	Aquatic life	High
		San Diego Bay; Near Chollas Creek (900.00)	B	Benthic Comm. Effects, Sediment Toxicity	Point/ Nonpoint	Aquatic life	High
		San Diego Bay; San Diego Naval Station (900.00)	B	Benthic Comm. Effects, Sediment Toxicity	Point/ Nonpoint	Aquatic life	High
		San Diego Bay; Seventh Street Channel (900.00)	B	Benthic Comm. Effects, Sediment Toxicity	Point/ Nonpoint	Aquatic life	High
		San Diego Bay; North of 24th Street Marine Terminal (900.00)	B	Benthic Comm. Effects, Sediment Toxicity	Point/ Nonpoint	Aquatic life	High
901.00	San Juan	Aliso Creek, Mouth of (901.13)	E	High Coliform Count	Point/ Nonpoint	Rec-1, Rec-2	Medium
		Aliso Creek (901.13)	R	High Coliform Count	Point/ Nonpoint	Rec-1, Rec-2	Medium
		Pacific Ocean, Laguna Beach HSA (901.12)	C	High Coliform Count	Point/ Nonpoint	Rec-1, Rec-2, Shellfish harvest	Medium
		Pacific Ocean, Aliso HSA (901.13)	C	High Coliform Count	Point/ Nonpoint	Rec-1, Rec-2	Low
		Pacific Ocean, Dana Point HSA (901.14)	C	High Coliform Count	Point/ Nonpoint	Rec-1, Rec-2	Low
		San Juan Creek (Mouth) (901.200)	E	High Coliform Count	Point/ Nonpoint	Rec-1, Rec-2, Shellfish harvest	Low
		Pacific Ocean, Lower San Juan HSA (901.270)	C	High Coliform Count	Point/ Nonpoint	Rec-1, Rec-2, Shellfish harvest	Low
		Lower San Juan Creek (901.270)	R	High Coliform Count	Point/ Nonpoint	Rec-1, Rec-2, Shellfish harvest	Low
		Pacific Ocean, San Clemente HA (901.30)	C	High Coliform Count	Point/ Nonpoint	Rec-1, Rec-2, Shellfish harvest	Low
902.00	Santa Margarita	Santa Margarita Lagoon (901.110)	E	Eutrophic	Point/ Nonpoint	Rec-1, Rec-2, Aquatic life	High
		Rainbow Creek (902.200)	R	Eutrophic	Point/	Aquatic life	High

Hydrologic Unit	Watershed	Major Water Bodies	Waterbody Type	Pollutant/Stressor	Sources	Impaired Beneficial Uses	TMDL Priority
903.00	San Luis Rey	Pacific Ocean, San Luis Rey HU (903.00)	C	High Coliform Count	Point/ Nonpoint	Rec-1, Rec-2, Shellfish harvest	Low
		Guajome Lake (903.110)	L	Eutrophic	Point/ Nonpoint	Aquatic life	Medium
904.00	Carlsbad	Pacific Ocean, Loma Alta HAS (904.10)	C	High Coliform Count	Point/ Nonpoint	Rec-1, Rec-2, Shellfish harvest	Low
		Loma Alta Slough (904.100)	E	Eutrophic	Nonpoint	Aquatic life	Low
				High Coliform Count		Rec-1, Rec-2	
		Pacific ocean, Buena Vista HA (904.20)	C	High Coliform Count	Point/ Nonpoint	Rec-1, Rec-2, Shellfish harvest	Low
		Buena Vista Lagoon (904.210)	E	High Coliform Count	Point/ Nonpoint	Rec-1, Rec-2	Low
				Nutrients		Aquatic life	
				Sedimentation/Siltation			Medium
		Agua Hedionda Lagoon (904.310)	E	High Coliform Count	Point/ Nonpoint	Rec-1, Rec-2, Shellfish harvest	Low
				Sedimentation/Siltation		Aquatic life	Medium
		Pacific Ocean, San Marcos HA (904.50)	C	High Coliform Count	Point/ Nonpoint	Rec-1, Rec-2, Shellfish harvest	Low
		Pacific Ocean, Escondido Creek HA (904.60)	C	High Coliform Count	Point/ Nonpoint	Rec-1, Rec-2, Shellfish harvest	Low
		San Elijo Lagoon (904.610)	E	Eutrophic	Point/ Nonpoint	Aquatic life	Low
				High Coliform Count		Rec-1,Rec-2, Shellfish harvest, Fish	
				Sedimentation/Siltation		Aquatic life	Medium
905.00	San Dieguito	Pacific Ocean, San Dieguito HU (905.00)	C	High Coliform Count	Rec-1, Rec-2, Shellfish	Rec-1, Rec-2, Shellfish harvest	Low
906.00	Mission Bay	Los Penasquitos Lagoon (906.100)	E	Sedimentation/Siltation	Point/ Nonpoint	Aquatic life	Medium
		Pacific Ocean, Scripps HA (906.30)	C	High Coliform Count	Point/ Nonpoint	Rec-1, Rec-2, Shellfish harvest	Low
		Mission Bay (906.400)	B	Eutrophic	Point/ Nonpoint	Aquatic life	Medium
				High Coliform Count		Rec-1, Rec-2, Shellfish harvest	Low
				Lead		Aquatic life	Medium
		Famosa Slough & Channel (906.400)	E	Eutrophic	Nonpoint	Aquatic life	Medium
		Tecolote Creek (906.500)	R	Cadmium	Point/ Nonpoint	Aquatic life	Medium
				Copper			
				Lead			
				Zinc			
				Toxicity			
				High Coliform Count		Rec-1, Rec-2	Low

Hydrologic Unit	Watershed	Major Water Bodies	Waterbody Type	Pollutant/Stressor	Sources	Impaired Beneficial Uses	TMDL Priority
907.00	**San Diego**	Pacific Ocean, San Diego HU (907.00)	C	High Coliform Count	Point/ Nonpoint	Rec-1, Rec-2, Shellfish harvest	Low
908.00	**San Diego Bay (Pueblo San Diego)**	San Diego Bay, Lindbergh (908.210)	C	High Coliform Count	Point/ Nonpoint	Rec-1, Rec-2	Low
		Chollas Creek (908.220)	R	Cadmium	Point/ Nonpoint	Aquatic life	High
				Copper			
				Lead			
				Zinc			
				Toxicity		Rec-1, Rec-2	
				High Coliform Count			Low
909.00	**San Diego Bay (Sweetwater)**	San Diego Bay, Telegraph HAS (909.11)	C	High Coliform Count	Point/ Nonpoint	Rec-1, Rec-2	Low
910.00	**San Diego Bay (Otay)**	Pacific ocean, Coronado HA (910.10)	C	High Coliform Count	Point/ Nonpoint	Rec-1, Rec-2, Shellfish harvest	Low
911.00	**Tijuana**	Pacific Ocean, Tijuana HU (911.00)	C	High Coliform Count	Point/ Nonpoint	Rec-1, Rec-2	Low
		Tijuana River Estuary (911.110)	E	Eutrophic	Point/ Nonpoint	Aquatic life	Low
				Lead			
				Nickel			
				Trash			
				Thallium			
				Pesticides		Aquatic life, Fish Consumption	
				High Coliform Count		Rec-1, Rec-2, Fish consumption, Shellfish harvest	
		Tijuana River (911.110)	R	Eutrophic	Point/ Nonpoint	Aquatic life, Fish Consumption	Low
				High Coliform Count		Rec-1, Rec-2, Fish consumption	
				Org. Enrichment/Low D.O.		Aquatic life	
				Pesticides		Fish consumption	
				Solids		Aquatic life	
				Synthetic Organics		Aquatic life, Fish Consumption	
				Trace Elements		Aquatic life, Fish Consumption	
				Trash		Fish consumption	

B=Bays and Harbors G=Ground Water R=Rivers/Streams
C=Coastal Shorelines L=Lakes/Reservoirs S=Saline Lakes
E=Estuaries O=Ocean and Open Bays T=Wetlands,Tidal

Figure II-3: Number of 303(d) Listings in the San Diego Region

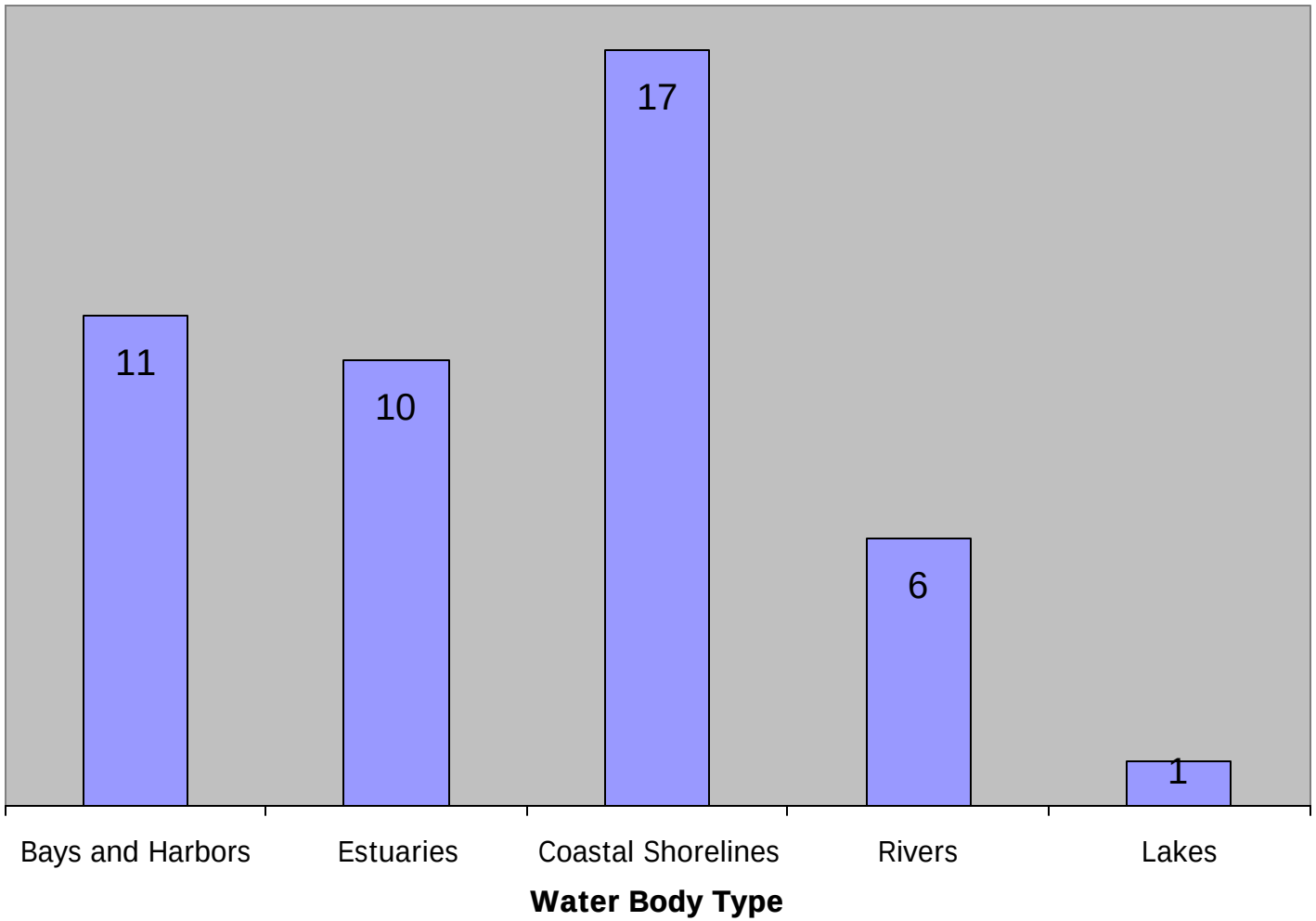
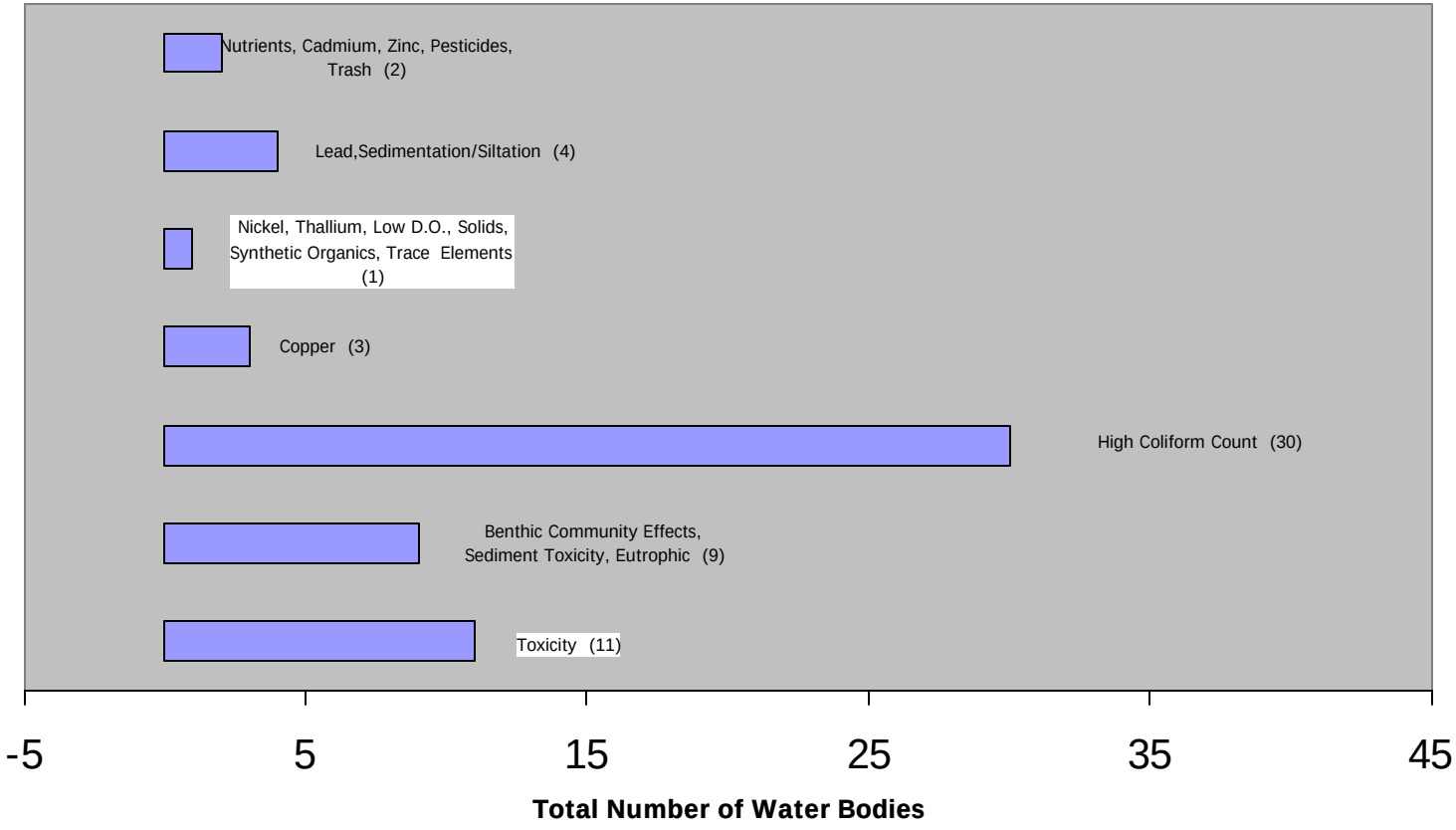


Figure II-4: Number of Affected Water Bodies by Pollutant/Stressor



D. DETAILS OF EACH HYDROLOGIC UNIT / HYDROLOGIC AREA

1. San Juan Creek Watershed

Hydrologic Unit: 901.11 – 901.53
Major Water Bodies: Orange County: Aliso Creek, San Juan Creek, Dana Point Harbor
San Diego County: San Mateo Creek, San Onofre Creek, Las Flores Creek
CWA 303(d) List: None present**.**
Major Impacts: Surface and groundwater quality degradation, habitat loss, channel bed erosion, and invasive species
Constituents of Concern: coliform bacteria, nutrients, TDS, solvents, trace metals, and petroleum
Sources/ Activities: urban runoff, agricultural runoff, and military operations

The San Juan Hydrologic Unit (SJHU) covers 496 square miles in San Diego, Orange, and Riverside counties. Approximately 150 square miles (30%) of this area is located in northwest San Diego County, almost entirely within the Camp Pendleton Marine Corps Base. There are five hydrologic areas (HA) in the SJHU, two of which, the San Onofre and San Mateo HAs are within San Diego County. The major stream systems in the San Onofre HA drain the San Onofre, Las Flores, and Aliso Canyon basins. It is not unusual for these creeks to be dry from July through November. The topography of the San Onofre and San Mateo HAs is varied, ranging from coastal plains in the western portion to the Santa Margarita Mountains, which rise over 2,000 feet above mean sea level.

The San Onofre and San Mateo HAs are largely undeveloped and contain 21 recognized plant communities within the Camp Pendleton MCB including coastal sage scrub, oak woodlands, chaparral, grasslands, coastal dunes, salt marshes, and riparian woodlands. This series of habitats supports 18 threatened or endangered plant and animal species. Various wildlife species use the undeveloped, low-lying creeks and streambeds as corridors to range freely within the MCB and outward to surrounding open space areas like the Cleveland National Forest to the northeast.

The land uses within the San Onofre and San Mateo HAs include open space, military base operations, and agriculture. In addition, there is a state beach along the Interstate 5 corridor near the northern boundary of the MCB, and a golf course near the southern boundary. Nearby jurisdictions include the cities of Oceanside and San Clemente to the south and north, respectively and the community of Fallbrook to the east. Past water quality monitoring has indicated that the region's surface waters are high in total dissolved solids. Local wells are the sole water source for Camp Pendleton and several elevated constituents have been noted including nitrates, TDS, iron, sodium, and E. Coli, although there appear to be no long-term trends.

BENEFICIAL USES WITHIN THE SAN JUAN CREEK WATERSHED

Beneficial Uses	Inland Surface Waters	Coastal Waters	Reservoirs and Lakes	Ground Waters
Municipal and Domestic Supply				X
Agricultural Supply	X			X
Industrial Service Supply	X	X		X
Navigation		X		
Contact Water Recreation	X	X		
Non-Contact Water Recreation	X	X		
Commercial and Sport Fishing		X		
Biological Habitats of Special Signif.		X		
Warm Freshwater habitat	X			
Cold Freshwater Habitat	X			
Wildlife Habitat	X	X		
Rare, Threatened, or End. Species	X	X		
Marine Habitat		X		
Migration of Aquatic Organisms		X		
Aquaculture		X		
Spawning, Reproduction, Early Dev.		X		
Shellfish Harvesting		X		

2. Santa Margarita River Watershed

Hydrologic Unit: 902.11 – 902.94
Major Water Bodies: Santa Margarita River, Temecula Creek, Murrieta Creek, Santa Margarita Lagoon, Vail Lake, Skinner Reservoir, Diamond Valley Lake Reservoir
CWA 303(d) List: Rainbow Creek: eutrophic, Santa Margarita Lagoon: eutrophic
Major Impacts: Surface and groundwater quality degradation, habitat loss, invasive species, channel bed erosion
Constituents of Concern: Nitrate (surface and groundwater), sediment, coliform bacteria, and TDS in groundwater
Sources/ Activities: Agricultural/ orchards, livestock/ domestic animals, septic systems, use of recycled water, and urban runoff

The Santa Margarita River watershed encompasses approximately 750 square miles in northern San Diego and southwestern Riverside counties. The watershed contains a variety of nearly intact habitats including chaparral-covered hillsides, riparian woodlands, and coastal marshes. Of the total watershed area, approximately 27% is within San Diego County. The Santa Margarita River is formed near the City of Temecula in Riverside County at the confluence of the Temecula and Murrieta creek systems. Once formed, the majority of the Santa Margarita River main stem flows within San Diego County through unincorporated areas, the community of Fallbrook, and the Marine Corps Base Camp Pendleton. The lower river and estuary have largely escaped the development typical of other regions of coastal Southern California, and are therefore able to support a relative abundance of functional habitats and wildlife.

The upper watershed basin lies in Riverside County, one of the fastest growing areas in California. In the absence of effective planning measures, this rapid development will likely exasperate surface water quality problems. Presently, the Rainbow Creek tributary and the Santa Margarita Lagoon are listed on the Clean Water Act section 303(d) list due to excessive inputs of nutrients from a variety of sources including agriculture, nursery operations, municipal wastewater discharges, urban runoff, septic systems, and golf course operations. Other serious water quality and environmental concerns in the watershed include excessive sedimentation from development and agricultural areas, groundwater degradation and contamination with nitrates and other salts, habitat loss, channelization, flooding and scour.

BENEFICIAL USES WITHIN THE SANTA MARGARITA WATERSHED

Beneficial Uses	Inland Surface Waters	Coastal Waters	Reservoirs and Lakes	Ground Waters
Municipal and Domestic Supply	X		X	X
Agricultural Supply	X		X	X
Industrial Service Supply	X	X	X	X
Industrial Process Supply	X		X	X
Ground Water Recharge	X		X	
Navigation		X		
Contact Water Recreation	X	X	X	
Non-Contact Water Recreation	X	X	X	
Commercial and Sport Fishing		X		
Warm Freshwater habitat	X		X	
Cold Freshwater Habitat	X		X	
Biological Habitats of Special Signif.		X		
Estuarine Habitat		X		
Wildlife Habitat	X	X		
Rare, Threatened, or End. Species	X	X	X	
Marine Habitat		X		
Migration of Aquatic Organisms		X		
Shellfish Harvesting		X		
Aquaculture		X		
Spawning, Reprod. and/ or Early Devel.		X		

3. San Luis Rey River Watershed

Hydrologic Unit: 903.11 – 903.32
Major Water Bodies: San Luis Rey River, Lake Henshaw
CWA 303(d) List: Pacific Ocean @ San Luis Rey River mouth: coliform bacteria
Major Impacts: Surface water quality degradation, habitat loss, invasive species, channel bed erosion
Constituents of Concern: Coliform bacteria, nitrate, sediment, pesticides
Sources/ Activities: agricultural/ orchards, livestock/ domestic animals, urban runoff, sand mining, septic systems

The San Luis Rey River watershed is located east of the City of Oceanside in the northwestern portion of San Diego County. The 558 square mile drainage is the largest hydrologic unit in the San Diego region. The watershed drains to the Pacific Ocean to the west and is bounded by the Moserate Mountains to the north, the Cleveland National Forest and Camp Pendleton to the northwest, and Escondido, San Diego, and other cities to the south. The basin is roughly 50 miles long by 16 miles wide, and is divided into two hydrologic units by Henshaw Dam. The areas above and below the dam encompass 206 and 354 square miles, respectively (USACOE, 1977).

Approximately 92.5% of the San Luis Rey River watershed is located in unincorporated areas of San Diego County. Roughly one-fourth of the land area in the watershed is located west of Interstate 15 including portions of the cities of Oceanside and Vista, the communities of Fallbrook and Bonsall, and the southwestern portion of Camp Pendleton. The land west of I-15 has multiple uses including open space/ undeveloped, residential, commercial/ industrial, and agricultural. East of Interstate 15, most of the land is owned and managed by government agencies (county, state, and federal), special districts, and Native American bands. The predominant land uses are open space/ undeveloped and agricultural.

Unlike most major rivers in Southern California, the San Luis Rey River has undergone relatively little channelization. The only significant segment of the river that has been channelized is within the City of Oceanside. However, the cumulative impacts of various land use practices in the basin appear to be degrading the river's environmental value. For example, an increased rate of bed erosion attributable to sand mining operations has been observed in the central reaches of the river.

BENEFICIAL USES WITHIN THE SAN LUIS REY WATERSHED

Beneficial Uses	Inland Surface Waters	Coastal Waters	Reservoirs and Lakes	Ground Waters
Municipal and Domestic Supply	X		X	X
Agricultural Supply	X		X	X
Industrial Service Supply	X		X	X
Industrial Process Supply			X	X
Hydropower Generation	X		X	
Navigation		X		
Freshwater Replenishment	X		X	X
Contact Water Recreation	X	X	X	
Non-Contact Water Recreation	X	X	X	
Commercial and Sport Fishing		X		
Biological Habitats of Special Signif.		X		
Warm Freshwater Habitat	X		X	
Cold Freshwater Habitat	X			
Wildlife Habitat	X	X	X	
Rare, Threatened, or End. Species	X	X	X	
Marine Habitat		X		
Migration of Aquatic Organisms		X		
Aquaculture		X		
Shellfish Harvesting		X		
Spawning, Reprod. and/ or Early Dev.		X		

4. Carlsbad Hydrologic Unit

Hydrologic Unit: 904.10 – 904.63
Major Water Bodies: Loma Alta Creek, Buena Vista Creek, Buena Vista Lagoon, Agua Hedionda Creek, Agua Hedionda Lagoon, San Marcos Creek, Batiquitos Lagoon, Escondido Creek, San Elijo Lagoon, Lake Wolhford
CWA 303(d) List: Pacific Ocean/ Buena Vista, Pacific Ocean/ Escondido Creek, Pacific Ocean/ Loma Alta, and Pacific Ocean/ San Marcos: coliform bacteria, Agua Hedionda Lagoon: coliform bacteria, sedimentation, Buena Vista Lagoon: coliform bacteria, nutrients, sedimentation, Loma Alta Slough: eutrophic, coliform bacteria, San Elijo Lagoon: eutrophic, coliform bacteria, sedimentation
Major Impacts: Surface water quality degradation, beach closures, sedimentation, habitat degradation and loss, invasive species, eutrophication
Constituents of Concern: Coliform bacteria, nutrients, sediment, trace metals and toxics
Sources/ Activities: urban runoff, agricultural runoff, sewage spills, and livestock/ domestic animals

The Carlsbad Hydrologic Unit is approximately 210 square miles in area extending from above Lake Wolhford in the east to the Pacific Ocean, and from Vista and Oceanside to Solana Beach, Escondido, and Rancho Santa Fe to the south. The cities of Carlsbad, San Marcos, and Encinitas are entirely within this HU. There are numerous important surface hydrologic features within the Carlsbad HU including four unique coastal lagoons, three major creeks, and two large water storage reservoirs. The HU contains four major hydrologic areas. From north to south they are the Buena Vista (901.2), the Agua Hedionda (904.3), the Batiquitos (904.5), and the San Elijo (904.6) HAs. Two smaller HAs, the Loma Alta (904.1) and the Canyon de las Encinas (904.4) are also within the Carlsbad HU.

The largest jurisdictions in terms of land area in the Carlsbad HU are the unincorporated San Diego County areas (66 sq. miles), the cities of Carlsbad (39 sq. miles) and San Marcos (24 sq. miles), and an approximately 27 square mile portion of the City of Escondido. The cities of Carlsbad, San Marcos, and Encinitas are located entirely within the HU. Approximately 48% of the Carlsbad HU is urbanized. The dominant land uses are residential (29%), commercial/ industrial (6%), freeways and roads (12%), agriculture (12%), and vacant/ undeveloped (32%). The Agua Hedionda, Buena Vista, and San Elijo lagoons are experiencing impairments to beneficial uses due to excessive coliform bacteria and sediment loading from upstream sources. They represent critical regional resources that provide freshwater and estuarine habitats for numerous plant and animal species. Other water bodies in the HU have been identified as impaired on the California 303(d) list for elevated coliform bacteria including several locations in the Pacific Ocean near creek and lagoon outlets.

BENEFICIAL USES WITHIN THE CARLSBAD WATERSHED

Beneficial Uses	Inland Surface Waters	Coastal Waters	Reservoirs and Lakes	Ground Waters
Municipal and Domestic Supply	X		X	X
Agricultural Supply	X		X	X
Industrial Service Supply	X	X	X	X
Navigation		X		
Hydropower Generation	X		X	
Contact Water Recreation	X	X	X	
Non-Contact Water Recreation	X	X	X	
Commercial and Sport Fishing		X		
Warm Freshwater Habitat	X	X	X	
Cold Freshwater Habitat	X		X	
Estuarine Habitat		X		
Wildlife Habitat	X	X	X	
Biological Habitats of Special Signif.		X		
Rare, Threatened, or End. Species	X	X		
Marine Habitat		X		
Migration of Aquatic Organisms		X		
Shellfish Harvesting		X		
Aquaculture		X		
Spawning, Reprod. And/or Early Devel.		X		

5. San Dieguito River Watershed

Hydrologic Unit: 905.11 – 905.54
Major Water Bodies: San Dieguito River, San Dieguito Lagoon, Lake Hodges
CWA 303(d) List: Pacific Ocean/ San Dieguito: coliform bacteria,
Major Impacts: Surface water quality degradation, habitat degradation and loss, invasive species, increased imperviousness
Constituents of Concern: Coliform bacteria, nutrients, sediment, lowered dissolve oxygen, and trace metals
Sources/ Activities: urban runoff, agricultural runoff, and domestic animals

The San Dieguito River watershed is a drainage area of approximately 346 square miles in west-central San Diego County. The watershed includes portions of the cities of Del Mar, Escondido, Poway, San Diego, and Solana Beach, and unincorporated San Diego County. In terms of land area, the majority of the watershed (79.8%) is within the unincorporated jurisdiction. The San Dieguito River watershed is presently divided into vacant/ undeveloped (54%), parks/ open space (29 %), and urban (18%) land uses. Nearly half of the vacant land area is open to future development, most of which is zoned for residential usage. The current watershed population is approximately 125,000 however; this level is projected increase to over 210,000 residents by 2015.

The watershed extends through a diverse array of habitats from its eastern headwaters in the Volcan Mountains to the outlet at the San Dieguito Lagoon and the Pacific Ocean. There are several important natural areas within the watershed that sustain a number of threatened and endangered species. Among these are the 55-mile long, 80,000 acre San Dieguito River Park, the 150 acre San Dieguito Lagoon, and five water storage reservoirs including Lake Hodges, Lake Sutherland, and Lake Poway.

The Pacific Ocean at the mouth of the San Dieguito River is listed as a 303(d)-impaired water body for elevated coliform bacteria. In the absence of a comprehensive watershed planning effort, large-scale future development may exasperate current water quality problems and create additional beneficial use impairments. The San Dieguito Lagoon is especially sensitive to the effects of pollutants and oxygen depletion due to restricted or intermittent tidal flushing.

BENEFICIAL USES WITHIN THE SAN DIEGUITO RIVER WATERSHED

Beneficial Uses	Inland Surface Waters	Coastal Waters	Reservoirs and Lakes	Ground Waters
Municipal and Domestic Supply	X		X	X
Agricultural Supply	X		X	X
Industrial Service Supply	X	X	X	X
Industrial Process Supply	X		X	X
Navigation		X		
Contact Water Recreation	X	X	X	
Non-Contact Water Recreation	X	X	X	
Commercial and Sport Fishing		X		
Warm Freshwater Habitat	X		X	
Cold Freshwater Habitat	X		X	
Wildlife Habitat	X	X	X	
Rare, Threatened, or End. Species	X	X	X	
Estuarine Habitat		X		
Biological Habitats of Special Sig.	X	X		
Marine Habitat		X		
Migration of Aquatic Organisms		X		
Aquaculture		X		
Shellfish Harvesting		X		
Spawning, Reprod. and/ or Early Development		X		

6. Los Penasquitos Watershed

Hydrologic Unit: 906.10 – 906.50
Major Water Bodies: Los Penasquitos Creek, Los Penasquitos Lagoon, Rose Creek, Tecolote Creek, Mission Bay, Miramar Reservoir
CWA 303(d) List: Los Penasquitos Lagoon: sedimentation, Mission Bay: coliform bacteria, eutrophic, lead, Tecolote Creek: cadmium, copper, lead, zinc, coliform bacteria, aquatic toxicity, Pacific Ocean/ Scripps: coliform bacteria, Formosa Slough and Channel: eutrophic
Major Impacts: Surface water quality degradation, beach closures, sedimentation, habitat degradation and loss, invasive species, eutrophication
Constituents of Concern: Coliform bacteria, nutrients, trace metals, toxics, and sediment
Sources/ Activities: urban runoff, sewage spills, dredging, and landfill leachate

The Los Penasquitos Hydrologic Unit (906) is comprised of the Los Penasquitos Creek watershed (906.10 - 906.20), several coastal tributaries (906.30), and the Mission Bay watershed (906.40 - 906.50). These watersheds drain a highly urbanized region located almost entirely west of Interstate 15 in coastal San Diego County. Collectively and individually, they support a variety of water supply, economic, recreational, and habitat-related beneficial uses. The major receiving waters, Los Penasquitos Lagoon and Mission Bay, are both fragile systems that support diverse native fauna and flora. Both water bodies are especially sensitive to the effects of pollutants due to restricted or intermittent tidal flushing.

The Los Penasquitos Creek watershed encompasses a land area of approximately 100 square miles including portions of the cities San Diego, Poway, and Del Mar. The watershed is highly urbanized with a population of approximately 400,000 residents. The creek discharges to a 0.6 square mile lagoon that is identified as an impaired water body on the California 303(d) list for sedimentation.

The Mission Bay watershed drains an area of approximately 80 square miles. Rose Creek and Tecolote Creek are the main tributaries to the Bay, which was converted from a coastal marshland in the 1940s after the completion of a large dredging project. Coliform bacteria inputted by urban runoff and sewage spills, which are discharged by the main tributaries and smaller conveyances draining the watershed, adversely affect much of Mission Bay. Tecolote Creek is identified as an impaired water body on the California 303(d) list for a host of pollutants including coliform bacteria, trace metals, and toxicity.

BENEFICIAL USES WITHIN THE LOS PENASQUITOS WATERSHED

Beneficial Uses	Inland Surface Waters	Coastal Waters	Reservoirs and Lakes	Ground Waters
Municipal and Domestic Supply			X	X
Agricultural Supply	X			X
Industrial Service Supply	X	X	X	X
Navigation		X		
Contact Water Recreation	X	X	X	
Non-Contact Water Recreation	X	X	X	
Commercial and Sport Fishing		X		
Biological Habitats of Special Signif.		X		
Warm Freshwater Habitat	X		X	
Cold Freshwater Habitat	X			
Estuarine Habitat		X		
Wildlife Habitat	X	X	X	
Rare, Threatened, or End. Species	X	X		
Marine Habitat		X		
Migration of Aquatic Organisms		X		
Aquaculture		X		
Shellfish Harvesting		X		
Spawning, Reprod., and/or Early Devel.		X		
Hydropower Generation			X	

7. San Diego River Watershed

Hydrologic Unit: 907.11 – 907.43
Major Water Bodies: San Diego River, El Capitan Reservoir, San Vincente Reservoir, Boulder Creek, Santee Lakes
CWA 303(d) List: Pacific Ocean @ San Diego River mouth: coliform bacteria
Major Impacts: Surface water quality degradation, habitat degradation and loss, sediment, invasive species, eutrophication, and flooding
Constituents of Concern: Coliform bacteria, TDS, nutrients, petroleum chemicals, toxics, and trash
Sources/ Activities: urban runoff, agricultural runoff, mining operations, sewage spills, sand mining

With a land area of approximately 440 square miles, the San Diego River watershed is the second largest hydrologic unit (HU) in San Diego County. It also has the highest population (~475,000) of the County's watersheds and contains portions of the cities of San Diego, El Cajon, La Mesa, Poway, and Santee and several unincorporated jurisdictions. Important hydrologic resources in the watershed include five water storage reservoirs, a large groundwater aquifer, extensive riparian habitat, coastal wetlands, and tidepools. Approximately 58.4% of the San Diego River watershed is currently undeveloped. The majority of this undeveloped land is in the upper, eastern portion of the watershed, while the lower reaches are more highly urbanized with residential (14.9%), freeways and roads (5.5%), and commercial/ industrial (4.2%) land uses predominating.

The five reservoirs in the San Diego River watershed supply water to as many as 760,000 residents in the region. Other areas including the Mission Trails Regional Park and the river flood plain near Lakeside represent two important undeveloped areas that host a wide variety of intact habitats and endangered species like the arroyo toad, least bell's vireo, and the southwestern pond turtle. In addition, Famosa Slough, near the mouth of the San Diego River contains extremely productive wetlands habitat.

The mouth of the river discharges into the Pacific Ocean at the community of Ocean Beach. Beach postings and closures from elevated levels of coliform bacteria more than doubled between 1996 and 1999 due to urban runoff and sewage spills. Discharge from the San Diego River outlet may also influence water quality in other nearby coastal areas including Sunset Cliffs, Pacific Beach, and Mission Beach.The extensive groundwater resources beneath the San Diego River provide a cost-effective and reliable water supply to four local water districts and the City of San Diego. Excessive extraction, increasing total dissolved solids, and MTBE contamination now threatens this resource.

BENEFICIAL USES WITHIN THE SAN DIEGO RIVER WATERSHED

Beneficial Uses	Inland Surface Waters	Coastal Waters	Reservoirs and Lakes	Ground Waters
Municipal and Domestic Supply	X		X	X
Agricultural Supply	X			X
Industrial Service Supply	X	X	X	X
Industrial Process Supply	X		X	X
Navigation		X		
Contact Water Recreation	X	X	X	
Non-Contact Water Recreation	X	X	X	
Commercial and Sport Fishing		X		
Warm Freshwater Habitat	X		X	
Cold Freshwater Habitat	X		X	
Estuarine Habitat		X		
Wildlife Habitat	X	X	X	
Biological Habitats		X		
Rare, Threatened, or End.		X	X	
Marine Habitat		X		
Migration of Aquatic Organisms		X		
Aquaculture		X		
Shellfish Harvesting		X		
Spawning, Reprod. and/ or Early		X		
Hydropower Generation			X	

8. Pueblo San Diego Watershed

Hydrologic Unit: 908.10 – 908.32
Major Water Bodies: Chollas Creek, Paleta Creek, and San Diego Bay
CWA 303(d) List: Chollas Creek: copper, lead, zinc, cadmium, coliform bacteria, stormwater toxicity San Diego Bay: coliform bacteria, benthic community effects, copper, sediment toxicity (discharges from several source basins contribute to impairments)
Major Impacts: Surface water quality degradation, habitat degradation, sediment toxicity in San Diego Bay, and sewer overflows
Constituents of Concern: trace metals and other toxic substances, coliform bacteria
Sources/ Activities: urban runoff

The Pueblo San Diego watershed is the smallest hydrologic unit (HU) in San Diego County, encompassing approximately 60 square miles of predominantly urban landscape in the cities of San Diego, La Mesa, Lemon Grove, and National City. The watershed contains the smallest proportion of unincorporated area (0.3%) of the HUs within the county. The population of the Pueblo San Diego watershed is approximately 500,000 residents, making it the county's most densely populated watershed. Approximately 75% of the watershed is developed. Residential, retail/ office, and industrial land uses account for 45%, 11%, and 10% of the total, respectively. In addition, there are relatively large percentages of land used for transportation corridors and highways. Due to the high level of existing urbanization in the watershed, only small amounts of additional land is projected for development over the next 15 years.

The beneficial uses of the inland surface waters in the Pueblo San Diego watershed are limited to contact (potential use) and non-contact recreation, warm freshwater habitat, and wildlife habitat. The San Diego Bay receiving water supports an extensive array of beneficial uses (see table below).

The watershed drainage consists of a group of relatively small local creeks and pipe conveyances, many of which are concrete-lined and drain directly into San Diego Bay. The creeks in the watershed are highly impacted by urban runoff, and Chollas Creek and the mouth of the creek in San Diego Bay are listed as 303(d)-impaired water bodies for various trace metals parameters and aquatic toxicity. Five sites in San Diego Bay that are impacted by runoff from the Pueblo San Diego watershed have been identified as hot spots by California's Bay Protection Toxic Cleanup Program.

BENEFICIAL USES WITHIN THE PUEBLO SAN DIEGO WATERSHED

Beneficial Uses	Inland Surface Waters	Coastal Waters	Reservoirs and Lakes	Ground Waters
Municipal and Domestic Supply				X
Industrial Service Supply		X		
Navigation		X		
Contact Water Recreation	X	X		
Non-Contact Water Recreation	X	X		
Warm Freshwater habitat	X			
Estuarine Habitat		X		
Wildlife Habitat	X	X		
Commercial and Sport Fishing		X		
Rare, Threatened, or End. Species		X		
Biological Habitats of Significance		X		
Marine Habitat		X		
Migration of Aquatic Organisms		X		
Shellfish Harvesting		X		

9. Sweetwater River Watershed

Hydrologic Unit: 909.11 – 909.35
Major Water Bodies: Sweetwater River, Sweetwater Reservoir, Loveland Reservoir, San Diego Bay
CWA 303(d) List: San Diego Bay/ Telegraph: coliform bacteria
Major Impacts: Surface and groundwater quality degradation, habitat degradation, invasive species
Constituents of Concern: coliform bacteria, trace metals and other toxics
Sources/ Activities: agricultural and urban runoff

The Sweetwater River watershed along with the Otay and Pueblo San Diego watersheds combine to form the San Diego Bay watershed area. The Sweetwater River watershed is the largest of the three encompassing 230 of the approximately 415 square mile total. Over 86% of the watershed is within unincorporated jurisdictions. The dominant land uses in the Sweetwater River watershed are urban (29%), open space/ agriculture (22%), and undeveloped (49%). Approximately two-thirds of the land area categorized as urban is composed of residential communities. Approximately 300,000 people currently reside within the Sweetwater River watershed, and this amount is projected to increase to 365,000 by 2015. The most important watershed issues are related to the protection of municipal water supplies, and the protection and restoration of sensitive wetland and wildlife habitats.

Between the headwaters and the outlet to San Diego Bay, the watershed contains a variety of habitat types including oak and pine woodlands, riparian forest, chaparral, coastal sage scrub, and coastal salt marsh. The upper watershed contains large undeveloped areas within the Cleveland National Forest and Cuyamaca Rancho State Park, the unincorporated communities of Pine Valley, Descanso, and Alpine, and the Viejas Indian Reservation. Unincorporated rural and suburban communities characterize the central part of the watershed. The urbanized lower portion of the Sweetwater watershed contains portions of several cities including San Diego, National City, Chula Vista, La Mesa, and Lemon Grove. Of the cities within the watershed, Chula Vista is the most important in terms of land area.

BENEFICIAL USES WITHIN THE SWEETWATER RIVER WATERSHED

Beneficial Uses	Inland Surface Waters	Coastal Waters	Reservoirs and Lakes	Ground Waters
Municipal and Domestic Supply	X		X	X
Agricultural Supply	X		X	X
Industrial Service Supply	X	X	X	X
Industrial Process Supply	X		X	
Navigation		X		
Contact Water Recreation	X	X	X	
Non-Contact Water Recreation	X	X	X	
Commercial & Sport Fishing		X		
Biological Habitats of Special Signif.	X	X		
Warm Freshwater habitat	X		X	
Cold Freshwater Habitat	X		X	
Wildlife Habitat	X	X	X	
Rare, Threatened, or End. Species	X	X		
Marine Habitat		X		
Migration of Aquatic Organisms		X		
Estuarine Habitat		X		
Shellfish Harvesting		X		

10. Otay River Watershed

Hydrologic Unit: 910.10 – 910.37
Major Water Bodies: Upper and Lower Otay Reservoirs, Otay River, San Diego Bay
CWA 303(d) List: Pacific Ocean (Coronado): coliform bacteria
Major Impacts: surface water quality degradation, reduced ground water recharge, sedimentation, habitat degradation and loss, flood control, invasive species
Constituents of Concern: coliform bacteria, trace metals and other toxic constituents
Sources/ Activities: urban runoff, agricultural runoff, resource extraction, septic systems, marinas and boating activities

The Otay River watershed encompasses approximately 160 square miles in southwest San Diego County and is one of the three hydrologic units that discharge to San Diego Bay. The watershed consists largely of unincorporated area, but also includes portions of the cities of Chula Vista, Imperial Beach, Coronado, National City, and San Diego. The predominant land uses in the watershed are open space (67%) and urban/ residential (20%). The major inland hydrologic features, Upper and Lower Otay Lakes, are two water supply reservoirs that also provide important habitat and recreational opportunities. Approximately 36 square miles of the watershed is part of the Multiple Species Conservation Plan effort that provides habitat for a wide range of endangered plant and animal species. Other important conservation areas within the watershed include the San Diego National Wildlife Refuge, the Rancho Jamul Ecological Reserve, and the vernal pool lands in the region.

The current population in the Otay River watershed is approximately 150,000 people. At the present time, serious water quality problems are limited to the presence of elevated coliform bacteria in the Pacific Ocean receiving waters near Coronado. However, an expected population increase of 88% from 1998 – 2015 will substantially increase the volume of urban runoff in the watershed, and could significantly alter the present water quality status. In the absence of effective watershed-based management, the natural resources of the Otay River watershed may be significantly degraded.

BENEFICIAL USES WITHIN THE OTAY WATERSHED

Beneficial Uses	Inland Surface Waters	Coastal Waters	Reservoirs and Lakes	Ground Waters
Municipal and Domestic Supply	X		X	X
Agricultural Supply	X		X	X
Industrial Service Supply	X	X	X	X
Industrial Process Supply	X		X	X
Commercial & Sport Fishing		X		
Navigation		X		
Hydropower Generation			X	
Contact Water Recreation	X	X	X	
Non-Contact Water Recreation	X	X	X	
Biological Habitats of Special Significance		X		
Warm Freshwater Habitat	X		X	
Cold Freshwater Habitat			X	
Estuarine Habitat		X		
Wildlife Habitat	X	X	X	
Rare, Threatened, or End. Species	X	X		
Marine Habitat		X		
Migration of Aquatic Organisms		X		
Spawning, Reproduction and/ or Early Dev.		X		
Shellfish Harvesting		X		

11. Tijuana River Watershed

Hydrologic Unit: 911.11 – 911.85
Major Water Bodies: Tijuana River, Cottonwood Creek, Tijuana Estuary
CWA 303(d) List: Tijuana River: eutrophic, coliform bacteria, organic enrichment/ low dissolved oxygen, pesticides, solids, synthetic organics, trace elements, trash; Tijuana River Estuary: eutrophic, coliform bacteria, lead, nickel, pesticides, thallium, trash; Pacific Ocean @ Tijuana River mouth: coliform bacteria
Major Impacts: surface water quality degradation, trash, sedimentation, eutrophication, habitat degradation and loss, flooding, erosion, invasive species
Constituents of Concern: Freshwater: coliform bacteria, nutrients, trace metals, pesticides, miscellaneous toxics, low dissolved oxygen, trash; Groundwater: TDS, nitrates, petroleum, MTBE, and solvents
Sources/ Activities: urban runoff, sewage spills, industrial discharges, agricultural/ orchards, livestock/ domestic animals, and septic systems

The Tijuana River watershed encompasses a region of approximately 1,750 square miles on either side of the California – Baja California border, and in terms of water quality degradation is probably the most severely impacted watershed in San Diego County. Although only 27% of the watershed area is within California, the river discharges to the Tijuana Estuary and Pacific Ocean on the U.S. side of the international border. On the U.S. side of the border, the cities of Imperial Beach and San Diego, and San Diego County have portions of their jurisdictions within the watershed. The cities of Tijuana and Tecate are the most important urban centers on the Mexican side. The current population of the entire watershed is approximately one million people.

The Tijuana River watershed is classified as a Category I (impaired) watershed by the State Water Resources Control Board due to a wide variety of water quality problems. These problems are largely a result of non-point agricultural sources on the U.S. side of the border and a large variety of point and non-point sources on the Mexican side. The Tijuana Estuary, a National Estuarine Sanctuary that supports a variety of threatened and endangered plants and animals, is threatened by inflows from the Tijuana River containing high concentrations of coliform bacteria, sediment, trace metals (copper, lead, zinc, chromium, nickel, and cadmium), PCBs, and other urban, agricultural, and industrial pollutants.

BENEFICIAL USES WITHIN THE TIJUANA WATERSHED

Beneficial Uses	Inland Surface Waters	Coastal Waters	Reservoirs and Lakes	Ground Waters
Municipal and Domestic Supply	X		X	X
Agricultural Supply	X		X	X
Industrial Service Supply	X	X	X	X
Industrial Process Supply	X		X	
Navigation		X		
Commercial & Sport Fishing		X		
Freshwater Replenishment	X		X	
Contact Water Recreation	X	X	X	
Non-Contact Water Recreation	X	X	X	
Biological Habitats of Special Significance		X		
Warm Freshwater Habitat	X		X	
Cold Freshwater Habitat	X		X	
Estuarine Habitat		X		
Wildlife Habitat	X	X	X	
Rare, Threatened, or End. Species	X	X	X	
Marine Habitat		X		
Migration of Aquatic Organisms		X		
Aquaculture		X		
Shellfish Harvesting		X		
Spawning, Reprod. and/ or Early Devel.		X		

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