
Otay-Cottonwood System				
	2010		2005	
Land Use Category	Acres	% Acres	Acres	% Acres
Parks & Open Space Preserves	59,399	26.2	52,978	23.3
Vacant & Undeveloped Land	143,532	63.2	156,095	68.8
Water	3,518	1.5	3,518	1.5
Total – Undeveloped	206,449	91.0	212,591	93.6
Agriculture	3,287	1.4	3,724	1.6
Commercial	27	0.0	25	0.0
Commercial Recreation	819	0.4	815	0.4
Industrial	57	0.0	23	0.0
Junkyard, Dump, Landfill	0	0.0	0	0.0
Mobile Home Park	17	0.0	16	0.0
Multi-Family Residential	0	0.0	0	0.0
Schools, Hospitals, Public & Private Institutions	298	0.1	284	0.1
Single Family Residential	829	0.4	523	0.2
Spaced Rural Residential	11,942	5.3	5,843	2.6
Transportation, Communication & Utilities	3,204	1.4	3,158	1.4
Under Construction	41	0.0	17	0.0
Total – Developed	20,521	9.0	14,428	6.4

Miramar System				
	2010		2005	
Land Use Category	Acres	% Acres	Acres	% Acres
Parks & Open Space Preserves	350	54.5	353	54.8
Vacant & Undeveloped Land	0	0.0	0	0.0
Water	135	21.0	135	21.0
Total – Undeveloped	485	75.5	488	75.8
Agriculture	0	0.0	0	0.0
Commercial	0	0.0	0	0.0
Commercial Recreation	0	0.0	0	0.0
Industrial	0	0.0	0	0.0
Junkyard, Dump, Landfill	0	0.0	0	0.0
Mobile Home Park	0	0.0	0	0.0
Multi-Family Residential	6	0.9	7	1.1
Schools, Hospitals, Public & Private Institutions	0	0.0	0	0.0
Single Family Residential	110	17.1	109	16.9
Spaced Rural Residential	0	0.0	0	0.0
Transportation, Communication & Utilities	41	6.4	40	6.2
Under Construction	0	0.0	0	0.0
Total – Developed	157	24.5	156	24.2

Hodges System				
	2010		2005	
Land Use Category	Acres	% Acres	Acres	% Acres
Parks & Open Space Preserves	26,105	16.5	20,850	13.2
Vacant & Undeveloped Land	70,950	44.9	75,054	47.4
Water	1,005	0.6	1,015	0.6
Total - Undeveloped	98,060	62.0	96,919	61.2
Agriculture	22,740	14.4	29,977	18.9
Commercial	547	0.3	516	0.3
Commercial Recreation	2,114	1.3	2,137	1.4
Industrial	197	0.1	208	0.1
Junkyard, Dump, Landfill	83	0.1	66	0.0
Mobile Home Park	107	0.1	188	0.1
Multi-Family Residential	280	0.2	610	0.4
Schools, Hospitals, Public & Private Institutions	766	0.5	689	0.4
Single Family Residential	8,575	5.4	8,103	5.1
Spaced Rural Residential	20,059	12.7	14,369	9.1
Transportation, Communication & Utilities	4,460	2.8	4,464	2.8
Under Construction	157	0.1	15	0.0
Total - Developed	60,085	38.0	61,342	38.8

4.1 Point Source

In 1972, Congress amended the FWPCA (commonly called the CWA) to prohibit the discharge of any pollutant to waters of the United States from a point source unless the discharge is authorized by an NPDES permit. The NPDES program is designed to track point sources and requires the implementation of the controls necessary to minimize the discharge of pollutants. The USEPA defines a point source as any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation (CAFO), landfill leachate collection system, vessel or other floating craft from which pollutants are or may be discharged.

Initial efforts to improve water quality under the NPDES program primarily focused on reducing pollutants in industrial process wastewater and municipal sewage. These discharge sources were easily identified as responsible for poor, often drastically degraded, water quality conditions. As pollution control measures for industrial process wastewater and municipal sewage were implemented and refined, it became increasingly evident that more diffuse sources of water pollution were also significant causes of water quality impairment. Specifically, stormwater runoff draining large surface areas, such as agricultural and urban land, was found to be a major cause of water quality impairment, including the nonattainment of designated beneficial uses.

To address the role of stormwater in causing or contributing to water quality impairments, in 1987, Congress wrote Section 402(p) of the FWPCA, bringing stormwater control into the NPDES program. In 1990, the USEPA issued the Phase I Stormwater Rules. These rules require NPDES permits for operators of municipal separate storm sewer systems (MS4s) serving populations over 100,000 and for runoff associated with industry, including construction sites five acres and larger. In 1999, the USEPA issued the Phase II Stormwater Rule to expand the requirements to small MS4s and construction sites between one and five acres in size (**Table 4.2**). The rule also allows other sources not automatically regulated on a national basis to be designated for inclusion based on increased likelihood for localized adverse impact on water quality. Point Sources statutorily do not include return flows from irrigated agriculture or agricultural stormwater runoff, individual homes that are connected to a municipal system, use a septic system, or do not have a surface discharge. Today's rule also conditionally excludes storm water discharges from industrial facilities that have „„no exposure'' of industrial activities or materials to stormwater.

Table 4.2 – **Active NPDES Permits within Local Source Water System Boundaries** SWRCB 2010		
San Diego River System		
Program Type	# Permits	% Permits
Stormwater Construction	25	93
Stormwater Industrial	2	7
NPDES	0	0
Total 2010	27	100
Total 2005	NA	NA
Otay-Cottonwood System		
Program Type	# Permits	% Permits
Stormwater Construction	38	95
Stormwater Industrial	2	5
NPDES	0	0
Total 2010	40	100
Total 2005	NA	NA
Miramar System		
Program Type	# Permits	% Permits
Stormwater Construction	1	100
Stormwater Industrial	0	0
NPDES	0	0
Total 2010	1	100
Total 2005	NA	NA
Hodges System		
Program Type	# Permits	% Permits
Stormwater Construction	63	82
Stormwater Industrial	11	14
NPDES	3	4
Total 2010	77	100
Total 2005	NA	NA

To comply with the SDCWA regulations, industrial and construction permittees must create and implement a stormwater pollution prevention plan, and MS4 permittees must implement a stormwater management plan. These plans document the stormwater control measures (SCMs), sometimes known as best management practices or BMPs, that will be used to prevent stormwater emanating from these sources from degrading nearby water bodies. These SCMs range from structural methods such as detention ponds and bioswales to nonstructural methods such as designing new development to reduce the percentage of impervious surfaces.

Point-source pollutants in surface water and groundwater are usually found in a plume that has the highest concentrations of the pollutant nearest the source with diminishing concentrations as distance from the source increases. The various types of point-source pollutants found in waters are as varied as the types of business, industry, agricultural, and urban sources that produce them.

Whether a discharged chemical is harmful to the aquatic environment depends on a number of factors, including the type of chemical, its concentration, the timing of its release, weather conditions, and the organisms living in the area. Commercial and industrial businesses use hazardous materials in manufacturing or maintenance, and then discharge various wastes from their operations. The raw materials and wastes may include pollutants such as solvents, petroleum products, or heavy metals. Point sources of pollution from agriculture include animal feeding operations, animal waste storage and treatment lagoons, or storage, handling, mixing, and cleaning areas for pesticides, fertilizers, and petroleum. Municipal point sources include wastewater treatment plants, landfills, utility stations, motor pools, and fleet maintenance facilities.

For all of these activities, hazardous materials may be included in the raw materials used in the process as well as in the waste stream for the facility. If the facility or operator does not handle, store, and dispose of the raw materials and wastes properly, these pollutants could end up in the water supply. This may occur through discharges at the end of a pipe to surface water, discharges on the ground that move through the ground with infiltrating rainwater, or direct discharges beneath the ground surface.

The most common point-source pollutants in surface water are:

- High-temperature discharges.
- Pathogens (bacteria, viruses, and *Giardia*).
- Nutrients (nitrogen and phosphorus).

Temperature increases and nutrients can result in excessive plant growth and subsequent decaying organic matter in water that depletes dissolved oxygen levels and consequently stressing or killing vulnerable aquatic life. Pathogens can be hazardous to both human health and aquatic life. Pesticides and other toxic substances can also be hazardous to both human health and aquatic life, but are less commonly found in surface water because of high dilution rates.

Hazardous Material and Waste Sites

Automotive and tractor fuels make up the majority of permitted liquid hazardous storage. These fuels are stored in underground fiberglass-reinforced plastic, cathodically protected steel, or steel clad with fiberglass-reinforced plastic. These tanks are installed with a leak interception and detection system.

The data used in this report was obtained from the SWRCB which registers and categorizes open hazardous disposal sites and leaking underground storage tanks (LUSTs). These are categorized as: inactive, site assessment, verification monitoring, assessment & interim remedial action, and remediation. The underground storage tanks (USTs) are categorized as registered in (**Table 4.3**).

The SWRCB changed the UST regulations on October 13, 2005. These changes can be found in Title 23, California Code of Regulations, Chapter 16.

Table 4.3 - Open Hazardous Disposal Sites & Permitted Underground Storage Tanks within Local Source System Boundaries
SWRCB 2010

San Diego River System			
	Number of Sites		
Status	Clean up & Disposal Sites	LUST	UST
Open – Inactive	2	0	NA
Open - Site Assessment	2	3	NA
Open - Verification Monitoring	2	0	NA
Open - Assessment & Interim Remedial Action	0	1	NA
Open – Remediation	0	10	NA
Registered	NA	NA	19
Total 2010	6	14	19
Total 2005	NA	NA	NA

Otay-Cottonwood System			
Status	Number of Sites Clean up & Disposal Sites	LUST	UST
Open – Inactive	0	0	NA
Open - Site Assessment	1	1	NA
Open - Verification Monitoring	1	0	NA
Open - Assessment & Interim Remedial Action	0	0	NA
Open – Remediation	0	0	NA
Registered	NA	NA	5
Total 2010	2	1	5
Total 2005	NA	NA	NA

Miramar System			
Status	Number of Sites Clean up & Disposal Sites	LUST	UST
Total 2010	0	0	0
Total 2005	NA	NA	NA

Hodges System			
Status	Number of Sites Clean up & Disposal Sites	LUST	UST
Open – Inactive	0	0	NA
Open - Site Assessment	5	11	NA
Open - Verification Monitoring	1	0	NA
Open - Assessment & Interim Remedial Action	0	2	NA
Open – Remediation	2	9	NA
Registered	NA	NA	35
Total 2010	8	22	35
Total 2005	NA	NA	NA

(Concentrated) Animal Feeding Operations

Animal feeding operations (AFO) are agriculture operations where animals are raised in confined situations and feed is brought to the animals rather than the animals grazing in pastures. Byproducts of these facilities include manure (feces and urine), spent bedding material, animal parts, animal mortality, and feed lot runoff. The primary pollutants associated with animal wastes are nutrients, pathogens, salts, organic matter, solids and volatile and odorous compounds. Much of the waste generated at AFO's is ultimately recycled by application on cropland and pastures. Contamination of surface waters can potentially come from regular activities such as land application of manure wastes and storm water runoff from animal holding areas. Rain events pose risks to facilities such as stored manure, waste lagoons and storage ponds that can runoff or overflow.

The AFO data used in this report was obtained from two sources: the San Diego County Department of Environmental Health (SDCDEH) which regulates poultry ranches, and SDRWQCB which regulates dairy operations.

- **Poultry Farms**

  Poultry production in the United States fall into three primary categories:

  1) Broilers, which are raised for meat.
  2) Layers, which produce table eggs and eggs for replenishing both the layers and the broiler flocks.
  3) Turkeys, which can be divided into meat birds and egg layers.

This report will address Broilers and Layers as there are no turkey ranches in the City's local source water system.

Broilers:

Broilers are raised in a confined environment, typically raised on the floor of a structure, where they are allowed to move about freely. The floor is covered with an absorbent, high carbon material (such as: sawdust or wood shavings) which is referred to as litter. The litter serves as bedding material, absorbent, and storage for manure. When the birds mature they are removed from the houses, which are cleaned and sanitized. The waste material is then hauled off site or kept on site and land applied.

Layers:

Layers are raised in cages and their manure falls below the cages were it can be collected. Two methods are used in layer production for the removal of manure:

1) The “frequent cleanout” method, where the manure is removed once a week and dried on-site.
2) The “drying and coning” method; where the manure is allowed to dry and build up in cones under the cages. The manure is removed semi-annually except for a 6 inch layer.

The removed manure is either hauled off site; or kept on site to use for composting spent hens. All ranches keep a certain amount of manure on site to compost destroyed birds since they cannot be taken to a land-fill.

The SDCDH does not require any permits to operate a commercial poultry farm. In addition, poultry farms do not discharge a significant amount of wastewater, so the SDRWQCB does not require these operations to have a discharge permit. However, watering and cooling systems are generally used, and requirements mandate that these systems be installed in a manner that prevents backflow, overflow, splashes and leaks on manure waste. Furthermore, the SDCDEH Community Health Division regulates poultry operations for fly breeding and inspects the farms at least once each year (**Table 4.4**).

Table 4.4 – Poultry Ranches within Local Source Water System Boundaries
SDCDEH 2010

San Diego River System			
Ranch Name		Manure Management	Total Birds
Total 2010	N=0	NA	NA
Total 2005	N=0	NA	NA
Otay-Cottonwood System			
Ranch Name		Manure Management	Total Birds
Total 2010	N=0	NA	NA
Total 2005	N=0	NA	NA
Miramar System			
Ranch Name		Manure Management	Total Birds
Total 2010	N=0	NA	NA
Total 2005	N=0	NA	NA
Hodges System			
Ranch Name	Product	Manure Management	Total Birds
Brouwer's Poultry	Broilers	Floor litter	60,000
Cebe Farms Main Ranch	Broilers	Floor litter	170,000
Ramona Ranch	Eggs	Floor litter	90,000
Eben-haezer Ranch	Eggs	Drying and coning	70,000
Pine Hills Egg Ranch	Eggs	Frequent cleanout	1,100,000
Ramona Egg Ranch	Eggs	Frequent cleanout	95,000
Swiss Mountain View Egg Farm	Eggs	Frequent cleanout	25,000
Ramona Duck Farm	Eggs	Floor litter	2,000
Fluegge Egg Ranch (Crownhill)	Eggs	Frequent cleanout	140,000
Total 2010	N=9	NA	1,752,000
Total 2005	N=13	NA	1,910,000

- **Dairy Farms**

  Dairy farms are composed of housing facilities for milking cows, dry cows, and replacements, cropland to grow forge based crops like corn silage and haylage, storage facilities for these and purchased forages (silages), and manure storage and treatment facilities. Cows are typically milked two to three times per day and are generally washed before each milking. In addition, corrals and barns are generally washed daily. It is estimated that tending one cow requires 50 gallons of waste water discharge each day. Manure is rich in organic nitrogen and phosphorous and is recycled to crop land as fertilizer. Sources of pollutants from dairy operations include manure storage, recycling of manure on cropland, milking center wastewater, stormwater runoff and silage leachate.

  The SDRWQCB issues wastewater discharge permits for dairy operations (**Table 4.5**). Each dairy farm is issued a permit for a maximum number of milk cows, which are adult females that provide milk. However, the herd is also composed of heifers, dry cows, and calves. They also issue Orders specific to individual dairies, which contain prohibitions, discharge specifications, facility designs, operation specifications and other guidelines for complying with the Watershed Basin Plan. Dairy farms are then required to submit quarterly reports to the SDRWQCB that describe herd size, manure disposal, groundwater monitoring results, and other pertinent information. Water quality data provided in these reports includes nitrates and dissolved solids. Furthermore, these facilities are inspected on a quarterly basis.

Table 4.5 – Permitted Dairy Farms within Local Source Water System Boundaries
SDRWQCB 2010

San Diego River System				
Facility Name		Herd Size[1]	Solid Manure Produced[2] (yds.^{3}/yr.)	Liquid Manure[3] (AFY)
Total 2010	N=0	NA	NA	NA
Total 2005	N=0	NA	NA	NA
Otay-Cottonwood System				
Facility Name		Herd Size[1]	Solid Manure Produced[2] (yds.^{3}/yr.)	Liquid Manure[3] (AFY)
Total 2010	N=0	NA	NA	NA
Total 2005	N=0	NA	NA	NA
Miramar System				
Facility Name		Herd Size[1]	Solid Manure Produced[2] (yds.^{3}/yr.)	Liquid Manure[3] (AFY)
Total 2010	N=0	NA	NA	NA
Total 2005	N=0	NA	NA	NA

Hodges System				
Facility Name	City	Herd Size[1]	Solid Manure Produced[2] (yds.^{3}/yr.)	Liquid Manure[3] (AFY)
T.D. Dairy	Ramona	1,225	8,115	30
Dowle Dairy	Ramona	690	4,100	4
Frank Konyn Dairy	Escondido	1,800	6,170	40
Total 2010	N=3	3,715	18,385	74
Total 2005	N=4	3,040	NA	NA

1. Herd size includes milking cows, heifers, dry cows and calves.

2. Manure produce is calculated with the following: one cow produces 6.7 cubic yards of manure per year; one heifer produces 3.3 cubic yards per year and one calf produce 1.3 cubic yards per year.

3. Total volume of liquid manure spread on land under the control of the dairy owner/operator.

Mines (Hard rock)

Discharges from historic abandoned mines affect surface waters throughout the state. Often the discharges originate from a distinct mine portal, tailings pile or waste rock disposal area. USEPA considers these discharges point sources. The most problematic mines discharge metals in concentrations that can impact beneficial uses, because they are predominantly toxic to aquatic life and/or threaten human health. Due to their large physical size, complexity of the natural distribution of the mineralized metal bearing ore, labyrinth of underground workings, myriad of chemical reactions taking place deep underground, and the often remote location and rugged, steep terrain, remediation of these mines is very costly and can take many years. At large abandoned mine sites it may be impossible, with today's technology, to remediate adequately to protect aquatic life beneficial uses or meet the water quality objectives designated for adjacent receiving waters.

Pollutants discharging from abandoned mines are generally from the chemical reaction of water and oxygen with naturally occurring residual minerals in the ore body, tailings, or waste rock. Metal mines may generate highly acidic discharges where the ore is a sulfide mineral or is associated with pyrite. In these cases the predominant metal ion may not be iron but rather zinc, copper, or nickel. The most commonly mined ore of copper, chalcopyrite, is itself a copper-iron-sulfide and occurs with a range of other sulfides. Thus, copper mines are often major sources of acid mine drainage.

There are several scenarios where such chemical reactions can result in the release of soluble pollutants. For example, rainwater infiltrates into the subsurface where it intersects the residual ore body and underground mine workings. When this oxygenated water contacts a reactive ore body it generates sulfuric acid. The acid in turn can dissolve other elements and minerals including copper, cadmium, lead, and zinc. The low pH, mineral laden water, referred to as acid mine drainage (AMD), is then collected in the mine workings and discharges from the mine portal where it can enter surface waters. The AMD is commonly toxic to aquatic life and can adversely impact the beneficial uses of the receiving waters. Common discharges may contain cadmium, copper, and zinc which are especially toxic to fish. Other discharges, including some where there is no acidity, may contain mercury, arsenic and other substances which pose a threat to human health.

Abandoned gold mines may have drainage that contains arsenic in concentrations that affect beneficial uses, specifically domestic drinking water supplies and, if precipitated into the stream sediments, may pose a threat to human health via dermal contact or inhalation of dried precipitates or tailings. These historic gold mines, especially the hydraulic surface mines, may contain residual mercury used to recover the gold values. The mercury not only poses a threat to aquatic life, but can enter the streams where it can bioaccumulate in the food chain and pose a threat to human health and the health of other high end predators.

The mine data used in this report was obtained from the United States Geological Survey Mineral Resources Data System (MRDS) (**Table 4.6**). The SWRCB and the SDRWQCB have regulatory authority over mines.

Table 4.6 – **Mines within Local Source Water System Boundaries**
USGS 2010

San Diego River System			
Development Status	Number of Mines	Commodity Type	Number of Mines
Occurrence	16	Metal	61
Past Producer	24	Non-metal	13
Producer	17	Both	0
Prospect	16		
Unknown	1		
Total	74	Total	74

Otay-Cottonwood System			
Development Status	Number of Mines	Commodity Type	Number of Mines
Occurrence	28	Metal	82
Past Producer	28	Non-metal	16
Producer	17	Both	3
Prospect	25		
Unknown	3		
Total	101	Total	101

Miramar System			
Development Status	Number of Mines	Commodity Type	Number of Mines
Total	0	NA	NA
Hodges System			
Development Status	Number of Mines	Commodity Type	Number of Mines
Occurrence	7	Metal	24
Past Producer	31	Non-metal	42
Producer	16	Both	3
Prospect	13		
Unknown	2		
Total	69	Total	69

Wastewater Treatment Facilities

Wastewater**,** also known as sewage, is water-carried wastes, in either solution or suspension produced by residences, businesses, and industries. It is generally composed of 99.9% water with the remaining 0.1% dissolved and suspended material. Wastewater is characterized by its volume or rate of flow, physical condition, chemical constituents, and the bacteriological organisms it contains. Wastewater is generally either treated on site in a private wastewater treatment facility, septic system; or disposed of into a collection system (sanitary sewer system) for treatment at a public wastewater treatment facility.

Wastewater can contain a range of pollutants including: sediment and turbidity; nutrients, particularly nitrogen and phosphorus; toxic compounds, including metals, pesticides and other chemicals; organic matter creating a biochemical oxygen demand; and gross pollutants, including plastic and paper products. Wastewater can carry pathogens that include bacteria, viruses, protozoa, helminths, moulds and fungi.

Human health impacts are dependent on the type and concentration of pollutants in the wastewater, and the duration and method of exposure. Humans can be exposed to pathogens through: contamination of drinking water sources and recreational waters, or direct contact in public areas such as parks and streets. Overflows can also cause organic rich pooling and streams which may result in increased mosquito breeding, which in turn, may create public pest and potential disease situations.

A release of untreated wastewater can exert physical, chemical and biological effects on the receiving environment. This may result in environmental, human health, and aesthetic impacts, which can be both acute and cumulative. Such impacts are dependent on the characteristics of the wastewater and receiving environment, along with the volume and duration of the release. Environmental impacts can be minimal to a localized area if the release is detected and rectified early, or significant if it is located in a sensitive area or volumes are large and occur over time. The potential environmental impacts of sewer overflows are noted in **Table 4.7**.

Table 4.7 - Environmental Impacts of Untreated Wastewater

Pollutant	Potential Impact
Suspended Solids	Deposited solids affects benthic habitats
Turbidity	Reduction of water clarity impacting aquatic plants
Nutrients	Stimulation of algae growth
Toxic Compounds	Kills living organisms; disrupts ecology of affected area
Organic Matter	Break-down consumes dissolved oxygen and causes anoxia
Gross Pollutants	Visually unattractive, harmful to wildlife

A Wastewater Treatment Facility provides a multi-stage process to renovate wastewater before reuse or reentry into the environment through a body of water or land application. The degree and method of treatment varies from facility to facility. The goal is to reduce or remove the organic matter, solids, nutrients, pathogens, and other pollutants from the wastewater to meet the Basin Plan water quality objectives of the Hydrographic Sub-area (**Table 4.8**).

Table 4.8 – Permitted Wastewater Treatment Facilities with Permitted Collection Systems within Local Source Water Boundaries

SDRWQCB 2010

San Diego River System			
Facility	Watershed Name	Hydrographic Area	Hydrographic Sub-Area
San Vicente WRP	San Diego	San Vicente	Gower
Heise Park WPCF	San Diego	Boulder Creek	Inaja
Julian WPCF	San Diego	Boulder Creek	Inaja
Total 2010	N=3	NA	NA
Total 2005	N=3	NA	NA
Otay-Cottonwood System			
Facility	Watershed Name	Hydrographic Area	Hydrographic Sub-Area
Pine Valley WPCF	Tijuana	Monument	Pine
Total 2010	N=1	NA	NA
Total 2005	N=1	NA	NA
Miramar System			
Facility		Hydrographic Area	Hydrographic Sub-Area
Total 2010	N=0	NA	NA
Total 2005	N=0	NA	NA

Hodges System			
Facility	Watershed Name	Hydrographic Area	Hydrographic Sub-Area
Santa Maria WRP	San Dieguito	Santa Maria Valley	Ramona
Total 2010	N=1	NA	NA
Total 2005	N=1	NA	NA

In general, the Waste Discharge Requirements (WDRs) Program (sometimes also referred to as the "Non Chapter 15 (Non 15) Program") regulates point discharges that are exempt pursuant to Subsection 20090 of Title 27 and not subject to the FWPCA. Exemptions from Title 27 may be granted for nine categories of discharges (such as: sewage or wastewater) that meet, and continue to meet, the preconditions listed for each specific exemption.

- **San Diego River System**
  San Vicente Wastewater Reclamation Facility (San Vicente WRF):
  The Ramona Municipal Water District (RMWD) is the agency responsible for this facility. WDR Order No. R9-2009-0005 establishes the discharge specifications for the San Vicente WRF.

  The treatment system comprises of a headwork's facility, two oxidation basins, four clarifiers, return activated biosolids pump station, dual media pressure filters, reverse osmosis facility, chlorine contact chamber, retention ponds, and drying beds. The SDRWQCB requirements permit a 30-day average dry weather effluent flow of up to 0.8 MGD. The plant effluent is discharged to three holding ponds with a capacity or 236 AF located at the facility with an additional 15 AF storage capacity available at Spangler Peak Ranch.

  Effluent from the secondary treatment process is for irrigation at The Spangler Peak Ranch. Effluent from the tertiary treatment process is used for irrigation at the San Vicente Golf Course.

  Biosolids from the San Vicente WRF dewatered in drying beds at the plant site. The waste is routinely hauled to a landfill for final disposal.

  The San Vicente Sewer Service Area (SVSSA) is approximately 99% built out and no plans exist for future expansion of SVSSA collection system.

Julian Water Pollution Control Facility (Julian WPCF):

The County of San Diego is the agency responsible for this facility. WDR Order No. R9-1983-0009 establishes the discharge specifications for the Julian WPCF.

The treatment and disposal system is comprised of: comminution, two 80,000 gallon oxidation basins and a 225,000-cubic-foot storage/settling basin. During periods of high inflows, large on-site effluent storage basins are utilized to maintain discharge rates within permit limits. The SDRWQCB requirements authorize the maximum discharge of 0.040 MGD by spray disposal.

Upgrades to the plant were recently completed which included the following:

1) Replacement and relocation of a large septic tank which serves as a pretreatment facility to help capture large amounts of grease common in Julian wastewater discharges.
2) Addition of a Return Activated Sludge Pump to serve as backup to the pump in operation.
3) Construction of a second aerobic digester. The new digester provides a proper-sized facility to augment the existing undersized digester. It also provides temporary back-up when the main digester is taken out of service for maintenance/repairs.

In 2009, additional improvements were completed including installation of a second clarifier, improvements to the equalization tank, drying bed upgrades, and replacement of miscellaneous aging equipment. Treatment plant upgrades did not allow for any additional system capacity. There are no foreseeable plans to expand system capacity.

The treated effluent is disposed on a 14 acre field adjacent to the facility. During wet weather periods when irrigation cannot be successfully practiced, an interceptor ditch, underground drainage system, and storage reservoir with a 24 day capacity prevents effluent runoff from the irrigation area. The facility has a complete oxidation process. There is no solid waste generated from the treatment process at this facility. In the event of biosolids generation, the biosolids would be dried in adjacent containment beds, stored in covered containment structures, and disposed of after testing in a sanitary landfill.

The sewer collection system includes approximately 3.0 miles of sewer pipe and a gravity conveyance line which transports sewage to the Julian WPCF. Average daily sewage flows (gpd) per connected Equivalent Dwelling Unit (EDU) fluctuate between 79-125 gpd. This variance may be the result of recent local water conservation efforts which can also reduce sewer flows. During fall and winter months, flows increase due to higher tourism levels, and rainwater infiltration into the sewage collection system. Rainwater infiltration generally worsens as collection systems age. In spite of these lower per unit flows, the existing treatment plant is operating at maximum capacity (0.040 MGD). The Julian Sanitation District Board has imposed a sewer moratorium policy that severely limits any new sewer connections due to the sewage treatment capacity issue. New sewer permits in Julian are only issued under very strict criteria, such as a failing septic system, or to previously purchased sewer commitments. Annexations are not allowed, except for septic system failures.

Heise Park Campground Water Pollution Control Facility (Heise Park Campground WPCF):
The County of San Diego is the agency responsible for this facility. WDR Order No. R9-1993-0009 establishes the discharge specifications for Heise Park Campground WPCF.

The treatment and disposal system comprises of: package type modified activated sludge plant, storage pond, and percolation pond. The SDRWQCB requirements certify a maximum discharge of 18,000 gpd by spray disposal on approximately two acres of park property. Biosolids are dried in adjacent containment beds, stored in covered containment structures, and disposed of after testing in a sanitary landfill.

- **Otay-Cottonwood System**

  Pine Valley Water Pollution Control Facility (Pine Valley WPCF):
  The County of San Diego is the agency responsible for this facility. WDR Order No. R9-1994-0161 establishes the discharge specifications for the Pine Valley WPCF.

  The treatment and disposal system comprises of: aerated oxidation ponds with a 72 day detention time and eight percolation beds. The treated effluent is disposed of through percolation and evaporation in ponds adjacent to the facility, and discharged into the groundwater system. The SDRWQCB requirements certify a maximum discharge of 0.040 MGD.

The facility has a complete oxidation process. There is no solid waste generated from the treatment process at this facility.

The sewer collection system consists of 0.7 miles of sewer pipe which conveys sewage to a 40,000 gpd (0.04 MGD) treatment plant. The average daily flow rate was 10,500 gpd (0.0105 MGD) as of April 2004 and flow rate fluctuations have been moderate since that time. The average daily flow is about 25 percent of total treatment capacity. The Pine Valley WPCF operations are considered adequate to meet current system demands. Since excess sewer capacity is available, the District appears capable of accommodating additional service connections.

Future system improvements and plans are determined on an as needed basis, rather than on a predetermined schedule.

- **Miramar System**
  There are no Wastewater Treatment Facilities permitted by the SDRWQCB in the Miramar System.

- **Hodges System**
  Santa Maria Wastewater Reclamation Plant (Santa Maria WRP):
  The RMWD is the agency responsible for this facility. WDR Order No. R9-2000-0177 establishes the discharge specifications for the Santa Maria WRP.

  The treatment system comprises of: equalization basin and pump station, aeration basins, secondary clarifiers, and aerobic biosolids digester. The SDRWQCB requirements permit a 30-day average dry weather effluent flow from the secondary treatment process of up to 1.00 MGD. The plant effluent is discharged to two effluent holding ponds or the Mt. Woodson Tertiary Treatment Plant. SDRWQCB requirements permit a maximum 30-day average flow from the tertiary treatment process of 0.35 MGD.

  Effluent from the secondary treatment process is disposed of at the Rangeland Road disposal fields. SDRWQCB requirements permit a maximum twelve month total discharge of effluent to the Rangeland Road disposal fields not to exceed 873.6 AFY. Effluent from the tertiary treatment process is used for irrigation at the Mt. Woodson Golf Course.

Biosolids from the Santa Maria WRP are treated in an aerobic digester, and then dewatered by centrifuge or in drying beds at the plant site. The waste is routinely hauled to a landfill for final disposal.

The Santa Maria Sewer Service Area (SMSSA) is approximately 50% built out and planning for ultimate build out has been completed. In April 2008 RMWD completed a preliminary design report for SMSSA and identified the key treatment elements required to meet growth over the next 20-30 years.

Sanitary Sewer Overflows (SSOs)

SSOs often contain high levels of suspended solids, pathogens, toxic pollutants, nutrients, oil, and grease. SSOs pollute surface and ground waters, threaten public health, adversely affect aquatic life, and impair the recreational use and aesthetic enjoyment of surface waters. Typical consequences of SSOs include the closure of beaches and other recreational areas, inundated properties, and polluted rivers and streams. Sewage overflows can cause unpleasant sights and odors, even if their human health and environmental impacts are successfully managed. They can be perceived as offensive, and undermine the confidence of the community in the effectiveness of sewerage authorities.

To provide a consistent statewide regulatory approach to address SSOs, in 2006, the SWRCB adopted Statewide General WDRs for Sanitary Sewer Systems: Water Quality Order No. 2006-0003 (Sanitary Sewer Systems WDR). The Sanitary Sewer Systems WDR requires public agencies that own or operate sanitary sewer systems to develop and implement sewer system management plans and report all SSOs to the State Water Board's online SSO database.

A sanitary sewer overflow is any overflow, spill, release, discharge or diversion of untreated or partially treated wastewater from a sanitary sewer system. A Sanitary Sewer System is defined by the State Water Resources Control Board as any system of pipes, pump stations, sewer lines, or other conveyances, upstream of a wastewater treatment plant headworks and which is comprised of more than one mile of pipes and sewer lines, used to collect and convey wastewater to a publicly owned treatment facility. SSOs include:

- Overflows or releases of untreated or partially treated wastewater that reach waters of the United States;
- Overflows or releases of untreated or partially treated wastewater that do not reach waters of the United States; and

- Wastewater backups into buildings and on private property that are caused by blockages or flow conditions within the publicly owned portion of a sanitary sewer system.

A Category One SSO (**Table 4.9**) includes all discharges of sewage resulting from a failure in a sanitary sewer system that:

- Equal or exceed 1000 gallons, or
- Result in a discharge to a drainage channel and/or surface water; or
- Discharge to a storm drainpipe that was not fully captured and returned to the sanitary sewer system.

Table 4.9 – Category 1 Sanitary Sewer Overflows within Local Source Water System Boundaries

SWRCB 2011

San Diego River System			
Date	Total Gallons	Gallons Released	Impacted Surface Waters
2/8/06	1,500	200	NA/Storm Drain/Unpaved Surface
3/27/06	82,500	82,500	San Vicente Creek
3/17/07	1,275	475	NA/Storm Drain/Unpaved Surface
4/30/07	48,546	48,546	San Vicente Creek
4/11/08	850	550	NA/Upaved Surface
8/11/08	3,360	360	NA/Drainage Channel
11/17/09	1,200	0	NA/Unpaved Surface
11/27/09	900	0	NA/Storm Drain/Unpaved Surface
Total 2010	140,131	132,631	N=8
Total 2005	36,776	33,028	N=18

Otay-Cottonwood System			
Date	Total Gallons	Gallons Released	
2010 Total	0	0	N=0
2005 Total	0	0	N=0

Miramar System			
Date	Total Gallons	Gallons Released	
2010 Total	0	0	N=0
2005 Total	2,400	0	N=1

Hodges System			
Date	Total Gallons	Gallons Released	Impacted Surface Waters
1/9/06	4,500	4,000	Kit Carson Pond
2/10/06	650	600	Creek
2/17/06	5,000	5,000	Santa Maria Creek
2/28/06	600	600	Rattlesnake Creek
5/6/06	60	60	NA
6/6/06	720	320	Delusion Creek
8/22/06	780	700	Lake Hodges
8/30/06	440	0	NA/Storm Drain
12/12/06	100	100	Green Valley Creek
12/18/06	550	350	Unpaved Surface
1/3/07	4,500	4,500	NA/Unpaved Surface
6/12/07	450	450	NA/Unpaved Surface
8/20/07	392,185	381,185	Lake Hodges
6/6/08	3,950	3,950	Lake Hodges
7/31/08	2,460	2,460	NA/Unpaved Surface
7/24/09	17,725	15,725	NA/Kit Carson Creek Area/Unpaved Surface
12/11/09	1,500	1,500	NA/Rancho Bernardo Golf Course Irrigation Pond
Total 2010	436,170	421,500	N=17
Total 2005	61,320	32,140	N=38

There is a wide range of potential causes for dry and wet weather sewer overflows including: sewer blockage, pump station failure, system growth or in-growth, system age and condition, system overload from stormwater.

- **Dry Weather Overflows**
  Sewer blockages where pipes are completely or partly blocked are the most common cause of dry-weather overflows. Causes can be infiltration from roots, grease, construction, or vandalism. Typically, blockages develop when displaced pipe joints or cracks in pipes permit the entry of soil or tree roots to form an initial obstruction. It is common for the blockage to become worse as the obstruction in the pipes catches grease and solids from sewage.

  Pump station failures may be due to factors such as equipment failure or interruptions to the power supply. System growth or in-growth can overburden sewers and sewage pumping stations that are too small to carry sewage from newly developed subdivisions or commercial areas. Overflows are also caused by system deterioration due to age or improper maintenance.

- **Wet weather Overflows**
  Wet weather overflows are caused by stormwater infiltrating the sewer system or damage to system caused by erosion of supporting soil. Excess water can enter through the ground into leaky sewers, illegal connections, and broken or badly connected property sewer/drains. This infiltration/inflow can significantly increase flows in sewers during wet weather far beyond the design storm allowance made for the sewers. Exceeding the capacity of the sewers causes overflows at maintenance holes, pump stations, and sewage treatment plants. Soil erosion can cause overflows due to breakage in sewers due to disturbance in the vicinity of the pipelines and land subsidence.

4.2 Nonpoint Source

Nonpoint sources are a diffused pollution source; nonpoint pollution does not emanate from a discernible, confined, and discrete conveyance but generally results from land runoff, precipitation, atmospheric deposition, drainage, seepage or hydrologic modification. The term "nonpoint source" is defined to mean any source of water pollution that does not meet the legal definition of "point source" in section 502(14) of the Clean Water Act. Nonpoint-source pollution is usually found spread out throughout a large area. It is often difficult to trace the exact origin of these pollutants because they result from a wide variety of human activities on the land as well as natural characteristics of the soil, climate, and topography.

Nonpoint sources of pollution in urban areas include paved surfaces where runoff picks up oils, grease, salts, metals, and other toxic materials. Rainfall and irrigation runoff from agricultural and landscaped areas may contain sediment, salts, pesticides, and fertilizers. Areas with a high density of animals such as agricultural livestock and residential are common nonpoint-sources of pathogens and nutrient pollutants. These pollutants are also found in areas where there is a high density of septic systems or where the septic systems are faulty or not maintained properly.

The most common nonpoint-source pollutants in surface water are:

- Sediment
- Pathogens (bacteria, viruses, and *Giardia*)
- Nutrients (nitrogen and phosphorus)

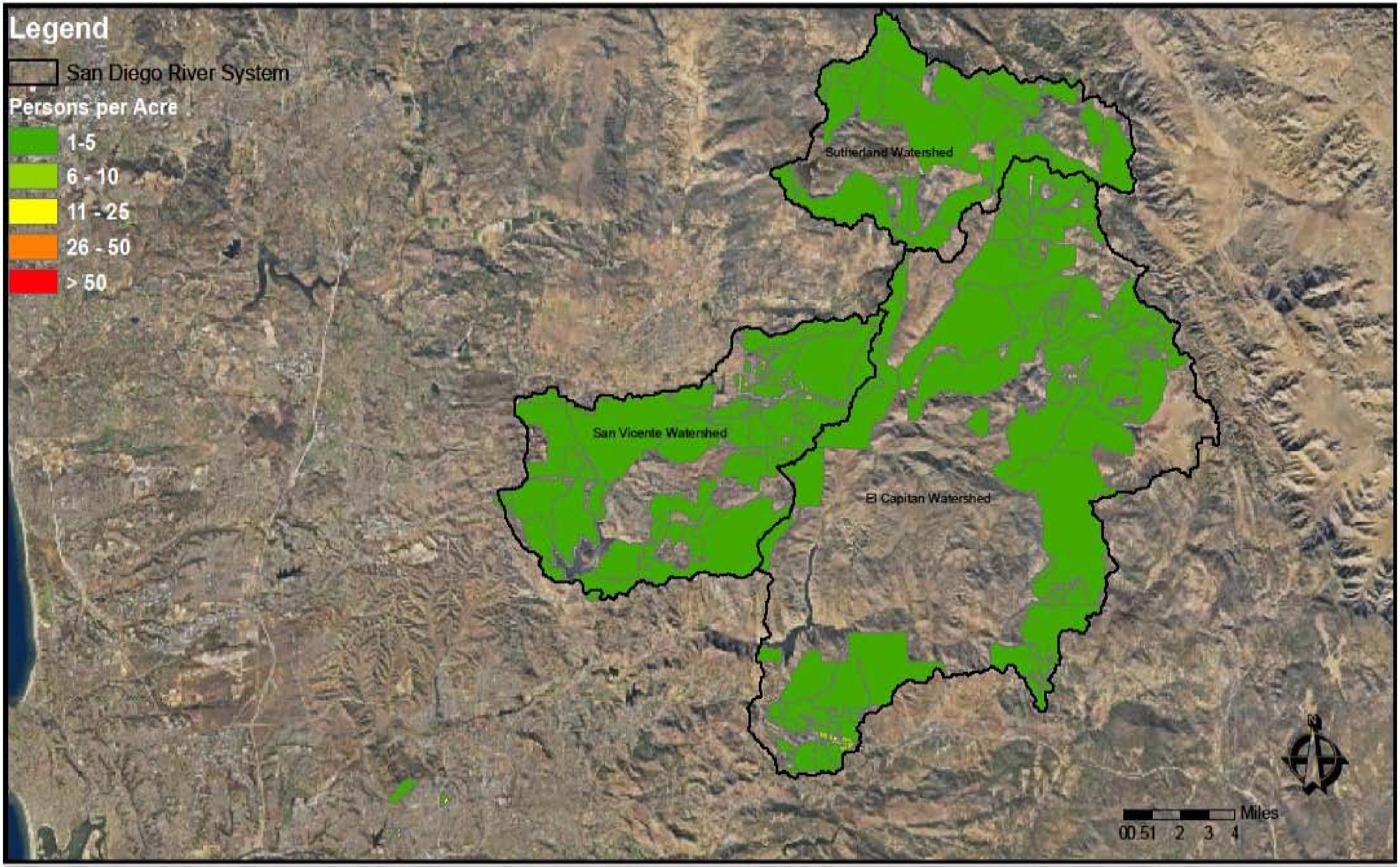
Septic Systems

Sanitary sewers are usually non-existent in rural areas of the country, forcing rural residents to use On-site Wastewater Disposal Systems (OWDS). OWDS have made relatively high density residential development possible in areas where municipal wastewater treatment facilities are not available (**Figures 4.1, 4.2, 4.3**). Estimates of septic system density for the 2010 WSS were calculated by using census tract data to determine population within each watershed. Next, the data layer containing the sewer mains in San Diego County, obtained from SanGIS, was overlaid with population density to create a new data layer. This data layer was queried to pull out polygons that were unsewered with a population greater than zero. Graduated color was applied to the septic density field to enable visual assessment of high potential concentrations of septic tanks.

OWDS treat and disperse relatively small volumes of wastewater from individual or small numbers of homes and commercial buildings. Poorly managed systems have been named as a concern by nearly every federal and state program that deals with water resource issues. According to various reports and studies, an estimated 10% to 20% of OWDS fail each year. The most common type of onsite sewage system is the septic tank/drain field system. The main function of the tank is to remove the solids from the wastewater. The drain field is used for sub-surface disposal of the septic tank effluent.

Septic tanks remove some solids and condition the effluent for on-site subsurface disposal. The organic solids retained in the tank undergo a process of liquefaction and anaerobic decomposition by bacterial organisms. Waste that is not decomposed by the anaerobic digestion (septage) eventually has to be removed from the septic tank. Septage is the mixture of sludge, fatty materials, and wastewater. The septage is periodically pumped out by licensed companies. Septage can only contaminate groundwater if the septic tank is damaged and begins to leak or if the pumped septage is not disposed properly. The concentrations of possible pollutants in septage are high, and septage has also been found to harbor pathogens. The clarified septic tank effluent is highly odorous, contains finely divided solids, and may contain enteric pathogens. The effluent from the septic tank is disposed of through the drain field where the remaining impurities are trapped and eliminated in the soil. This process of filtration varies with the soil type, the size of the particles, soil texture, and the rate of the water flow. The major pollutants associated with septic systems are nitrates and bacteria.

Figure 4.1 Population Densities of Unsewered Tracts within San Diego River System

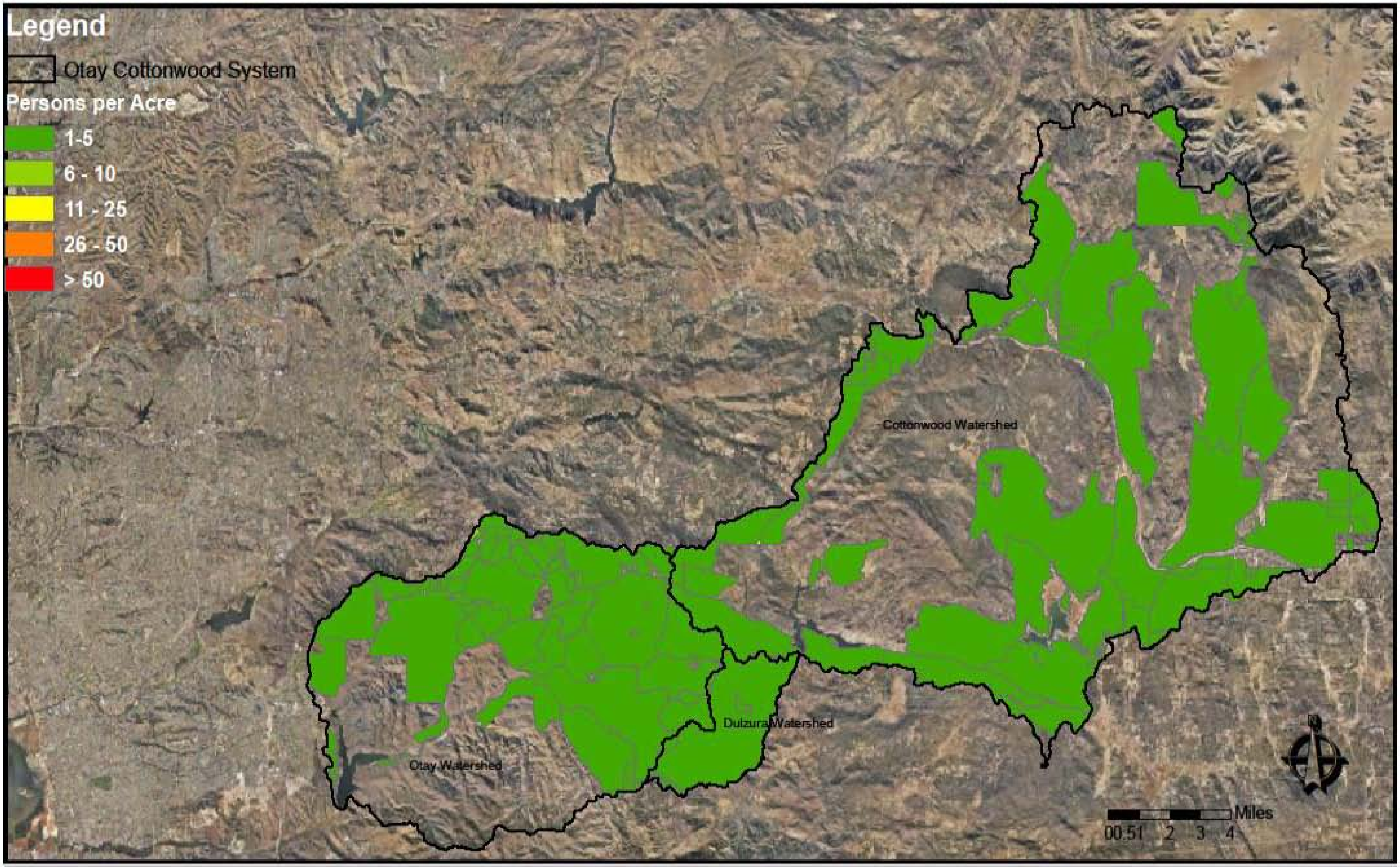


File Path: J:\WTRL\ms\GIS_WATERSHED\2010 Sanitary Survey - maps\Septic Systems

Created By: Dan Daft

Date: 12/01/2010

Figure 4.2 Population Densities of Unsewered Tracts within Otay-Cottonwood System



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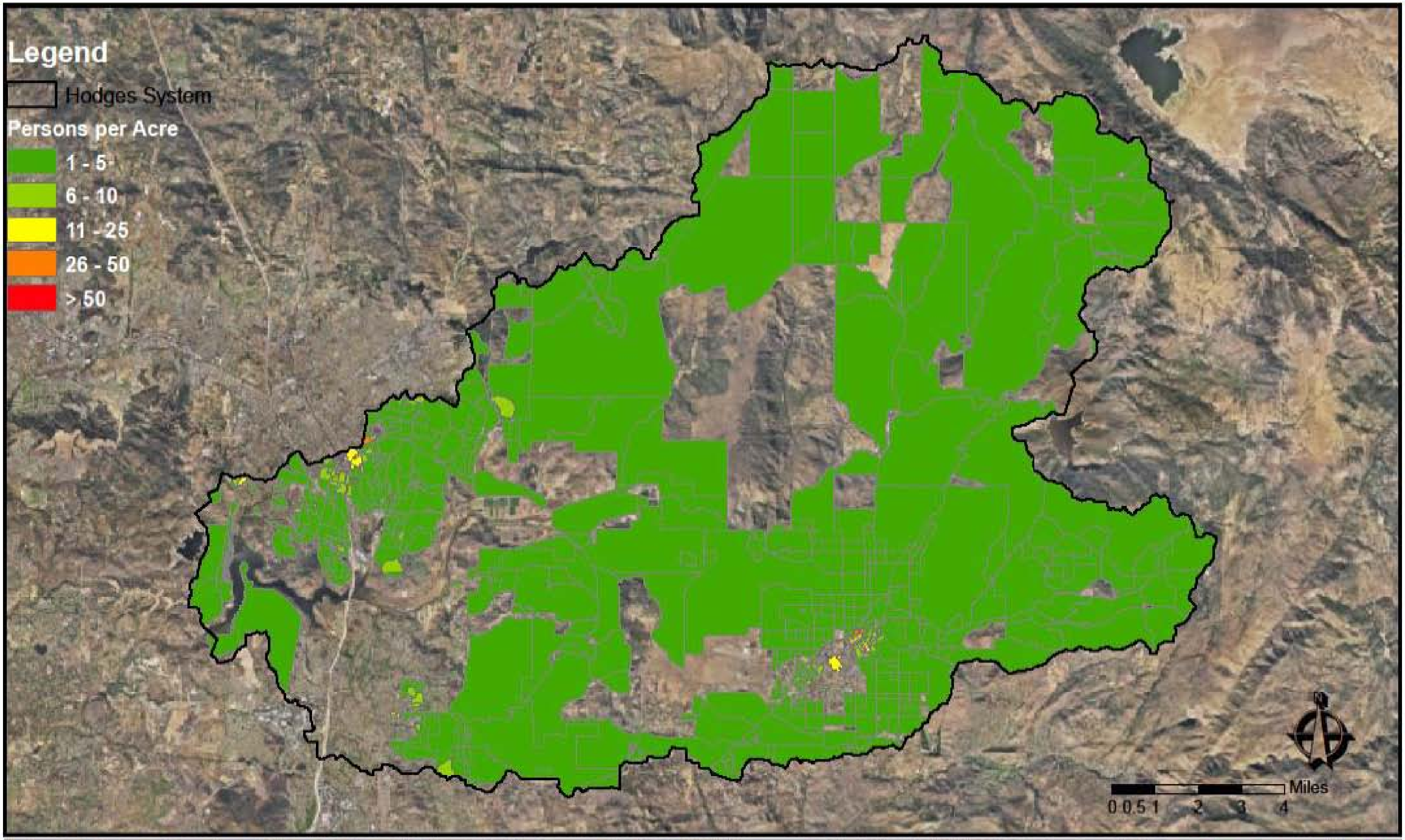
Created By: Dan Daft
Date: 12/01/2010

Figure 4.3 Population Densities of Unsewered Tracts within Hodges System



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Created By: Dan Daft

Date: 12/01/2010

Conventional OWDS systems work well for the removal of pathogens, and to a lesser extent some but not all other contaminants, when they are installed in areas with appropriate geology, soils, and hydrologic conditions. The amount of slope, soil permeability and texture, soil depths to impermeable soils, bedrock and groundwater, amount and frequency of rainfall, and distances from drinking water sources and surface water bodies are major factors associated with the system's associated environmental effects. Specific soil conditions, such as soil texture, soil structure, pH, salinity, temperature, oxygen, and moisture, affect the soil microorganisms that are essential for breaking down and decomposing wastewater effluent.

A common failure of a system is when the capacity of soil to absorb effluent is exceeded. Inappropriate siting or design and/or inadequate long-term maintenance are the primary causes of failure. When this happens the wastewater from the drain lines makes its way to the surface. This type of failure occurs when the soil is clogged with waste particles or other substances and it is harder for the water to move through the soil. When the system fails in this way and wastewater makes its way to the surface, water runoff from rain may wash the contaminants into surface waters or into inadequately sealed wells down gradient.

Many chemicals and pathogens are found in untreated or improperly treated sewage and can be a risk to public health. In the case of OWDS, this may occur where people come in direct contact with surfacing effluent or through ingestion of contaminated foods or drinking water, recreational contact, or droplet spray. Indirect contact may occur through contact with sewage-soiled clothing or tools, handling of pets that have had contact with sewage, or through vectors such as rodents or other organisms in contact with untreated sewage. Other indirect health effects may take place where vectors such as mosquitoes breed in surfacing effluent and may then carry diseases not related to sewage to human and animal populations.

Agriculture

Agriculture's impact on water quality depends on the type of agricultural activity employed. Soil erosion and sedimentation, nutrients, pesticides, and irrigation are the major agricultural concerns to nonpoint source pollution. The USEPA has estimated that about 75 percent of the sediment, 52 percent of the nitrogen loading, and 70 percent of the phosphorus loading that enters waterways of the 48 contiguous states originates in agricultural settings. Further, irrigation practices may have an impact on both water quality and quantity.

Soil erosion results in nutrient depletion and reduction of soil depth, both of which directly affect plant growth. Soil erosion may also lead to changes in river channels, and to sedimentation in rivers, lakes and reservoirs.

In agriculture, erosion occurs when fields are cleared of vegetation to prepare for crop planting or when vegetation is removed by grazing animals. The physical erosion potential of some soil may be exacerbated by previous agricultural practices which may have reduced the soil's chemical fertility. The loss in fertility slows vegetative growth and leaves the soil surface exposed to wind and rain. Rates of soil erosion are usually much higher on cropland than on grassland or forest because the soil surface is exposed for at least part of the year, during cultivation and the early stages of crop growth.

Application of fertilizers such as nitrogen or phosphorus may result in pollutants entering water courses or the groundwater. There is evidence that river and groundwater nitrate levels have increased as a result of increased use of nitrogen fertilizers. Fertilizer use may also add phosphorus as well as nitrogen into surface waters resulting in eutrophication or nutrient enrichment. Phytoplankton and other aquatic plants become more abundant, and when the increased mass of organic matter decomposes, the dissolved oxygen content of the water may be depleted. Under reduced oxygen conditions, foul odors are generated, fish populations are adversely affected, and the aesthetic quality and recreational value of the water is reduced.

Another potential nonpoint source originating from cropped land is pesticides, which include herbicides, insecticides and fungicides. Surface runoff from irrigation or rainfall can wash pesticides from fields into groundwater, streams, and lakes. Some pesticides can also be lost to the atmosphere, either as drift during application or through volatilization from surface of soil or plants. Once airborne, they may become available for redeposition on land or water.

The amount of pesticide runoff depends on the grade or slope of an area, the erodibility and texture of the soil, the soil moisture content, the amount and timing of irrigation or rainfall, and properties of the pesticide. Runoff ratings are based on the pesticide's ability to bind to the sediment during a runoff event. The leaching potential depends on whether the pesticide dissolves easily in water, the soil structure and texture, the amount and timing of irrigation or rainfall, the amount of adsorption to soil particles, and the persistence of the pesticide.

- **Agricultural Categories (Table 4.10;** excludes home gardens and hobby farms**)**

  Intensive Agriculture:

  The farming that we see today, involves high capital investment. Typical characteristics of intensive agriculture include excessive use of chemical fertilizers, pesticides, herbicides, hi-tech machinery and employing high number of labor (per unit land). The main aim of carrying out intensive agriculture is earning maximum amount of profit from a given piece of land.

  Extensive Agriculture (Field Crops):

  Is an agricultural production system that uses small inputs of labor, fertilizers, and capital, relative to the land area being farmed. Extensive farming most commonly refers to sheep and cattle farming in areas with low agricultural productivity, but can also refer to large-scale growing of wheat, barley and other grain crops.

  Orchard

  Is an intentional planting of trees or shrubs that is maintained for food production. Orchards comprise fruit or nut-producing trees which are grown for commercial production. Most temperate-zone orchards are laid out in a regular grid, with a grazed or mown grass or bare soil base that makes maintenance and fruit gathering easy.

Table 4.10 – **Agriculture within Local Source Water System Boundaries** SanGIS updates 2010 & 2005				
San Diego River System				
	2010		2005	
Land Use	Acres	% Acres	Acres	% Acres
Field Crops	8,639	89	9,665	89
Intensive Agriculture	402	4	326	3
Orchard or Vineyard	693	7	875	8
Total	9,734	100	10,866	100
Otay-Cottonwood System				
	2010		2005	
Land Use	Acres	% Acres	Acres	% Acres
Field Crops	3,203	97	3,560	96
Intensive Agriculture	52	2	52	1
Orchard or Vineyard	32	1	113	3
Total	3,287	100	3,725	100
Miramar System				
	2010		2005	
Land Use	Acres	% Acres	Acres	% Acres
Field Crops	0	0	0	0
Intensive Agriculture	0	0	0	0
Orchard or Vineyard	0	0	0	0
Total	0	0	0	0
Hodges System				
	2010		2005	
Land Use	Acres	% Acres	Acres	% Acres
Field Crops	14,110	62	19,984	67
Intensive Agriculture	3,138	14	3,147	10
Orchard or Vineyard	5,492	24	6,847	23
Total	22,740	100	29,978	100

Grazing

The key issues of concern regarding the environmental impacts of livestock on both public and private grazing lands are their effects on soil, water quality, riparian areas, and biodiversity (including invasive plant species).

Livestock can affect soil quality through compaction, erosion, and changes in the plant community. Inappropriate grazing practices may accelerate erosion and sediment transport to water, alter stream flow, and disrupt aquatic habitats. Mismanagement of grazing lands can impair the capacity of riparian vegetation to filter contaminants, shade aquatic habitats, and stabilize stream banks and shorelines.

Water quality impacts of livestock on grazing lands include manure and urine deposited directly into water or on land near surface waters where leaching and surface runoff can transport potential contaminants to streams, ponds, and lakes. Water quality contaminants associated with grazing are sediment (erosion), nutrients, organic matter, and pathogens particularly when they are not fenced out from streams and farm ponds.

The animal grazing data presented derives from two sources: the Bureau of Land Management (BLM), and the United States Forest Service (USFS). Although grazing on private land occurs in these watersheds, no spatial data was available for such areas, and grazing on these lands is not included in this report. It is important to note that grazing on BLM and USFS land is a very small percentage of grazing occurring in these watersheds, with most occurring on private lands. It is estimated that Hodges watershed hosts the most grazing use on private lands (Personnel Communication, USFS Staff). The SDRWQCB does not issue waste discharge permits for livestock grazing, nor does grazing require a permit through the San Diego County Department of Planning and Land Use.

A total of 51,163 acres of BLM and USFS lands are permitted for grazing, while this is a large amount of acreage, USFS estimates only a portion of this land is actually grazed (**Table 4.11**).

Table 4.11 – Permitted Active Grazing Ranges within Local Source Water System Boundaries

BLM & USFS 2010

Range Name	Number of Head	Total Acres	Estimated Acres Grazed	Ownership
San Diego River System				
Range Name	Number of Head	Total Acres	Estimated Acres Grazed	
Total 2010	0	0	NA	N=0
Total 2005	0	0	NA	N=0
Otay-Cottonwood System				
Range Name	Number of Head	Total Acres	Estimated Acres Grazed	Ownership
Corte Madera	40	6,100	470	USFS
Clover Flat	59	7,522	NA	BLM
Guatay	20	900	300	USFS
Hauser Mountain	11	2,952	NA	BLM
Laguna	80	29,700	724	USFS
Total 2010	210	47,174	1,494	N=5
Total 2005	1,286	54,950	NA	N=8
Miramar System				
Range Name	Number of Head	Total Acres	Estimated Acres Grazed	Ownership
Total 2010	0	0	NA	N=0
Total 2005	0	0	NA	N=0
Hodges System				
Range Name	Number of Head	Total Acres	Estimated Acres Grazed	Ownership
Black Mountain	5	454	5	USFS
Mesa Grande	30	3,535	240	USFS
Total 2010	35	3,989	245	N=2
Total 2005	5	454	NA	N=1

Recreation

The primary purpose of surface water reservoir is for domestic water supply; recreation is a secondary use of the reservoir. The potential sources of contamination associated with the recreational activities include; loss of vegetation, erosion, trash, pathogens associated with humans and animals, spillage/leakage of petroleum products, and production of combustion byproducts.

General recreational activities include: hiking, jogging, biking, and picnicking. Activities requiring a permit include: boating, fishing, hunting, water body contact (skiing, personal watercraft), and camping (**Table 4.12**). All reservoirs allow launching of private vessels with the exception of Barrett. San Vicente Reservoir was closed to all recreation in 2007 due to construction associated with the San Diego County Water Authority Emergency Storage Program; opening of the reservoir to recreation is scheduled for 2014 - 2017.

Table 4.12 - Permitted Recreational Use on City Owned Property within Local Source Water System Boundaries
City & County of San Diego 2010

San Diego River System								
	Permits					Rentals		
Reservoir	Fishing	Hunting	Body Contact	Campin g	Launch	Row	Motor	Total Open Days
Murray	73,436	NA	NA	NA	10,467	6,443	4,076	1,820
San Vicente	44,166	NA	143,286	NA	52,769	1,254	3,417	560
El Capitan	109,813	NA	114,766	NA	78,402	1,614	4,347	1,300
Sutherland	27,996	509	200	200	6,775	647	1,573	310
Total 2010	255,411	509	258,252	200	152,450	9,958	13,413	3,990
Total 2005	313,709	1,002	276,591	325	184,446	27,148	7,309	2,825

Otay-Cottonwood System								
	Permits					Rentals		
Reservoir	Fishing	Hunting	Body Contact	Campin g	Launch	Row	Motor	Total Open Days
Otay	84,996	NA	NA	NA	23,166	3,375	7,091	780
Barrett	14,781	2,915	NA	NA	NA	0	5,956	330
Morena	43,206	NA	NA	46,972	4,177	289	3,661	1,820
Total 2010	142,983	2,915	NA	46,972	28,944	3,664	16,708	2,930
Total 2005	154,381	2,199	NA	NA	31,078	10,720	15,405	2,800

Miramar System								
	Permits					Rentals		
	Fishing	Hunting	Body Contact	Camping	Launch	Row	Motor	Total Open Days
Total 2010	40,537	NA	NA	NA	4,897	3,145	2,317	1,820
Total 2005	37,799	NA	NA	NA	3,419	4,542	1,011	768

Hodges System								
	Permits					Rentals		
	Fishing	Hunting	Body Contact	Camping	Launch	Row	Motor	Total Open Days
Total 2010	62,949	NA	NA	NA	35,106	1,447	5,706	585
Total 2005	36,526	NA	1,599	NA	11,481	3,138	1,489	585

Facilities associated with recreation are owned and operated by the City of San Diego except for those at Morena Reservoir which are operated by the County of San Diego. The facilities generally include: parking, launch, docks, floats, rental boats, trash receptacles, portable toilets, and comfort stations (restroom facilities supplied with running water). Floating relief stations (toilets) are located on all reservoirs with the exceptions of Barrett and Morena. A pre-fabricated toilet facility with manual removal of waste is located at El Capitan Reservoir. There are no boat-holding tank pump-out stations, marinas, or berths available at the reservoirs. On shore, trash cans and portable toilets are placed above current water levels.

All reservoirs open to recreation with the exception of Barrett have a barrier demarcating a restricted access zone around the outlet facilities and dams. This area is to prevent direct recreational contact to the water immediately available for transfer or use by the Treatment Plants.

Fires

Fire can indiscriminately devastate certain vegetation and wildlife communities, but is very important to the sage scrub and chaparral communities located in Southern California. Many taxa of coastal sage scrub plants are adapted to fire by stump sprouting or high seed production. Similarly, many chaparral plants are adapted to frequent fires either through resprouting or seed carry-over (**Vegetation, Chapter 3**). While these communities are adapted to fire and usually recover in three to five years, the soils are subject to increased erosion immediately following a severe burn.

All fires alter the cycling of nutrients and the biotic, physical, moisture, and temperature characteristics of soil. In many cases however, these impacts are either negligible or short-lived and thus have little, if any, impact on the overall ecosystem. In some cases however, the impact of fire on soil conditions can be moderate to severe. The overall degree and longevity of this impact is determined by numerous factors including fire severity, temperature, fire frequency, soil type and moisture, vegetation type and amount, topography, season of burning, and pre- and post-fire weather conditions. In general, when compared to the impacts felt by other ecosystem components, fire effects on soil are typically minor, are often short-lived and can be either positive or negative, with degree of impact increasing with increased fire severity.

Past studies have found post-fire erosion to be facilitated by wind, water, and/or gravity. This includes all of the following types of erosion: raindrop splash, sheet and rill erosion, soil creep, and mass wasting. When compared to unburned sites, the overall extent of erosion will vary considerably. Vegetation removal, combined with changes in soil physical properties, will typically result in erosion following a fire. Whether or not erosion occurs, is not only dependant on fire-influenced changes (bare soil, soil structural changes, altered hydrology etc.), but also on a variety of topographical factors, including slope and aspect, and climatic factors, such as rate and amount of precipitation.

Sediments from the burned areas can impact streams and the aquatic organisms within those streams, ultimately feeding into reservoirs where sediment loads may affect treatment procedures and decrease storage capacity. Water chemistry can be affected directly by input of nutrients and other substances in eroding sediment, and by the direct diffusion of biomass smoke and ash into surface water. Thus, wildfires can contribute to eutrophication of water when additional nutrients are added, particularly nitrogen and phosphorus. Control of large fires is important from both a preservation perspective as well as a watershed management perspective.

Overall, in most cases, a fire increases the amount of nutrients available, and as a result nutrient cycling is increased. While various nutrients can become more available during and after a fire, others may be volatilized and thus lost during a fire. Volatilization, which is temperature dependant, most commonly affects nitrogen and to a lesser extent, sulphur, phosphorus and carbon. Even though volatilization removes nutrients from a system, it can also convert them to a more available form. For example, nitrogen is often converted to the more available form ammonium, during the volatilization process. Thus, even though the total amount of nitrogen on a site decreases, the amount of available nitrogen for primary productivity may actually increase or decrease, depending on the site.

The California Department of Forestry and Fire Protection (CAL FIRE) addresses all large brush fires within the watersheds. The local fire districts handle structural fires only. CAL FIRE has an extensive fire prevention plan and also provides an evaluation of burned sites and a regrowth plan to prevent erosion immediately following a fire. Fire information in this report is supplied by CAL FIRE. The current data available from CAL FIRE is through December 31, 2009. Below are the listed fires and any observations made by City staff, any water quality data associated with the fires will be addressed in

Table 4.13 – Reported Fires within Local Source Water System Boundaries
CAL FIRE 2010

San Diego River System			
Fire Name	Alarm Date	Acres Burned	% Watershed
Volcan	9/6/2005	590	0.3
Angel	2/8/2006	31	0
67	8/11/2006	43	0
Open	11/30/2006	308	0.2
Angel 3	9/15/2007	1	0
McCoy	10/21/2007	353	0.2
Witch	10/21/2007	53,036	25.9
Total 2010	N=7	54,362	26.5
Total 2005	N=3	170,767	83.4
Otay-Cottonwood System			
Fire Name	Alarm Date	Acres Burned	% Watershed
Border 6	5/15/2005	35	0
Hauser	7/14/2005	123	0.1
Proctor	7/23/2005	113	0
Barrett	8/24/2005	12	0
Skye	10/6/2005	230	0.1
Spice	10/13/2005	19	0
HWY 94	10/30/2005	9	0
Pine	7/14/2006	123	0.1
Border 16	7/20/2006	317	0.1
Horse	7/23/2006	16,649	7.3
Proctor	8/6/2006	9	0
Hauser	6/5/2007	17	0
Border 25	7/6/2007	136	0.1
Border 26	7/7/2007	4	0
Pine	9/12/2007	2,109	0.9
Harris 2	10/21/2007	53,869	23.7
Checkpoint	9/4/2009	44	0
Total 2010	N=17	73,817	32.5
Total 2005	N=7	39,401	17.3

Miramar System			
Fire Name	Alarm Date	Acres Burned	% Watershed
Total 2010	N=0	NA	NA
Total 2005	N=0	NA	NA

Hodges System			
Fire Name	Alarm Date	Acres Burned	% Watershed
Ridge	7/31/2005	17	0
78 #4	7/9/2007	100	0.1
Witch	10/21/2007	101,750	64.3
Poomacha	10/23/2007	2,471	1.6
Total 2010	N=4	104,338	65.9
Total 2005	N=4	27,645	17.5

- **San Diego River System**
  From 2005 through 2009 seven fires occurred (**Table 4.13**). Six of the seven fires were less than 600 acres and had minimal impact on the watershed. On October 21, 2007 the Witch fire started and burned 53,036 acres (25%) of the watershed mostly around El Capitan Reservoir. This area also burnt in the 2003 Cedar fire and the vegetation was still sparse which resulted in a less intense fire. City of San Diego Public Utilities Department Staff did not notice significant erosion/sedimentation from the burn areas. Compared to the last WSS the SDR Watershed experienced fewer acres burned.

- **Otay-Cottonwood System**
  Seventeen fires were recorded with thirteen of them under four hundred acres. The Pine fire burned 2,100 acres north of Morena Reservoir with no observed effect on water quality. The Horse fire started July 23, 2006 and burned 16,649 acres near Barrett Reservoir with resulting sedimentation noticed at the reservoir. On October 21, 2007 the Harris 2 Fire started and burned 53,869 (24%) acres of the watershed. This fire burned from Barrett Reservoir westerly to Otay Reservoir. City of San Diego Public Utilities Department Staff observed significant sedimentation in drainage networks and watercourses resulting from the burn area. About twice as many acres burned during this 2006-2010 timeframe compared to the 2001-2005.

- **Miramar System**
  No fires reported during 2006-2010.

- **Hodges System**
  Four fires have taken place since the last WSS. The 78 #4, Poomacha and Ridge fires were relatively small and located in the outermost regions of the watershed; no effect on water quality was observed. On October 21, 2007 the Witch fire started and burned 101,750 acres (64%) of the watershed. The staff of the City of San Diego Public Utilities Department, observed sedimentation in drainage networks and watercourses associated with rain events with in this Watershed. 76,693 more acres burned in Hodges watershed during 2006-2010 then in 2001-2005.