SANTA CLARA RIVER WATERSHED
SANITARY SURVEY UPDATE

System Numbers: 5610046 & 5601706
Reporting Period: January 1, 2006 through December 31, 2010

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FOREWORD

PRIOR SANITARY SURVEYS

United Water Conservation District performed the first sanitary survey for the Santa Clara River watershed in 1996 (supplemented in 1997). The original sanitary survey has been updated on two occasions, the first update represented the period between the original survey and December 31st 2000, and the second survey followed five years later culminating on December 31st 2005. These prior surveys are summarized below. Comments made by the California Department of Public Health (CDPH) are italicized and followed by brief status updates.

Original and 2000 Watershed Sanitary Surveys

The watershed sanitary survey for the Santa Clara River was completed in February 1996 and updated in 2000. The reports fulfilled the watershed sanitary survey requirements of the Surface Water Treatment Rule and the domestic water supply permit. The original survey recommendations included provision of training to wastewater treatment staff (particularly staff at the Santa Paula Wastewater Treatment Facility) informing them of the consequences of major spills; continued focus on watershed management to control activities and events; and a request to review frequency of the quarterly monitoring program for the Santa Clara River and perform particulate analysis and/or particulate count studies for El Rio wells and the Lake Piru water treatment system. The update report reiterated the recommendations of the original survey. The CDPH concurred with the recommendations.

1) Raw Water Sampling

United should follow through with the recommendations made in the original sanitary survey and conduct particulate tests at the Lake Piru Recreation Area's water system and the El Rio well fields.

United responded by collecting samples for Giardia species assay, Cryptosporidium assay and microscopic particulate analysis from Lake Piru (both treated water effluent and unfiltered raw surface water) and from the El Rio facility (treated finished water, filtered well water, and raw water from the inlet weir). With the exception of the El Rio inlet weir sample, all samples contained less than 0.0003 Giardia species per liter and Cryptosporidium oocysts per liter. The sample obtained from the El Rio weir inlet contained less than 0.07 Giardia cysts per liter and Cryptosporidium oocysts per liter. No microscopic particulates were found in Lake Piru treated water effluent, the El Rio finished water, or samples obtained from several of the El Rio wells (filtered well water). Microscopic particulates were observed in the unfiltered raw surface water at Lake Piru, and in samples obtained from the #6 well at El Rio. Monitoring practices are expected to increase under the LT2 Enhanced Surface Water Treatment Rule (LT2SWTR).

United has been sampling surface water at numerous sites along the Santa Clara River on a frequent basis (quarterly-monthly) for turbidity, pH, temperature, color, odor, total alkalinity, calcium, magnesium, potassium, sodium, hydroxide, carbonate, bicarbonate, sulfate, chloride, phosphate, fluoride, nitrate, nitrite, ammonia, TDS, manganese, boron, total coliforms, fecal coliforms, MBAS, MTBE, BOD and hardness. The treatment plants at the Lake Piru Recreation Area and the El Rio facility have online turbidimeters.

2010 Update: A total of 24 samples were collected and analyzed for Cryptosporidium between October 2006 and September 2008 to meet the requirements of the LT2SWTR. The average result was 0.029 oocysts per liter, qualifying United's operations for Bin 1. The second round of Cryptosporidium sampling is required prior to January 1, 2015.

2) Nitrates in El Rio Wellfield
United shall continue to monitor and review data from the wells and recharge sources to determine the source and transport parameter involved with the presence of nitrates near the El Rio wellfield.

United monitors the water pumped from El Rio wells for nitrates on a regular basis. The nitrate levels from individual wells have at times exceeded the MCL of 45 mg/L. A series of studies conducted by United determined that the Santa Clara River which provides much of the natural and artificial recharge to the Oxnard forebay has relatively low concentrations of nitrates (average 7mg/L) indicating that the nitrate is being introduced by land use within the forebay. United determined that the likely sources of contamination are local septic systems and application of nitrogen fertilizers to the agricultural sites that are located up-gradient of the El Rio wellfield. In order to comply with the nitrate MCL, United blends the water supply and selectively shuts down wells that have excessive nitrate concentrations.

2010 Update: As of submission of the 2010 sanitary survey update, 1,361 residences had been connected to sewer systems and are no longer discharging to septic systems in the Oxnard forebay. The new sewer connections were recently completed and improvements are not yet apparent in monitoring results. We anticipate that nitrate concentrations at the El Rio wellfield will decrease during the next reporting period.

3) Treated Wastewater Discharges
United shall encourage and support the City of Santa Paula in their efforts to effectuate full tertiary treatment at the Santa Paula Wastewater Reclamation Plant (WRP). United shall investigate the possibility of extending the discharge point to downstream of the Freeman Diversion.

United reported that it had been active in addressing these issues with the City of Santa Paula and the Regional Water Quality Control Board (RWQCB). The City of Santa Paula was issued a time schedule order by the RWQCB stipulating that they complete construction on new facilities or upgrade facilities to comply with the NPDES permit discharge requirements by spring of 2007.

2010 Update: During this reporting period, three WRPs located within the sphere of influence of the Freeman Diversion have been replaced with new treatment facilities (Piru, Fillmore, and Santa Paula). The new treatment facilities do not discharge effluent directly to the Santa Clara River. Treated effluent from the new facilities is either distributed as recycled water or discharged to percolation ponds.

4) Regulatory/Water Quality Database
United shall investigate the creation of a regulatory/water quality database where information could be accumulated over the ensuing reporting period.

United played an active role in establishing the Santa Clara River Enhancement and management Plan available at http://publicworks.countyofventura.org/fc/scremp2005.pdf. United provided data and reviewed documentation for the management plan.

2005 Watershed Sanitary Survey
The 2005 sanitary survey concluded that overall, the Santa Clara River watershed was well managed and remained favorable from a water quality protective perspective. Approximately 90% of the watershed remained undeveloped open space. The most populated regions are located

in the upper portions of the watershed in Los Angeles County. During normal flow conditions there is no connection between the Los Angeles and Ventura portions of the river and contaminants that are introduced in the upper portions of the river generally are not transported to the El Rio spreading grounds. The primary concern related to United's operations in the Santa Clara River Watershed is contaminants that are introduced downstream of the county line.

Under 2005 conditions, discharges from the Santa Paula and Fillmore wastewater treatment plants posed a potential source of contamination. Both plants had a history of violations and received time schedule orders by the Regional Water Quality Control Board to complete construction of new facilities or upgrade the treatment facilities to comply with the NPDES discharge requirements. The Santa Paula discharge point was located 3 miles upstream of the Freeman Diversion and therefore discharge violations from the Santa Paula facility had the greatest potential to adversely impact the O-H system.

The periodic presence of excessive nitrate concentration in El Rio wells continued to be a concern. United determined that the nitrate was being introduced by land use within the forebay and traveling laterally through groundwater transport. The most probable sources of contamination were local septic systems and applications of fertilizer to the agricultural fields surrounding the El Rio wellfields.

The 2005 survey listed the following recommendations and the DWFOB concurred with the recommendations.

1) *The recognized constituents and activities of concern should continue to be addressed by treatment operations and watershed management. As a groundwater manager United should continue with the regimented water quality monitoring program.*

2010 Update: United has continued to actively participate in water resource management within the Santa Clara River watershed. In addition to the ongoing water quality monitoring program, United has also participated in studies and projects to protect and improve water quality within the watershed. United conducted a 3-year study that assessed the efficiency of agricultural management practices at reducing discharges of pesticides, herbicides, and nutrients to both surface water and groundwater in the watershed. United also participated in development of a Chloride TMDL and Salt and Nutrient Management Plan for the Los Angeles region of the Santa Clara watershed.

2) *The current sampling program performed by United has been demonstrated to be adequate, and should continue at the present levels and frequencies.*

2010 Update: United has and will continue the current sampling/monitoring program.

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SUMMARY

This sanitary survey update provides an evaluation of potential contaminants to source waters for the two potable water delivery systems operated by United Water Conservation District (United). United's Oxnard-Hueneme (O-H) water system (Department of Health Services system #5610046) provides potable water on a wholesale basis to several agencies on the Oxnard Plain. These agencies serve over 205,000 people in the cities of El Rio, Oxnard, Port Hueneme, the United States Naval Air Warfare Center Weapons Division at Point Mugu, and the United States Naval Construction Battalion Center at Port Hueneme. United also operates a small potable water system at the Lake Piru Recreation Area (LPRA) (Department of Health Services system #5601706) that serves recreation users and staff members of United and the U.S. Forest Service.

Summaries are provided describing current conditions in the watershed and changes or events that have occurred during this 5-year reporting period. Some of the changes that are discussed include: upgrades to both the O-H and LPRA water systems; significant improvements to wastewater treatment plants upstream of United's diversion; construction and connection of a new sewer system in the El Rio vicinity resulting in the abandonment of 1,361 septic systems; a slight shift of land use within the watershed from the conversion of some natural and agricultural terrain to urban development; and, the occurrence of five major fires.

1.0 INTRODUCTION

1.1 SANITARY SURVEY REQUIREMENTS / OBJECTIVES

In order to comply with the California Surface Water Treatment Rule (SWTR), domestic water suppliers with water sources classified as being under the direct influence of surface water must regularly conduct sanitary surveys of their source water watershed. The purpose of a sanitary survey is to provide a mechanism to recognize and assess potential sources of contaminants, as well as evaluate the status of the treatment and distribution facilities and their ability to adequately and consistently distribute safe drinking water. The primary components of a sanitary survey are: characterization of the physical and hydrogeological conditions within the watershed; identification of activities that are potential sources of contamination; description of the watershed control and management practices; review of facilities, equipment, operation, maintenance, and monitoring compliance; and recommendations for corrective actions.

1.2 CONDUCT OF THE SURVEY

This survey was performed by staff members of UWCD. The survey was performed through field assessment, data research and compilation, and personal interviews. Field observations were conducted by driving throughout the watershed. Individual site assessments were conducted on foot.

1.3 REPORT ORGANIZATION

United Water Conservation District performed the first sanitary survey for the Santa Clara River watershed in 1996 (supplemented in 1997). The original sanitary survey has been updated on two occasions, the first update represented the period between the original survey and December 31st 2000, and the second survey followed five years later culminating on December 31st 2005. This report will serve as the third update to the original sanitary survey document. The original sanitary survey was meticulously detailed in scope, and included a complete description of the physical and hydrogeological characteristics of the watershed, United's water system infrastructure, potential sources of contaminants, watershed control and management, and an assessment of source water quality. This report is structured to provide a summary of the

components of prior sanitary surveys that have remained constant (unchanged), while integrating pertinent revisions where conditions have changed. The report follows the format outlined by the Watershed Sanitary Survey Guidance Manual prepared by the Source Water Quality Committee of the American Water Works Association, California-Nevada Section (1993).

2.0 WATERSHED AND WATER SUPPLY SYSTEM

2.1 WATERSHED

The Santa Clara River watershed encompasses approximately 1,629 square miles. Approximately forty percent (40%) of the watershed is located in Los Angeles County, and the remaining sixty percent (60%) is located in Ventura County (with the exception of small areas in the upper watershed in Santa Barbara and Kern Counties). Ninety percent (90%) of the watershed is comprised of mountainous, backcountry terrain; the remainder consists of valley floor and coastal plain (VCWPD and LACDPW 1996). Elevations in the watershed range from sea level to 8,800 feet above sea level. Major tributaries of the Santa Clara River include Bouquet Creek, Castaic Creek, Piru Creek, Sespe Creek, and Santa Paula Creek . There are 4 reservoirs in the watershed that capture flow from approximately thirty-seven percent (37%) of the watershed. These reservoirs are Bouquet Reservoir, Castaic Lake, Pyramid Lake, and Lake Piru. Because this study addresses activities that have a potential to impact source waters for UWCD's potable distribution systems, the area for the study is defined to include the upper portions of the Santa Clara River watershed, downward to UWCD's intake structure at the Freeman Diversion facility, an area of approximately 1,550 square miles (Figure 1).

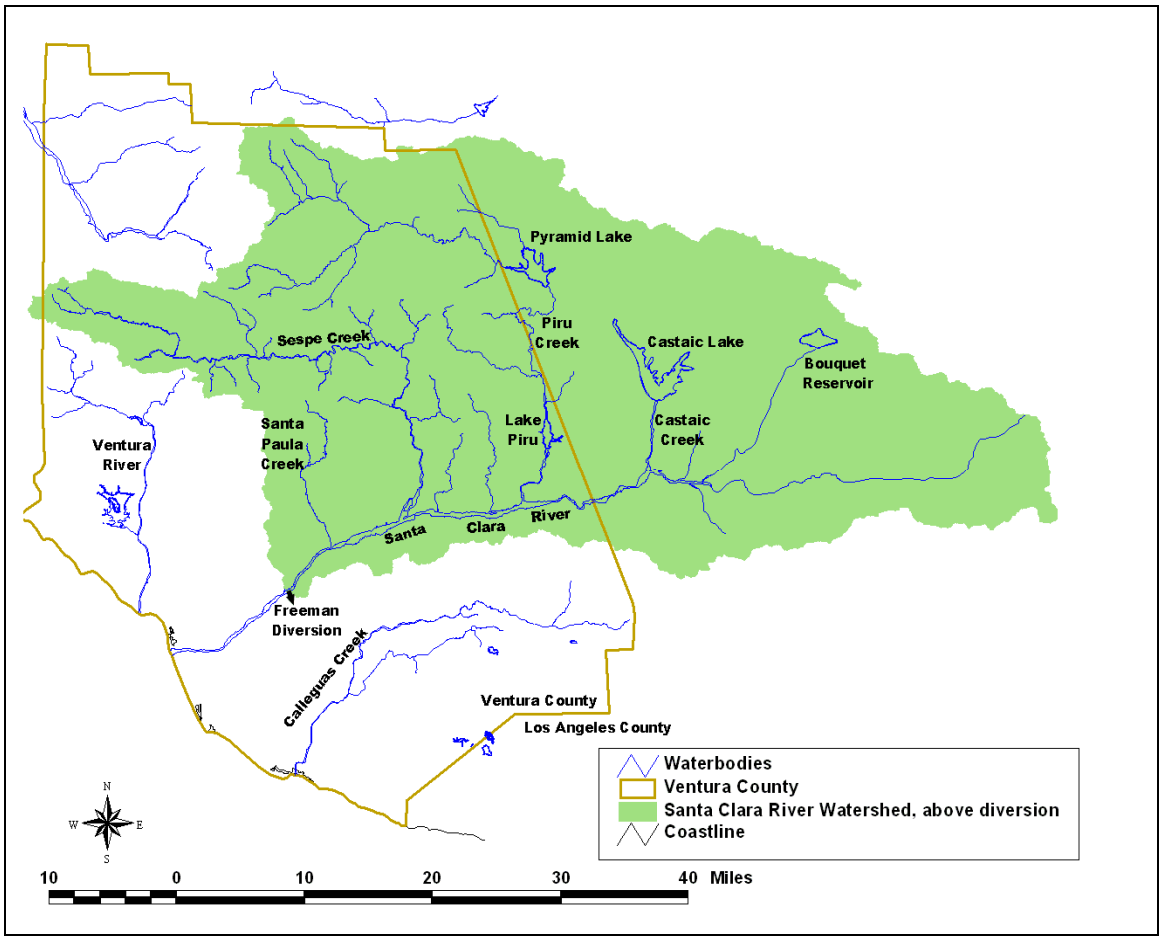

Figure 1 Study Area

Includes all portions of the Santa Clara River watershed above UWCD's intake structure at the Freeman Diversion facility.

2.1.1 Land Use

As discussed above, the Santa Clara River watershed is divided by two counties; Los Angeles and Ventura. Approximately ninety percent (90%) of the watershed is open space and designated National Forest (Angeles and Los Padres National Forests). The primary cities and unincorporated urban areas located within the study area include Acton, Santa Clarita, Castaic, Lockwood Valley, Hungry Valley, Piru, Fillmore, and Santa Paula. Land use data representing 2008 conditions was obtained from the Southern California Association of Governments (SCAG) and is presented in Figures 2 and 3.

A 2005 land use assessment for the area within the 500-year floodplain of the Santa Clara River was published in the Santa Clara River Enhancement & Management Plan (VCWPD & LACDPW 2005). Land use acreages and percentages are presented in Table 1. The primary land use within the 500-year flood plain is open space and the secondary land use is agriculture. Together these two land uses encompass over 90% of the 500-year flood plain. An analysis of land use alteration in the Santa Clara River watershed indicates that the major change in land use in recent years has been the conversion of natural and agricultural terrain to urban development (VCWPD & LACDPW 2005).

Table 1 2005 Land use acreage and percentages within the 500-year flood plain of the Santa Clara River

Land Use	Acreage	Percent
Open space	12,915	62
Agriculture	5,814	29
Industrial	548	3
Residential	367	2
Commercial	357	2
Recreation	276	1
Urban Vacant	107	1
Total	**19,784**	**100**

Source: VCWPD and LACDPW 2005

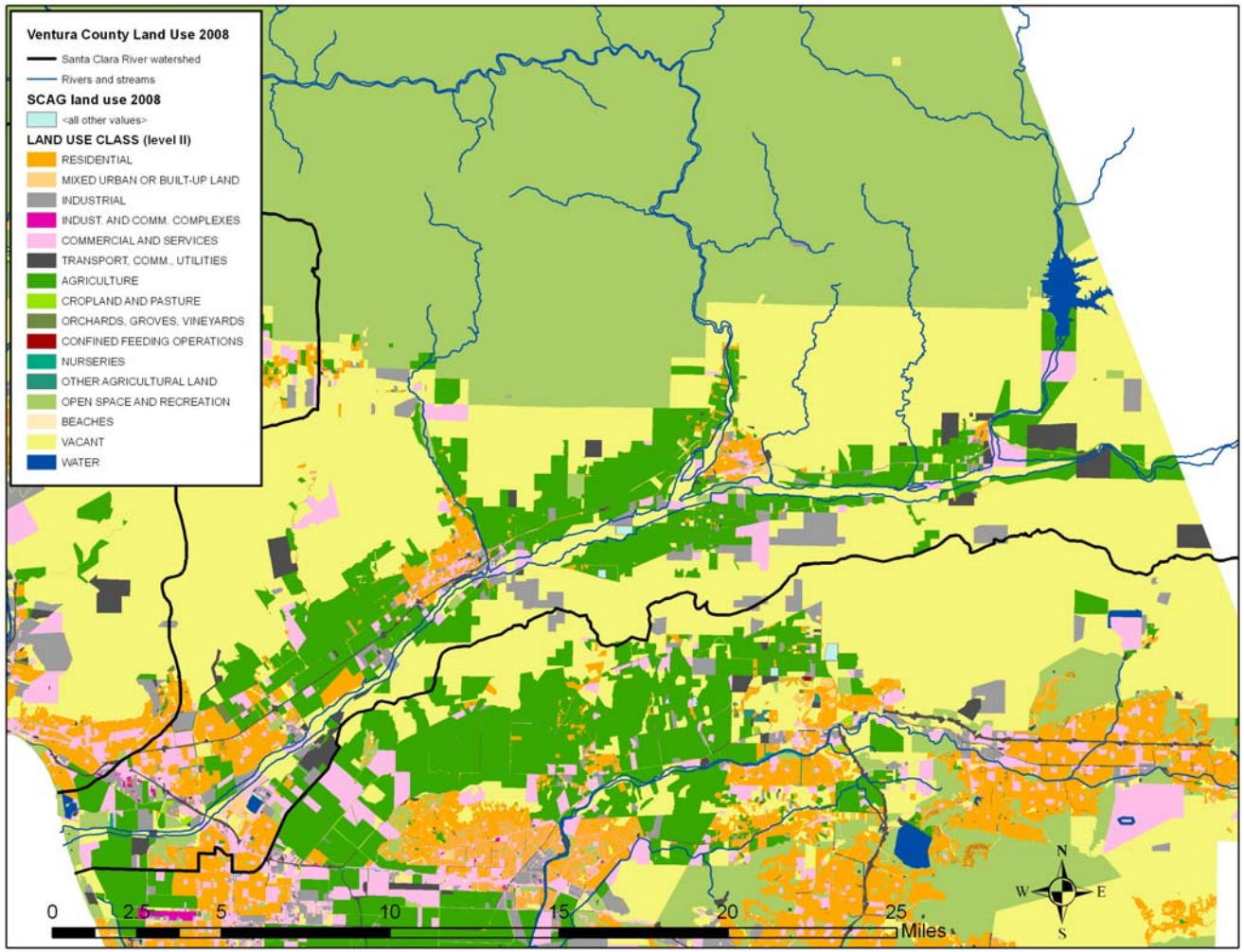

Figure 2 2008 Land use for the Ventura County portion of the Santa Clara River watershed (SCAG 2008)

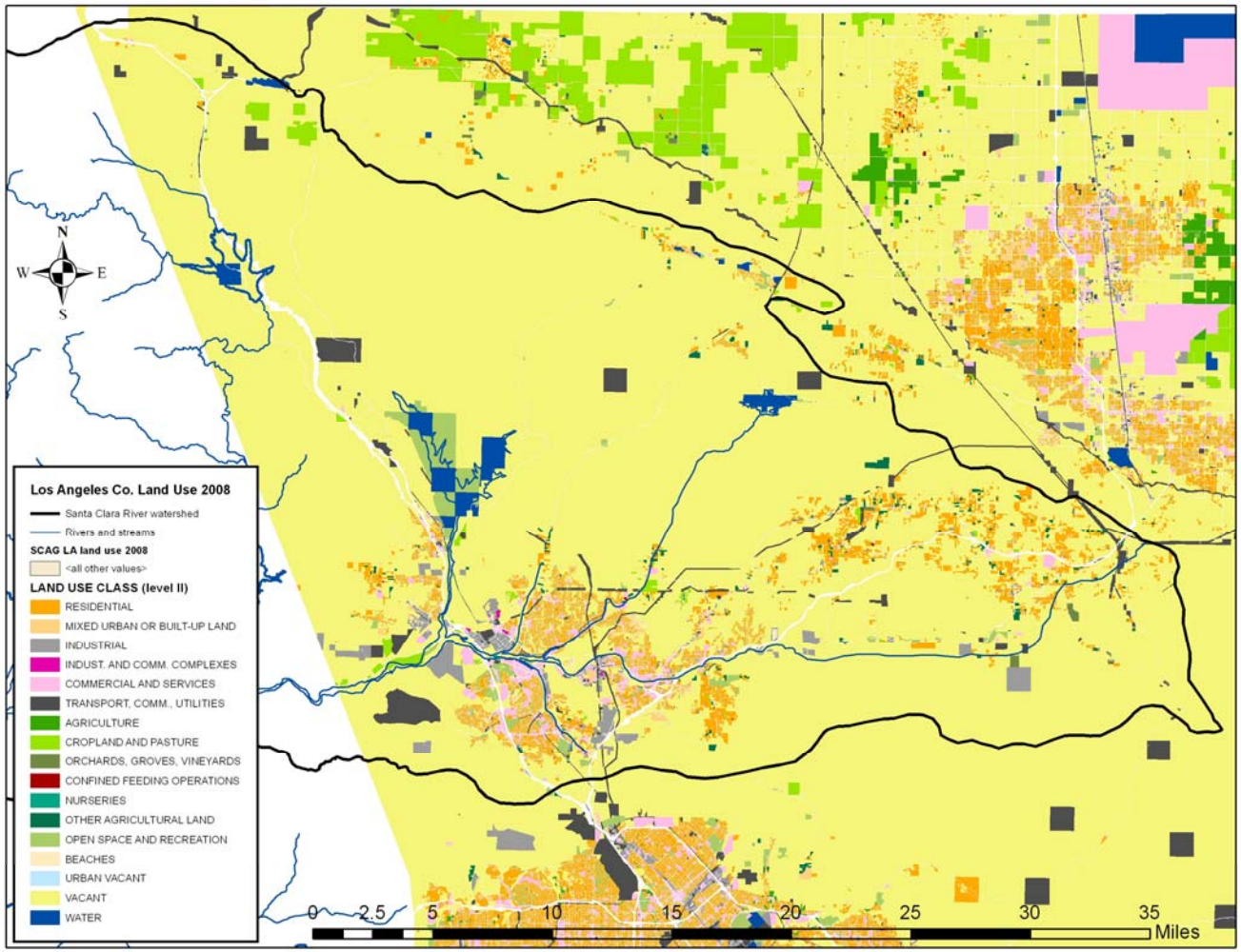

Figure 3 2008 Land use for the Los Angeles County portion of the Santa Clara River watershed (SCAG 2008)

2.1.2 Natural Setting

The natural setting of the Santa Clara River watershed is described in detail in the original sanitary survey. Topography, geology, soil characteristics, vegetation types and wildlife have not significantly changed in the past 10 years, and therefore this section is not updated in this report.

2.1.3 Hydrology

The general hydrology of the Santa Clara River watershed is presented in the original sanitary survey and remains unchanged. Variable characteristics such as annual precipitation and groundwater recharge at District facilities are presented below. Precipitation values include data from three gaging stations in Ventura County (Lake Piru, Santa Paula, and Saticoy) maintained by the Ventura County Watershed Protection District (VCWPD 2010) (Table 2). Annual artificial groundwater recharge totals are presented in Table 3 which lists recharge volumes resulting from United's Piru and Freeman Diversions.

Table 2 Annual Precipitation (per water year - October 1 to September 30)

Location	Gage Station	Annual Precipitation (inches)				
		2005-2006	2006-2007	2007-2008	2008-2009	2009-2010
Lake Piru	#160	23.76	6.37	19.77	13.15	not available
Santa Paula	#245A	18.44	4.98	16.07	11.45	not available
Saticoy	#261	17.07	6.95	14.44	9.71	not available

Source: VCWPD 2010

Table 3 Artificial Groundwater Recharge at United Facilities

Water Year	Piru Basin (acre feet)	Oxnard Plain Forebay* (acre-feet)
2005-06	2,262	82,775
2006-07	75	32,305
2007-08	227	50,257
2008-09	0	30,930
2009-10	0	34,009

*Oxnard Plain Forebay includes diversions from the Freeman Diversion to Saticoy and El Rio spreading basins, and the Noble Pit.

2.2 WATER SUPPLY SYSTEM

2.2.1 United Water Conservation District – Background

2.2.1.1 History

The original founding organization for United Water Conservation District was called the Santa Clara River Protective Association. It was formed in 1925 to protect the runoff of the Santa Clara River from being appropriated and exported outside the watershed. The Santa Clara Water Conservation District was formed in 1927 to further the goals of the Association by protecting water rights and conserving the waters of the Santa Clara River and its tributaries. The District began a systematic program of groundwater recharge in 1928, primarily through constructing

spreading basins along the Santa Clara River. Sand dikes were constructed on the Santa Clara River near Saticoy to divert river water into spreading basins.

As seawater intrusion on the Oxnard Plain was recognized in the 1940s, it was clear that the District did not have the financial ability to raise money to construct the facilities necessary to combat the problem. A new district was organized in 1950 under the Water Conservation Act of 1931. The new district was called United Water Conservation District for its unification of urban and agricultural concerns. United Water then constructed a number of water conservation projects, including:

- Santa Felicia Dam (1955) to capture and store winter runoff on Piru Creek to release in controlled amounts during the dry season. The 200-foot high dam can store about 83,245 acre-feet in Lake Piru reservoir. The reservoir is downstream from the State Water Project, enabling the District to receive northern California water directly without the construction of expensive conveyance facilities.
- A pipeline to new spreading basins at El Rio.
- Wells at El Rio to produce water for the O-H pipeline (1954) that supplies drinking water to the cities of Oxnard and Port Hueneme, mutual water districts, and the two Navy bases at the coast. The O-H system supplies water from the Oxnard Forebay basin (the recharge area for the Oxnard Plain basin), rather than by pumping of individual wells in areas of the Oxnard Plain that could accelerate seawater intrusion.

Following increasing intrusion of seawater from the 1950s to the 1980s, United built several new facilities to increase recharge to the aquifers and to decrease groundwater pumping in areas affected by the intrusion. The Freeman Diversion (1991), which replaced the temporary diversion dikes in the Santa Clara River with a permanent concrete structure, allowed diversion of storm flows throughout the winter. In addition, the Freeman structure stabilized the riverbed after years of degradation caused by gravel mining in the river.

Formed in 1956, the Pleasant Valley County Water District was established to import surface water from the Santa Clara River to the Pleasant Valley basin. Bonds were issued for the construction of the Pleasant Valley Pipeline, and water diverted by United was first delivered to Pleasant Valley in 1958. United continues to deliver surface water to Pleasant Valley to decrease the demand for groundwater in this agricultural area.

The Pumping Trough Pipeline (PTP) was constructed, starting in 1983- and completed in 1985, to convey diverted river water to agricultural pumpers on the Oxnard Plain, thus reducing the amount of groundwater pumping in critical areas.

The Noble spreading basins (1995) were acquired to store additional river water for groundwater recharge, particularly during periods of excess runoff, or to accommodate diversion of highly turbid water.

In 2009, United purchased the Ferro and Rose basins. Beyond the short term benefits of this acquisition – reduced irrigation water demand and nitrate loading – these acquisitions were intended to take advantage of a favorable real estate market and provide land for future recharge facilities. These facilities will be described further in later updates.

2.2.1.2 Water Sources

Source water for the LPRA water system is drawn directly from Lake Piru. Approximately three quarters of the watershed above Santa Felicia Dam and the Lake Piru Reservoir passes through Pyramid Dam. The source of water in the Pyramid Dam Reservoir is primarily the State Water Project. United holds prior water rights to all water contributed to Pyramid Lake by natural drainage from the Piru Creek Watershed. The blended water released from the Pyramid Reservoir results in a large percentage of the Lake Piru yield being of State Water Project origin.

Water sources for the O-H water system consists of nine upper aquifer system wells located within the El Rio groundwater recharge facility and three lower aquifer system wells located along Rose Avenue in the Oxnard forebay groundwater basin. The source of the groundwater supplying the wells is a blend of groundwater from the basin and recharged water that has been diverted from the Santa Clara River and distributed to the Saticoy and El Rio recharge basins adjacent to the well field. Santa Clara River water includes releases from Lake Piru and Castaic Lake, and runoff from the Santa Clara River watershed.

2.2.2 Lake Piru Recreation Area Water System #5601706

The LPRA water system is classified as a transient non-community water system. The LPRA water system has been upgraded since the 2005 sanitary survey update was completed. The upgrades include a new water treatment plant, increased storage capacity and distribution system improvements. A significant portion of the landscape irrigation demand is now supplied by a separate irrigation system for non-potable water. The current treatment process is outlined below.

> The LPRA domestic water system extracts water via a floating pump barge located near the west shore of the Lake Piru reservoir. The raw water is supplied by two vertical turbine pumps (25 horsepower each) with intakes located 12 feet beneath the barge. Each domestic pump has an operating capacity of 150 gpm and alternates between “on” and “standby” modes. Water is delivered from the pump barge to the treatment facility by a floating 4-inch high pressure hose.
>
> The raw water is immediately disinfected at the treatment plant with sodium hypochlorite. The disinfectant is injected into the system at a variable rate dependent upon chlorine demand. An in-line chlorine analyzer regulates the flow of disinfectant in order to maintain a chlorine residual goal of 3.0 ppm. The water then passes through two pressurized sand filter vessels. A cationic polymer is injected into the sand filter effluent.
>
> The sand filter effluent then flows directly to a two stage pressure filter system manufactured by EPDUSA Inc. The water treatment facility is designed for a maximum flow of 150 gpm at an operating pressure of 150 psi. Treatment works have the capability of treating turbidity up to 20 NTU. A second dose of the polymer is injected between the first and second stage filters. The filter media is composed of graded garnet sand. The filter beds have a maximum loading of approximately 12 gpm/sq ft. Filters automatically enter a backwash cycle based on differential pressure within the filters. Backwashing is performed with treated, disinfected water from a 140,000 gallon storage tank in the distribution system.
>
> The filtered effluent then leaves the treatment plant and travels to the 140,000 gallon storage tank where it enters the distribution system. All water delivered from the LPRA water system during this 5-year reporting period was in compliance with state and federal primary drinking water standards.

A significant portion of the LPRA water demand is required for landscape irrigation. A separate irrigation distribution system was constructed in 2010. The water is supplied by a vertical turbine pump (20 horsepower) on the pumping barge adjacent to the domestic pumps. The irrigation pump has a capacity of 150 gpm. The irrigation intake is located 12 feet beneath a floating barge. Water is delivered from the barge to the shore by a floating 4-inch high pressure hose. The irrigation system is a non-potable system that includes two pressurized sand filters and a 50,000 gallon storage tank.

2.2.3 Oxnard-Hueneme Water System #5610046

The O-H water system has also been upgraded since the last sanitary survey update was completed. The cover and liner were replaced in clearwell #1 and it was put back in service in June of 2007. In 2008, well #3 was inactivated and replaced with a newly installed well #16. The upper aquifer wellfield spreading basins were upgraded in 2009/2010 by removal of the weir inlet structure and installation of a magnetic meter and two stilling well inlet structures. The treatment process at the O-H system is outlined below.

The Oxnard-Hueneme delivery system consists of two wellfields (one wellfield that draws water from the upper, Oxnard and Mugu aquifers; and a deeper wellfield that draws water from the lower, Hueneme and Fox Canyon aquifers), a water treatment plant, two 8.5 million gallon reservoirs, a booster plant, and a total of 11.6 miles of distribution pipeline.

The upper aquifer wellfield consists of nine wells (2A, 4, 5, 6, 7, 8, 11, 15, and 16) located around the perimeter of the El Rio spreading basins (Figure 4). These shallow wells are drilled to depths ranging from 250 to 360 feet. Of the nine shallow wells, eight are located within 150 feet of the spreading basins, and therefore, are considered to be under the influence of surface water and subject to Surface Water Treatment Rule requirements (Well #11 is located greater than 150 feet from the nearest spreading basin). Infiltration through the natural substrate beneath spreading basin has the effect of slow sand filtration with a loading of less than 0.1 gpm/sq ft; therefore the artificial recharge/well pumping process qualifies for alternative natural filtration treatment credit.

The lower aquifer wellfield consists of three wells (12, 13, and 14) located along Rose Avenue (Figure 4). These wells are drilled to depths of approximately 1,200 feet. The deep wells are primarily used during drought conditions. During dry periods, the nine shallow wells may be unable to meet the demands of the water system. In addition, during drought conditions, nitrate concentrations in the upper aquifer have at times exceeded the maximum contamination level of 45 mg/L nitrate. In order to reduce the nitrate concentrations to acceptable levels, United has the ability to blend water from the upper and lower aquifers. Use of the deep well water is not favorable because of high iron and manganese concentrations. United customers have chosen not to support removal processes for iron and manganese, and the Department of Health Services has granted United repetitive 5-year waivers from providing an iron and manganese removal filtration treatment. Although the three deep wells are maintained as standby sources, they were not pumped for the O-H water system during this 5-year reporting period.

The pumped water is pre-chlorinated by injection of gaseous chlorine. The chlorinator controls the flow of disinfectant based upon proportional flow to maintain a 2 ppm chlorine residual (goal) to meet the required contact time ratio within each 8.5 million gallon clearwell reservoir. Upon leaving the clearwells, the treated water is post-chlorinated followed by injection of aqueous ammonia. The existing disinfectant equipment consists of

a total of eight 2,000 pound chlorine cylinders (two cylinders online, two stand-by cylinders, and four replacement cylinders); and one 4,000 gallon ammonia tank.

The finished water is pumped to various agencies by the El Rio booster station through the O-H pipeline (Figure 5). The booster station consists of four 400 horsepower variable frequency drive (VFD) pump/motors that transmit the water through approximately 8.5 miles of concrete cylinder pipe, ranging in diameter from 24 to 42-inches. The O-H pipeline is designed to deliver 53 cfs at a constant pressure of 60 psi. For proper maintenance of the booster station, the four VFDs are rotated periodically based on hours of use. In addition, four 500 horsepower natural gas engines are reserved for use during power outages. All water delivered from the O-H pipeline during this 5-year reporting period was in compliance with state and federal primary drinking water standards, as documented in our annual consumer confidence reports.

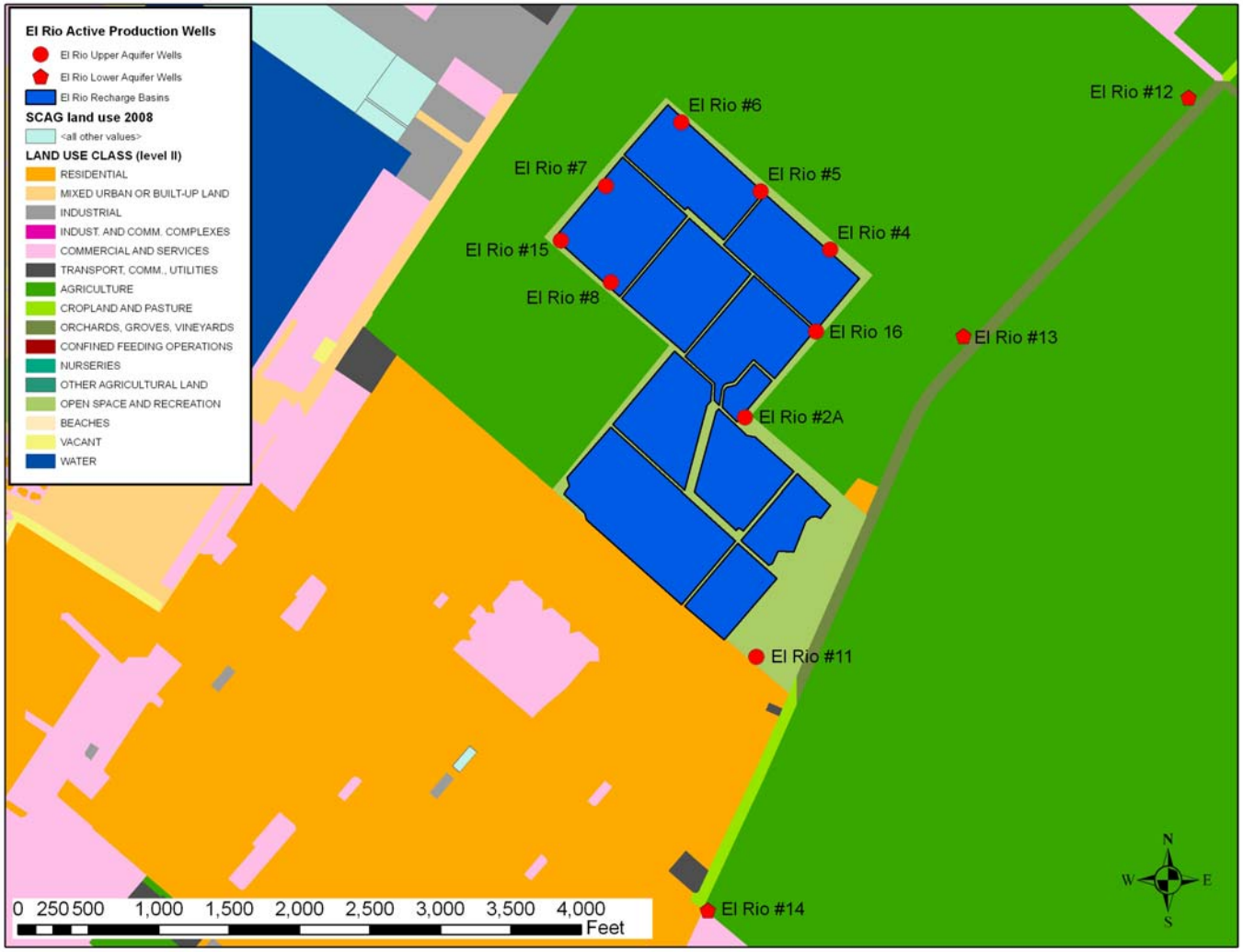

Figure 4 El Rio wellfield (with land use information)

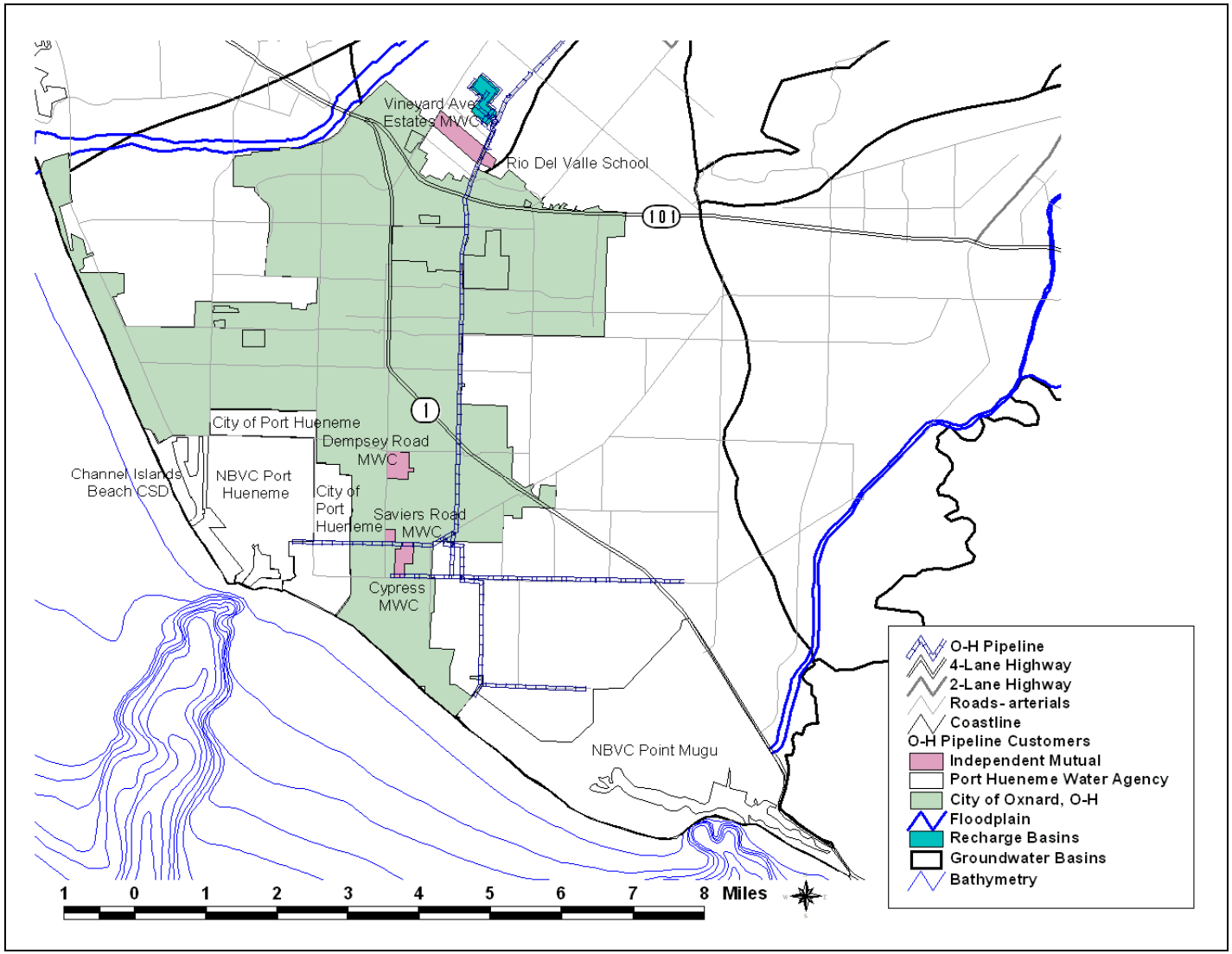

Figure 5 Oxnard-Hueneme pipeline and service boundary

2.2.4 Emergency Plans

Emergency procedures were provided in the original sanitary survey. An updated organizational chart is presented in Figure 6.

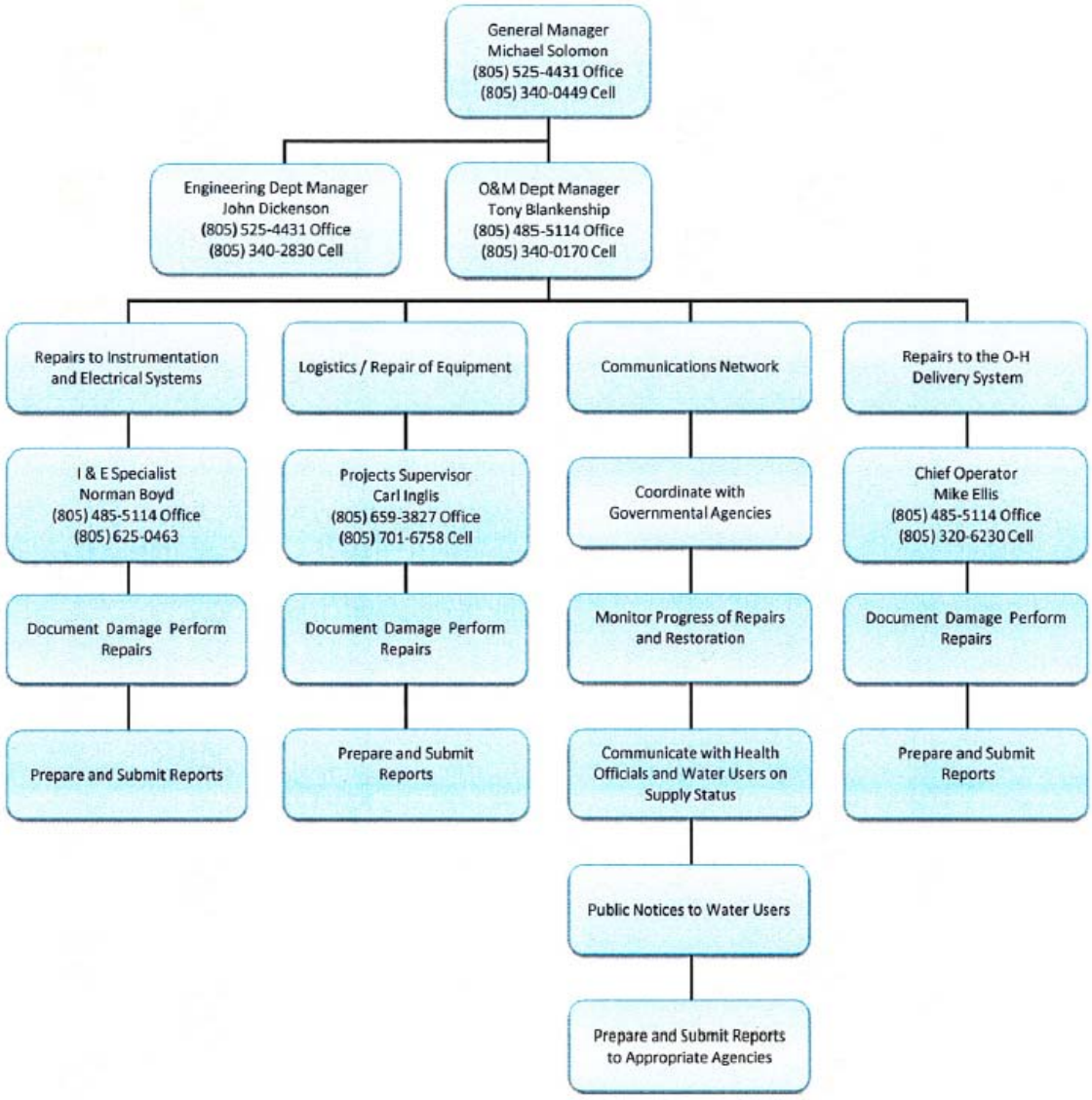

Figure 6 Oxnard-Hueneme water system emergency response organization chart

3.0 POTENTIAL CONTAMINANT SOURCES

3.1 WASTEWATER

There are 5 wastewater treatment facilities located within the study area. The locations of each of the Wastewater Reclamation Plants (WRPs) within the study area are shown in Figure 7. The County Sanitation District of Los Angeles County owns and operates the two WRPs located in the upper region of the study area (Saugus WRP and the Valencia WRP). The Piru Treatment Facility is operated by the Ventura County Waterworks District No. 16. The City of Fillmore

Wastewater Treatment Facility is operated by OMI, Inc.; and the City of Santa Paula Water Reclamation Facility is operated by Perc Water Corporation. The Los Angeles Regional Water Quality Control Board (RWQCB) regulates and monitors discharge compliance of each plant. UWCD receives and reviews copies of all discharge compliance reports (monthly, quarterly, semi-annual, annual, etc.) submitted to the RWQCB by each of the WRPs.

Each of the water treatment facilities are individually detailed below. It is important to note that although the Saugus and Valencia facilities discharge relatively large quantities of treated effluent to the Santa Clara River, they are both located in the upper region of the watershed, a substantial distance from the Freeman Diversion where UWCD diverts water from the river for recharge. In general, flow in the Santa Clara River is not continuous, and there are several dry reaches between the Los Angeles County WRPs and the intake structure at the Freeman Diversion. The most persistent of these dry reaches is approximately 4 miles long, located in the central Piru basin. During wet periods, discharge from the WRPs may reach the Freeman Diversion; however, the discharge would be significantly diluted by increased runoff within the watershed.

Substantial improvements have been achieved during this reporting period with regard to potential contamination from wastewater discharges that could affect diverted water at the Freeman Diversion. The three WRPs located in the mid to lower reaches of the study area have been replaced with new treatment facilities and no longer discharge to the Santa Clara River. The three upgraded facilities are located in Piru, Fillmore, and Santa Paula. All three of these WRPs have a prior history of violations and as of the 2005 reporting period had received Time Schedule Orders (TSO) by the RWQCB to complete construction of new facilities or upgrades to facilities that would enable the WRPs to comply with discharge requirements prescribed by their NPDES permits.

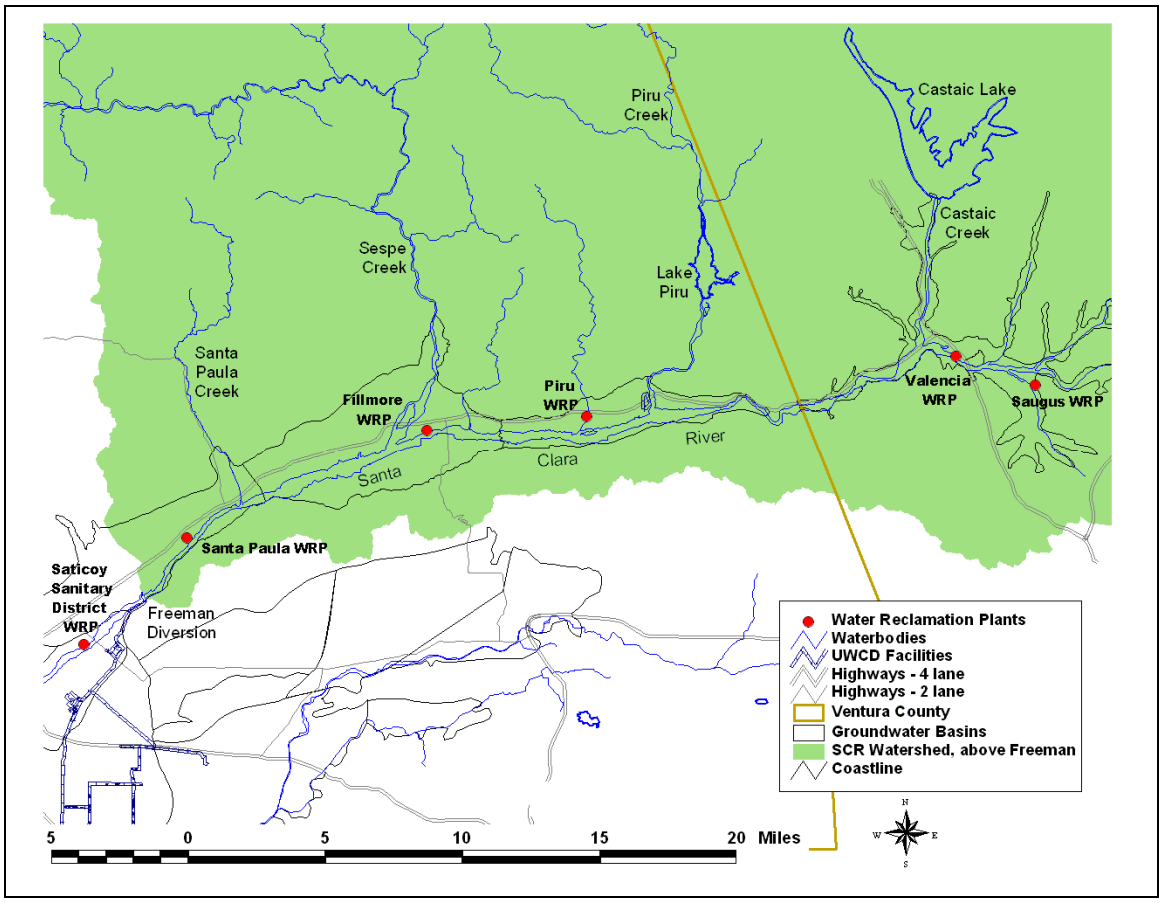

Figure 7 Wastewater reclamation plants located in the study area

3.1.1 Saugus Water Reclamation Plant

The Saugus WRP is located in the community of Saugus, on the south side of the Santa Clara River. The Saugus WRP serves a population of 70,000 people, and provides primary, secondary, and tertiary treatment with a maximum capacity of 7 million gallons of wastewater per day (Figure 8). Wastewater that exceeds the 7 million gallons per day capacity bypasses the Saugus WRP and is treated at the Valencia WRP. Processed wastewater from the plant is discharged directly into the Santa Clara River.

Monthly monitoring reports filed during this reporting period were reviewed and reported violations are presented in Table 4.

Table 4 Reported violations of waste discharge requirements at the Saugus WRP during 2006-2010

Month/Year	Criteria	No. of Exceedences
Dec/2006	Turbidity	1
Dec/2008	Residual Chlorine	1
Jan/2009	Residual Chlorine	1
Sep/2009	Trihalomethane	1
Mar/2010	Foam	1

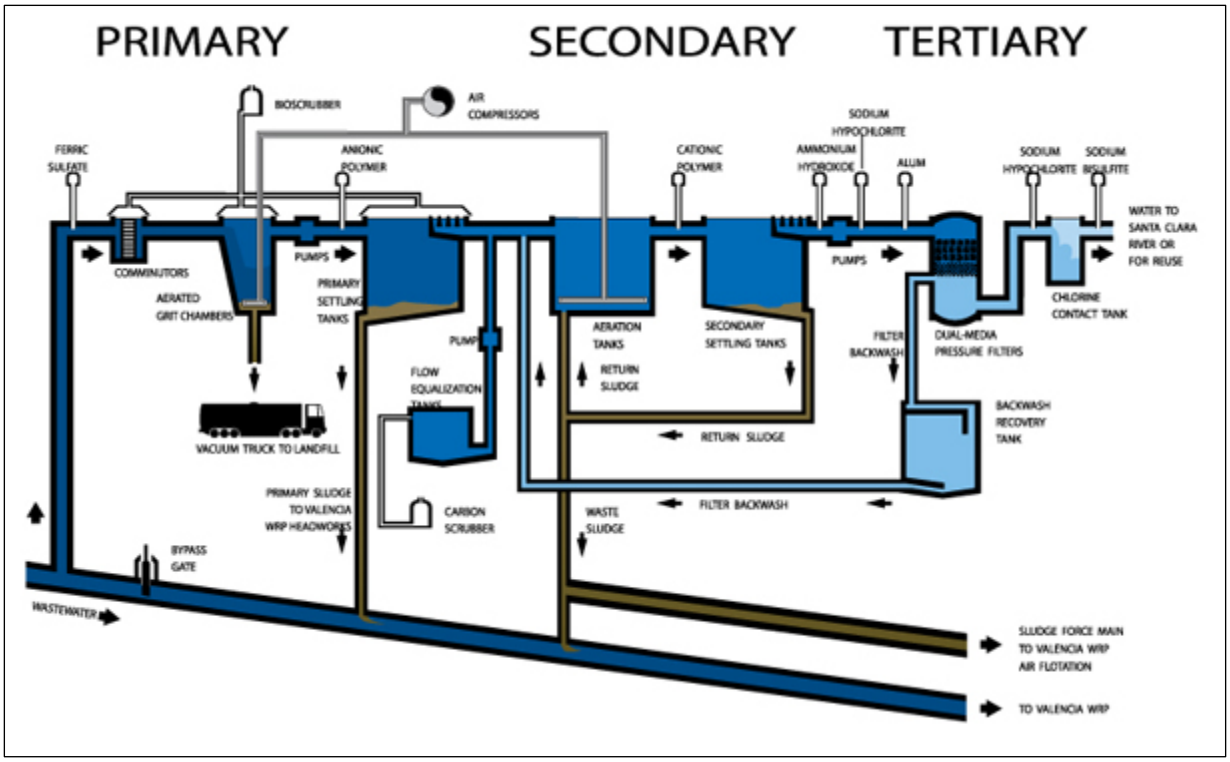

Figure 8 Schematic of the Saugus WRP

3.1.2 Valencia Water Reclamation Plant

The Valencia WRP is located in the community of Valencia adjacent to the Santa Clara River and Interstate 5. The Valencia plant serves a population of 110,000 people, and provides primary, secondary, and tertiary treatment (Figure 9). The Valencia WRP has nitrogen removal equipment and a maximum capacity of 21.6 million gallons of wastewater per day. This plant includes solids processing facilities. Wastewater solids are anaerobically digested, stored and dewatered using plate and frame filter presses. The dewatered cake, or biosolids, is hauled away for agricultural land application. Methane gas is produced during the digestion process and is utilized by a cogeneration process that heats water and produces electricity. Processed wastewater from the plant is discharged directly to the Santa Clara River.

Monthly monitoring reports filed during this reporting period were reviewed and reported violations are presented in Table 5.

Table 5 Reported violations of waste discharge requirements at the Valencia WRP during 2006-2010

Month/Year	Criteria	No. of Exceedences
Jan/2006	Turbidity	1

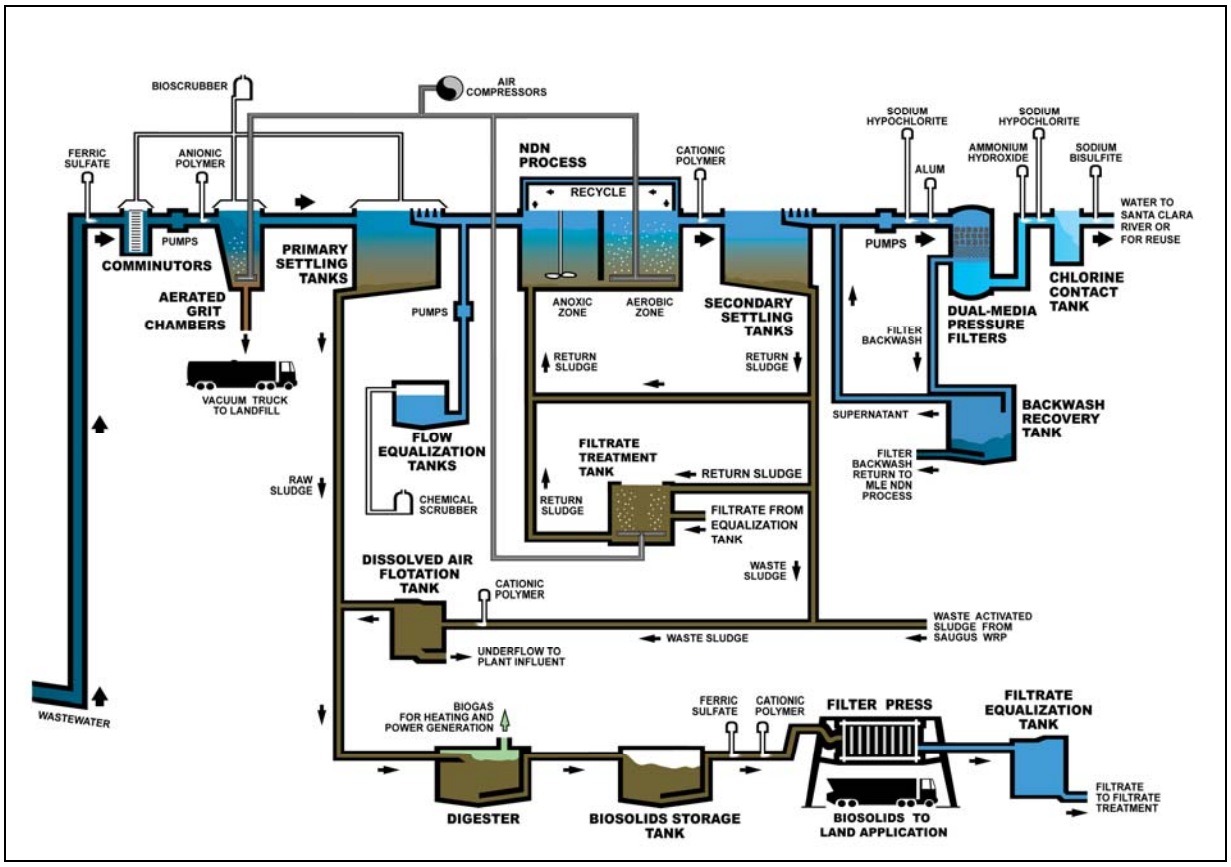

Figure 9 Schematic of the Valencia WRP

3.1.3 Piru Treatment Facility, Ventura County Works District #16

The Piru facility was replaced with a new treatment facility (shown in Figure 10) in March of 2010 with an increased capacity of 0.5 million gallons per day. The Piru Treatment Facility provides service to approximately 400 residential and industrial customers in the community of Piru. The implemented treatment process includes use of an oxidation ditch followed by secondary treatment. The plant discharges treated effluent into shallow alluvial percolation ponds located just west of the confluence of Hopper Creek and the Santa Clara River.

The prior Piru Treatment Facility also discharged to percolation ponds and did not directly discharge to the river. The previous facility had a history of violations that included exceedances to established thresholds for the following constituents or parameters: chloride, total nitrogen, TDS, TSS, and BOD. Since construction of the new treatment facility, discharges have routinely exceeded the threshold for chloride and TDS, however, because the source water also exceeds the thresholds these exceedances are considered non-violations.

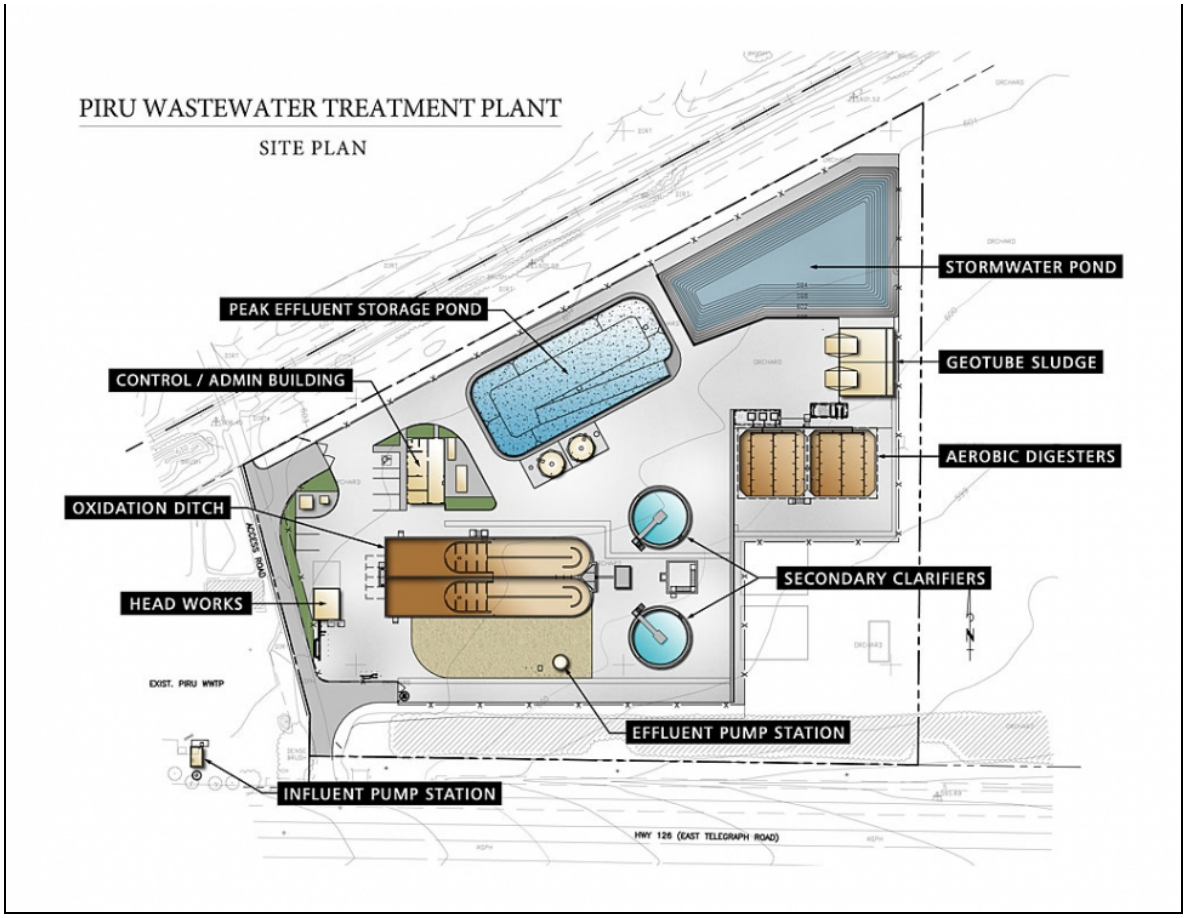

Figure 10 Piru Wastewater Treatment Plant site layout

3.1.4 The City of Fillmore Wastewater Treatment Facility

The City of Fillmore constructed a new state of the art water treatment facility that was completed in August of 2009 and started operating in September of 2009. The new plant is located near the Santa Clara River east of Sespe Creek in the Fillmore basin. The City of Fillmore serves a customer base of approximately 15,000 people. Operating at full capacity, the plant is designed to treat 2.4 million at final buildout. The current configuration is intended to operate at 1.8 million gallons per day. The treatment process at the facility includes a membrane bioreactor system and an ultraviolet disinfection system. Approximately 20% of the treated effluent is delivered as recycled water to two local schools, a newly constructed green belt, and a city park. The remaining treated effluent is discharged to an underground effluent disposal system that provides groundwater recharge.

Prior to construction of the new facility, the previous treatment facility had a history of violations. During this reporting period, the violations included exceedances to thresholds for the following constituents and parameters: nitrate+nitrite, fecal coliform, Ecoli coliform, and chloride. There were two sanitary sewer overflow occurrences, the first in 2008 and the second in 2009. In both cases, the spills were contained before they reached the river. The facility has been in compliance with all wastewater discharge requirements since the new plant went into operation.

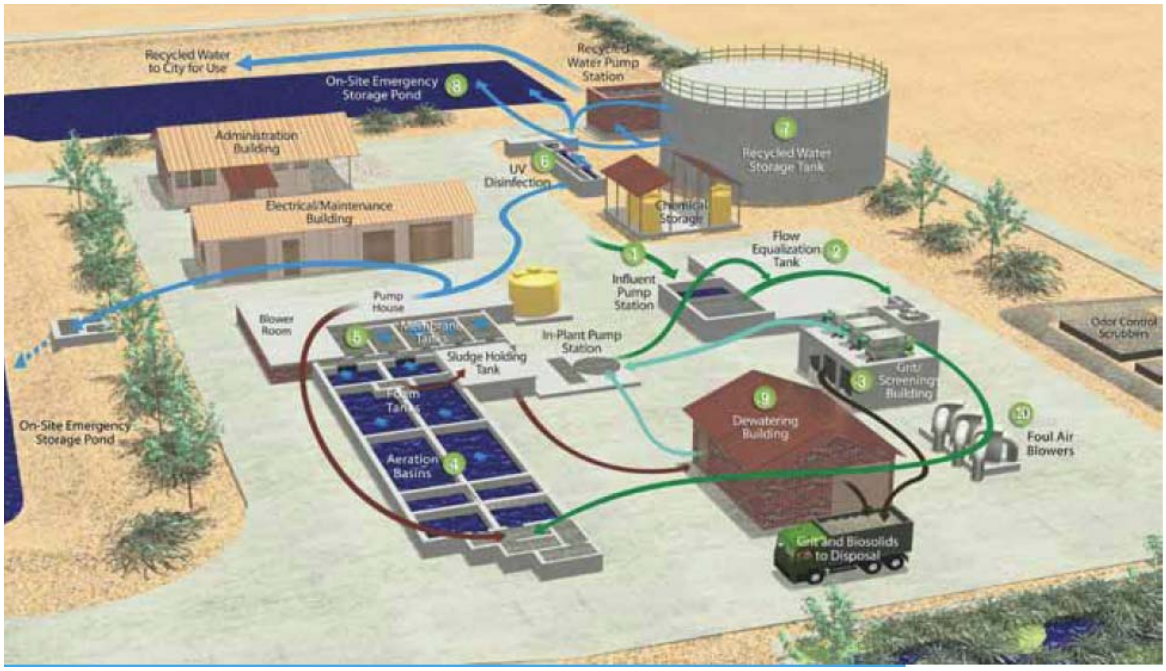

Figure 11 City of Fillmore Wastewater Treatment Plant site layout

Location of sludge disposal: Toland Landfill
3500 North Toland Road
Santa Paula, CA 93060

Location of grit disposal: Toland Landfill
3500 North Toland Road
Santa Paula, CA 93060

3.1.5 The City of Santa Paula Water Reclamation Facility

The City of Santa Paula has also constructed new treatment facilities during this reporting period. The new treatment/recycling plant is designed for 3.4 million gallons per day with expandability to 4.2 million gallons per day. The plant has all new utilities including an influent sewer lift station, three digester tanks, three anoxic tanks, three aerobic tanks, a UV disinfection tank and system, a foam control system, two-flow equalization tanks and a membrane bioreactor. Construction of the facility was completed on April 14th 2010 and it was operational and achieved full discharge on May 16th 2010. The effluent is currently discharged into percolation ponds, but qualifies for Title 22 unrestricted reuse and the City is developing strategies to implement use of a portion of the recycled water.

Prior to construction of the new facility, the previous treatment facility had a history of violations. During this reporting period, the violations included exceedances to thresholds for the following constituents and parameters: turbidity, BOD, TDS, TSS, chlorine residual, and iron. The facility has been in compliance with all wastewater discharge requirements since the new plant went into operation.

Location of sludge disposal: Toland Landfill
3500 North Toland Road
Santa Paula, CA 93060

Location of grit disposal: Toland Landfill
3500 North Toland Road
Santa Paula, CA 93060

3.2 SEPTIC TANK SYSTEMS

Septic systems are used in several of the unincorporated areas of the watershed. Although septic systems in the upper regions of the watershed can directly impact local drinking water wells, they are not a significant concern in relation to source water for either of the drinking water systems discussed in this survey, and therefore are not addressed further in this update. Septic systems located within the Oxnard Forebay have historically been a major concern, and the focus of this discussion.

In the previous sanitary survey update, United reported that as of 1999 there were approximately 3,000 septic systems (permitted and unpermitted) that served a population between 10,000 and 15,000 people in the Oxnard Forebay. The Los Angeles RWQCB concluded that discharges from residential and commercial septic systems in the Oxnard Forebay did not meet water quality objectives specified in the Basin Plan, and threatened or impaired the drinking water use of underlying groundwater resources. In order to ensure the long-term protection of groundwater resources in the Oxnard Forebay and in aquifers extending onto other portions of the Oxnard Plain, the RWQCB adopted a Basin Plan amendment that prohibited installation of new septic systems within the forebay, and mandated that discharges from existing septic systems on lot sizes of less than five acres ceased by January 1, 2008 (RWQCB 2004a).

To facilitate abandonment of septic systems by homeowners in the unincorporated area of El Rio, the County of Ventura is constructing a conventional sewer system. The work is under way and connection for the community will be finished by the end of 2011. The septic tank prohibition affects approximately 1,600 property owners in the El Rio and Strickland Acres communities, and also in the City of Oxnard city limits. To date the project is fully funded with approximately $25.2 million in federal, state, and local funding, and the remainder in State Revolving Fund financing for 30 years. The Project is divided into eleven phases. Nine phases have been completed. As of December 31st 2010, 1,361 residences have been connected to the sewer system as a result of these efforts. The final two phases are scheduled to start to connect to the new sewer collection system in March 2011.

3.3 RECLAIMED WATER

During this reporting period there has been an introduction of use of reclaimed or recycled water in the study area as agencies have implemented treatment procedures that have resulted in removing discharges to the Santa Clara River. As discussed above, the City of Fillmore is using reclaimed water for irrigation at city owned properties and facilities. The City of Santa Paula intends to begin use of recycled water in the near future. The recycled water that is currently being distributed within the study area meets Title 22 criteria for unrestricted reuse.

3.4 URBAN AND INDUSTRIAL AREA RUNOFF

Urban and industrial runoff is considered to be a significant source of water pollution. Fortunately, only a small percentage of the Santa Clara River watershed is populated. According to a recent study by the RWQCB, there were a total of 30 NPDES permits issued within the watershed. Four of the permits were held by WRPs (Saugus, Valencia, and Santa Paula; as well as one WRP located near the Ventura Estuary below the study area). At the time of the study, 11 of the permits were for minor discharges, and 15 were for discharges covered under general

permits. In addition to the NPDES permits, there were 114 dischargers covered under industrial storm water permits and 317 dischargers covered under construction storm water permits; the majority of these sites are located in the upper watershed within the city of Santa Clarita (RWQCB 2004b).

It should be noted that flow characteristics of the Santa Clara River watershed and UWCD's diversion operating criteria significantly reduce the effect of urban runoff on the water quality of water recharged at UWCD facilities. This is because in smaller precipitation events, urban and industrial runoff from the most populated area of the watershed (Santa Clarita), is lost to recharge in the Piru Basin. Conversely, in large precipitation events, urban and industrial runoff is diluted by significantly higher volumes of tributary flows, most notably from Sespe Creek. In addition, high turbidity levels typically observed in the rising limb of a storm hydrograph dictate rejection of the "first flush" flows at the Freeman Diversion.

3.5 AGRICULTURAL CROP LAND USE – PESTICIDES AND HERBICIDES

The primary land use in the watershed is open space (approximately 90%), the secondary land use is agriculture. The Annual Crop Report for 2009 is presented in Appendix A (VCAC 2009). According to the report, the top eight crops in Ventura County are strawberries, nursery stock, celery, raspberries, lemons, tomatoes, peppers, and avocados. For many years citrus and avocado orchards were the primary crops grown in the Santa Clara River watershed. In recent years, nursery stock and row crops (particularly strawberries) have become more common in this area.

Strawberry fields are located along the western, northern, and eastern boundaries of the El Rio spreading basins and wellfield. Wells in these areas have periodically exhibited high nitrate concentrations that are likely contributed by the close proximity of agriculture to the wellfield. Nitrate is a constituent of concern to the O-H drinking water system and is discussed further in Section 5.2.2.1.

As a groundwater manager and water purveyor, United works closely with the local agricultural community. United recently performed a study that was designed to assess the efficiency of modified management practices intended to reduce the discharge of nutrients and pesticides from agricultural parcels into surface waters. The project was completed in 2007 and identified several management practices that are being promoted for use within the agricultural community.

3.6 GRAZING ANIMALS

There are multiple small to medium size operations that support grazing animals within the watershed. Small herds of cattle are often observed grazing in the vicinity of South Mountain. Further up in the watershed, there is a 6,000 acre cattle and guest ranch (Rancho Temescal). UWCD previously leased land located around Lake Piru for cattle grazing, but all such leases have been cancelled.

3.7 CONCENTRATED ANIMAL FACILITIES

We are unaware of any concentrated animal facilities in the Santa Clara River watershed.

3.8 WILD ANIMALS

The Santa Clara River represents one of the last natural river systems in Southern California. A variety of upland, riparian, and wetland vegetation types exist in the Santa Clara River floodplain that provide habitat for a diverse assemblage of both plant and animal species. To this date, the presence and activities of wild animals in the watershed have not been recognized to present

negative impacts to either of the drinking water systems that were substantial enough to pose a challenge to the treatment operations.

3.9 MINE RUNOFF

Several gravel mining operations are present in the watershed. The operations do not present significant adverse affects on either drinking water system addressed in this sanitary survey.

3.10 SOLID AND HAZARDOUS WASTE DISPOSAL FACILITIES

Solid and hazardous waste disposal facilities are discussed in the original sanitary survey and have not significantly changed in the past 10 years.

3.11 LOGGING

We are unaware of any commercial logging within the Santa Clara River watershed.

3.12 RECREATIONAL USE

Recreational use has not changed significantly since submittal of the 2001 sanitary survey update. USFS campgrounds that were previously closed due to funding restraints, wilderness and forest use designations, and protection of endangered species remain closed. Hungry Valley continues to be a popular off-road vehicle recreation area, and Lake Piru Recreation Area serves over 100,000 visitors per year.

3.13 UNAUTHORIZED ACTIVITY

Unauthorized activities include illegal dumping of chemicals, paint, or any other toxic material to surface waters, or disposal of municipal or industrial waste into conveyance channels. United is not aware of any quantification of unauthorized activity, or reports that would present this type of data.

3.14 TRAFFIC ACCIDENTS AND SPILLS

United is not aware of any traffic accidents that resulted in a substantial introduction of toxic or hazardous waste to the Santa Clara River or its tributaries during this reporting period. A significant spill occurred on April 3rd of 2009. The piping system failed on a 5,000 gallon diesel tank located on a ranch east of the City of Santa Paula. The spill was contained before it flowed into the Santa Clara River.

3.15 GROUNDWATER WHICH INFLUENCES SURFACE WATER QUALITY

There are three reaches of the Santa Clara River that are significantly influenced by rising groundwater.

1. Upstream of Blue Cut, in the vicinity of County line and some distance above. Generally not apparent due to the presence of constant flow in the river from the Valencia WRP discharge;
2. Piru/Fillmore basin boundary, in the vicinity of the fish hatchery, upstream to approximately Willard road. Generally dry from this point to at least Torrey Road;
3. Fillmore/Santa Paula basin boundary from Hallock Drive east to approximately Toland Road. This flow remains continuous to the Freeman Diversion.

3.16 SEAWATER INTRUSION

Source water intakes for both of the water systems discussed in this survey are located inland from local areas that are under the influence of seawater intrusion. Although seawater intrusion

does not impact the addressed source water quality, it is a major concern on the Oxnard Plain, and a continual focus of United's activities.

United staff is currently finalizing a report on the first stage of a new study to identify the extent of saline intrusion into coastal aquifers. The project represents the first significant study since 1990 and the most detailed study to date identifying the extent of saline intrusion into local groundwater resources. The study utilized Time Domain Electromagnetic (TDEM) technology to map the inland extent of saline intrusion in both the upper and lower aquifer systems. In short, the maps show that the extent and configuration of highly saline areas in the coastal aquifers varies significantly from the previous understanding. The results from the TDEM study will be used to design strategies to address the saline intrusion problem.

A key player in the fight against saline intrusion is the Fox Canyon Groundwater Management Agency (FCGMA). The FCGMA was initially created to manage the groundwater in both overdrafted and potentially saline-intruded areas within Ventura County. The prime objectives and purposes of the FCGMA are to preserve groundwater resources for agricultural, municipal, and industrial uses in the best interests of the public and for the common benefit of all water users. Protection of water quality and quantity along with maintenance of long-term water supply are included in their goals and objectives. During this reporting period the FCGMA released an updated groundwater management plan that can be viewed on their website at the following address: http://www.fcgma.org/.

3.17 GEOLOGIC HAZARDS

Geological hazards are discussed in the original sanitary survey and have not significantly changed.

3.18 FIRES

Five major fire events occurred within the Santa Clara River watershed during this reporting period.

- The Day Fire burned largely in Los Padres National Forest in Ventura County. It was the sixth largest fire in California history. The fire began on September 4th in 2006 and by October 1st had burned over 162,700 acres. The Day fire was completely contained on October 13th;
- The following fires occurred in October of 2007:
    - The Magic Fire which burned approximately 2,824 acres on the west side of Santa Clarita;
    - The Meadowridge Fire which burned 40 acres in Santa Clarita;
    - The Ranch Fire (or Castaic Fire) burned 58,401 acres in the Angeles and Los Padres National Forests.
- The Guiberson Fire occurred in September of 2009 and burned approximately 17,500 acres between Fillmore and Moorpark.

3.19 OIL FIELDS

Existing oil fields have been operated in compliance with NPDES permits and in general, impacts could be expected to be similar to the conditions stated in the original sanitary survey report.

3.20 SIGNIFICANCE OF POTENTIAL CONTAMINANT SOURCES

3.20.1 Lake Piru Recreation Area Water System

The watershed above Lake Piru is primarily open space with limited potential for anthropogenic contamination. A stretch of Piru Creek (between Pyramid Lake and Lake Piru) runs adjacent to Highway 5 and is vulnerable to contamination resulting from traffic accidents on the highway. Another concern is contamination due to oil spills like the one that occurred at Pyramid Lake in March of 2005 (CDFG 2005). Recreational boating activities on Lake Piru could result in contamination due to fuel or oil spills, or spills from floating toilet facilities. Floating toilet facilities are designed to prevent spills and include double wall tanks with inspection ports. Toilet facilities are monitored and maintained by United staff. Contamination from natural sources could also impact the water system; however this has not been an issue in the history of the water system operation. Processes that result in increasing turbidity within Lake Piru pose a challenge to the water treatment facility, but have not resulted in compromised water quality. The types of processes that can increase turbidity include increased erosion due to fires or floods. These processes have the greatest impacts when the lake is low and there is less dilution.

3.20.2 Oxnard-Hueneme Water System

In general, contaminant sources in the upper watershed have less potential to impact drinking water quality of the O-H water system than those located in close proximity of United's El Rio facility. The Ventura County portion of the Santa Clara River is characterized by alternating losing and gaining reaches, and during typical flow regimes, there is no connection between the upper and lower reaches of the river. Water that is discharged to the upper reaches of the Santa Clara River (in Los Angeles County), generally infiltrates into the streambed before reaching the confluence with Piru Creek. During wet seasons, streamflow in the Santa Clara River is only continuous for very short durations. This was evident following the winter storms of 2005, the second wettest year in recorded history. When flow in the upper reaches (above the Newhall Crossing) receded below 100 cfs, all flow infiltrated into the streambed and a disconnect in the river was observed above Piru Creek. At the same time, flows below Piru Creek remained in excess of 1,000 cfs. If a spill were to occur in the Los Angeles side of the watershed during storm conditions, when streamflow is continuous, any contamination would be subject to extreme dilution. In addition, operation criterion stipulates that the Freeman Diversion gates be closed when river water is excessively turbid. A side benefit of this procedure is that contaminants that are entrained in the "first flush" of a storm bypass the Freeman Diversion. Following major storm events, the diversion gates are re-opened after flows recede and turbidity declines to acceptable levels.

4.0 WATERSHED CONTROL AND MANAGEMENT PRACTICES

Control and management practices within the Santa Clara River watershed were discussed in the original sanitary survey and are summarized below.

4.1 WATERSHED AGENCY MANAGEMENT PRACTICES

UWCD has limited control over management practices within the watershed. United owns and has direct control of the Lake Piru Recreation Area, as well as three parcels of land used for water conveyance and groundwater recharge facilities (one located near the confluence of Piru Creek and the Santa Clara River, and the other two located in Saticoy and El Rio), and an office building located in Santa Paula. In general, the management plans implemented on UWCD properties are designed to protect water resources and ensure that our operations comply with standards and regulations set by federal, state, and local agencies.

4.2 OTHER AGENCIES WITH WATERSHED CONTROL AUTHORITY

There are multiple agencies at the federal, state, and local levels that interact to regulate activities within the Santa Clara River watershed. The Los Angeles Regional Water Quality Control Board, the local branch of the State Water Resources Control Board, has established a Basin Plan for the coastal watersheds of Los Angeles and Ventura Counties (CRWQCB 1994). The Basin Plan incorporates a number of state and federal laws including the California Porter-Cologne Water Quality Control Act (California Water Code, Division 1, Chapter 2, article 3, et seq., plus others) and the Clean Water Act (PL 92-500, as amended). The Basin Plan identifies beneficial uses within the watershed, designates water quality objectives, and details strategic plans and policies as well as monitoring and assessment procedures to be implemented within the watershed. The Basin Plan is presented in Appendix B.

4.3 WATER AGENCY COORDINATION MEASURES

United District cooperates with other agencies in their management roles through the following means:

- United staff members participate in government and legislative issues as members of the Association of California Water Agencies, the American Water Works Association, and Channel Counties Water Utility Committee;
- UWCD has fostered cooperative relationships with representatives from various agencies including the Fox Canyon Groundwater Management Agency, the County of Ventura Watershed Protection District, local water agencies, Regional Water Quality Control Board, California Department of Fish and Game, U.S. Army Corps of Engineers, and U.S. Fish and Wildlife Service;
- United was an active participant in the development of the Santa Clara River Enhancement and Management Plan (SCREMP), and the Fox Canyon Groundwater Management Plan;
- UWCD reviews and comments on new environmental impact reports, studies, and plans for activities occurring within the watershed that have the potential to impact water resources, or United facilities;
- United allows the Ventura County Watershed Protection District to operate a Mass Emission Station at the Freeman Diversion;
- United supports public education programs which include the attendance of local science and career fairs and the development of an elementary school informational pamphlet. Additionally, the District promotes education through the distribution of informational brochures, District updates included with the bi-annual billing statements, and facility tours.

5.0 WATER QUALITY

5.1 DRINKING WATER REGULATIONS (SURFACE WATER TREATMENT RULE)

The Surface Water Treatment Rule (SWTR) is a set of treatment technique requirements that apply to all potable water systems using surface water or groundwater that is under the influence of surface water. The rule requires that water systems properly filter the water unless they can meet strict criteria. The rule also requires that all systems using surface water disinfect the water; there are no exceptions from the disinfection requirements.

The SWTR requires that all water systems meet the following treatment criteria:

- Minimum of 99.9 percent (3 log) removal and/or inactivation of Giardia Lamblia cysts;
- Minimum of 99.99 percent (4 log) removal and/or inactivation of enteric viruses.

In general, compliance by water purveyors could be met through one of the following alternatives:

- Meeting the criteria for which filtration is not required and providing disinfection according to specific requirements of the SWTR; or
- Providing filtration and meeting disinfection criteria required for those supplies that are filtered.

Water supply systems that are required to filter can use a variety of treatment technologies in conjunction with disinfection to meet the expected performance levels. These technologies include conventional filtration, direct filtration, slow sand filtration, and diatomaceous earth filtration.

Additional requirements of the SWTR include design standards, reliability features (alarms, dedicated standby replacement equipment, and a backup power supply), operation criteria, development of an emergency disinfection plan and operations plan, submittal of monthly operations reports and conductance of sanitary surveys.

5.2 CONSTITUENTS OF CONCERN

5.2.1 Lake Piru Recreation Area Water System

Water quality within Lake Piru reflects that of high quality imported water from the State Water Project. Results from regular laboratory analyses of both raw and treated lake water do not indicate that there is cause for concern regarding any assessed constituent.

5.2.2 Oxnard-Hueneme Water System

Constituents of concern for the O-H water system include nitrate and pathogenic components (pathogen indicators - coliform and e-coli; Cryptosporidium, and Giardia), both of which are thought to be contributed from relatively local sources.

5.2.2.1 Nitrate

United monitors water pumped from El Rio wells for nitrate on a weekly basis. At times, nitrate concentrations from individual wells have exceeded the maximum contamination level (MCL) of 45 mg/L for drinking water (Figure 12). As a water resource manager, United has conducted a series of studies to determine the extent of nitrate concentrations and the possible sources of contamination. The most recent study, *Nitrate Observations in the Oxnard Forebay and Vicinity, 1995-2006* (UWCD 2008), is presented in Appendix C.

The Santa Clara River, which provides much of the natural and artificial recharge to the Oxnard Forebay, exhibits relatively low concentrations of nitrate (average 7 mg/L NO_3) (Figure 13), indicating that the nitrate is being introduced by land uses within the forebay. The likely sources of historical contamination are local septic systems (discussed in Section 3.2) and application of nitrogen fertilizer to agricultural sites that are located up-gradient of the El Rio wellfield (Section 3.5). With the recent installation of sewer systems in the El Rio vicinity we expect to see a decline in nitrate concentrations in the future. Figures 14-18 show annual maximum recorded nitrate concentrations at each monitored well in the El Rio area. The wells that are located in the northern portion of the El Rio wellfield (El Rio wells 4, 5, 6, and 7) exhibit the highest nitrate concentrations.

Nitrate levels in the El Rio wells are highly variable. The highest nitrate concentrations are present during and immediately after drought periods, and comparatively low nitrate

concentrations typically occur during wet periods. Low nitrate concentrations are maintained during wet periods when low-nitrate Santa Clara River water is in abundance for spreading at the El Rio recharge basins. During drier periods, when river water is not available to spread at El Rio, nitrate concentrations in El Rio wells increase, particularly in the northeastern area of the wellfield (UWCD 1998). In order to maintain acceptable nitrate concentrations in the O-H potable water delivery system, United's personnel blend and selectively shut down wells that have excessive nitrate concentrations.

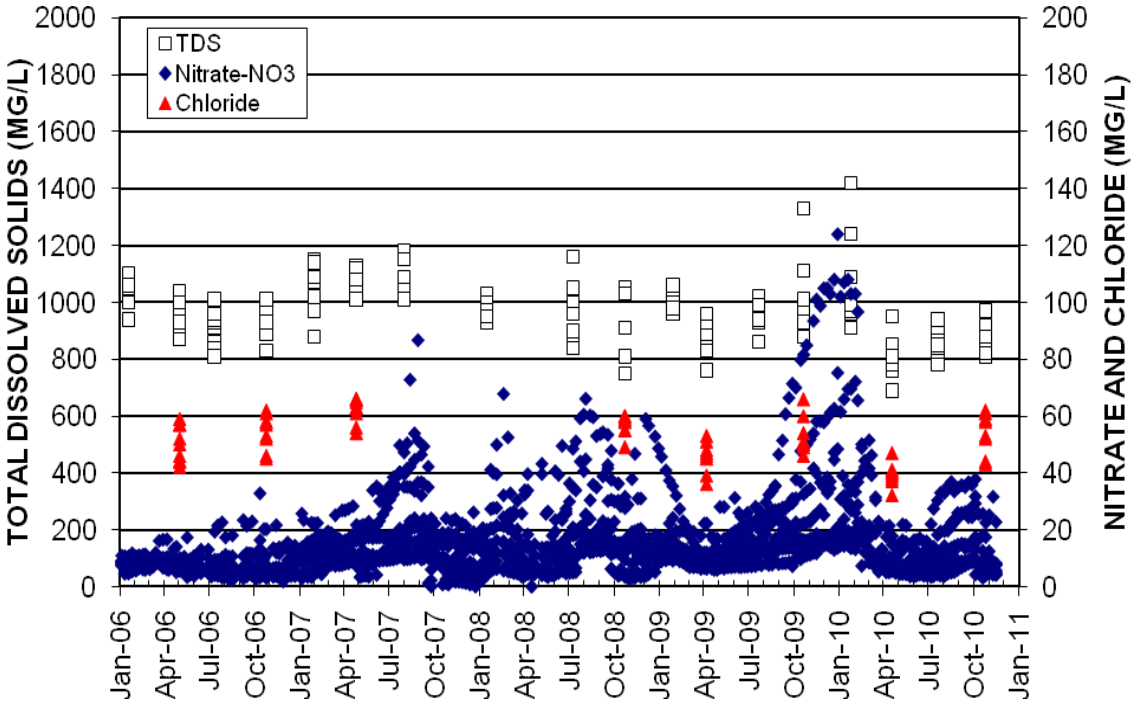

Figure 12 Monitoring data for individual wells located at the El Rio wellfield

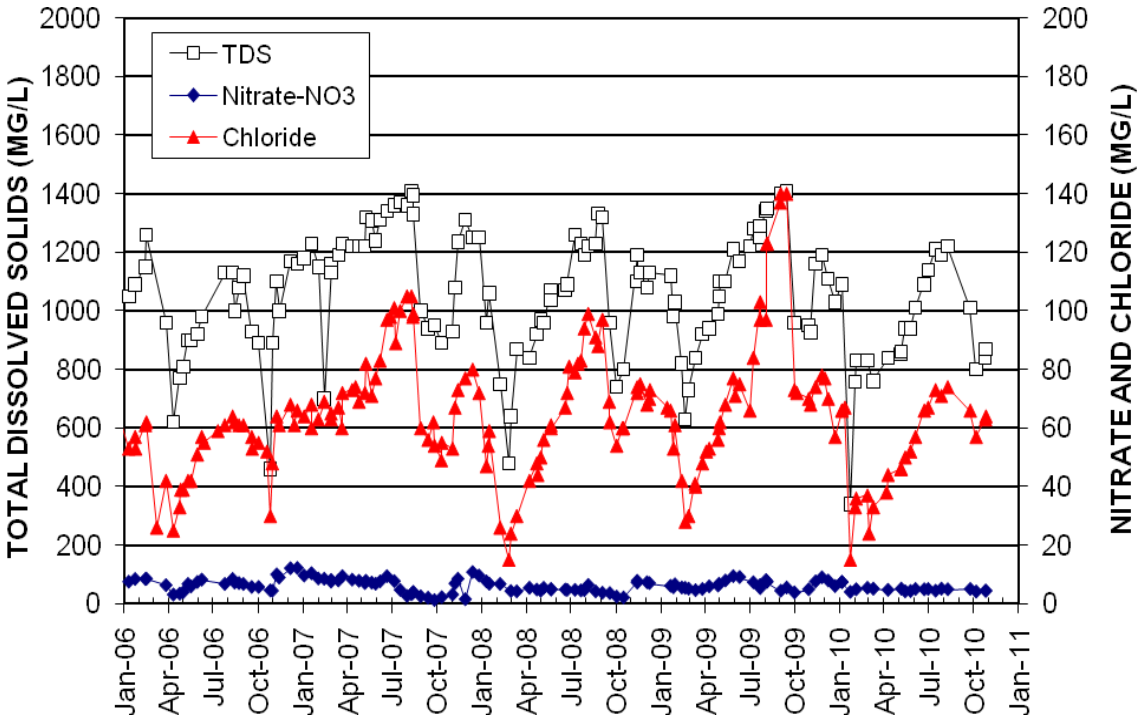

Figure 13 Monitoring data for Santa Clara River water at the Freeman Diversion

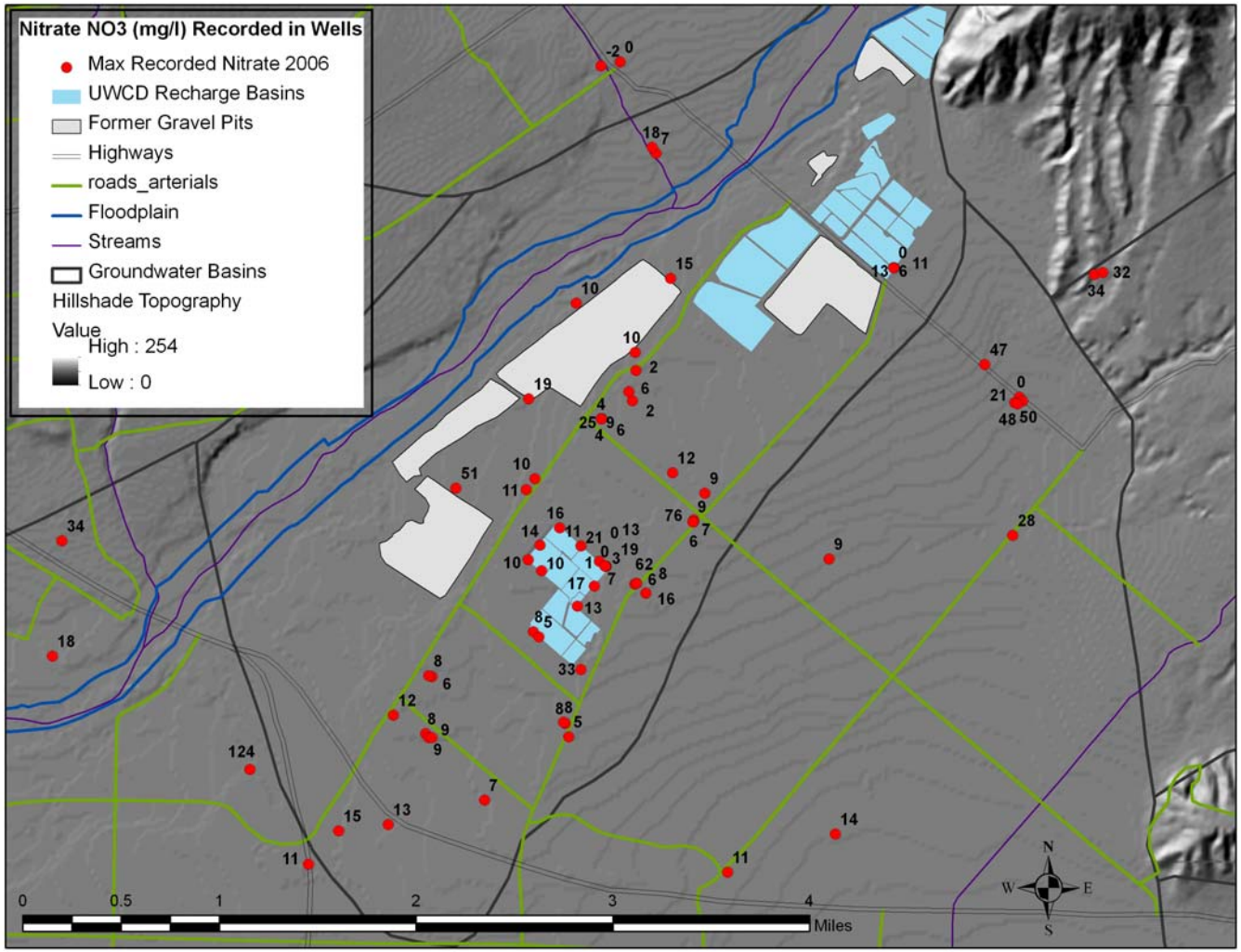

Figure 14 Maximum recorded nitrate concentration in monitored wells (2006)

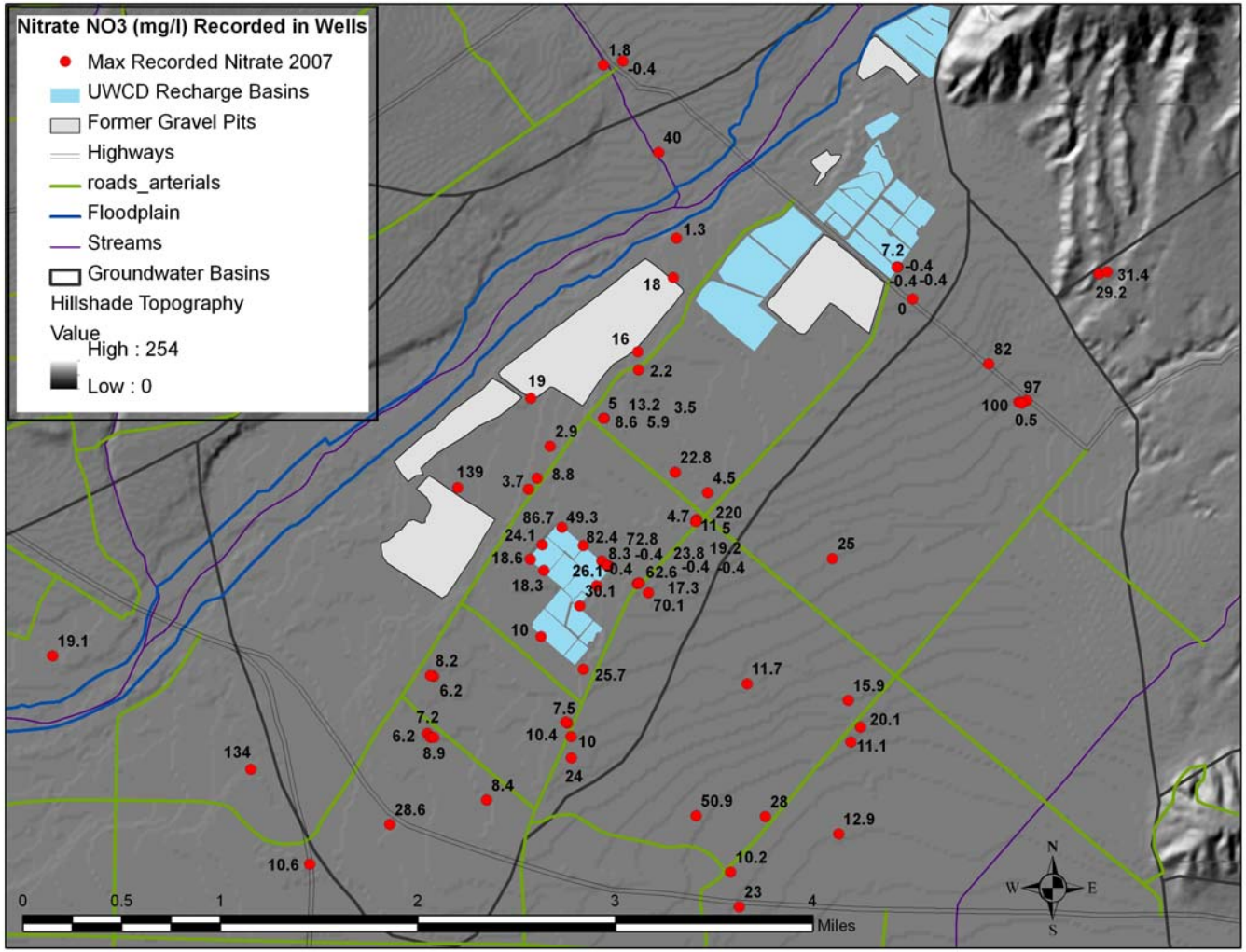

Figure 15 Maximum recorded nitrate concentration in monitored wells (2007)

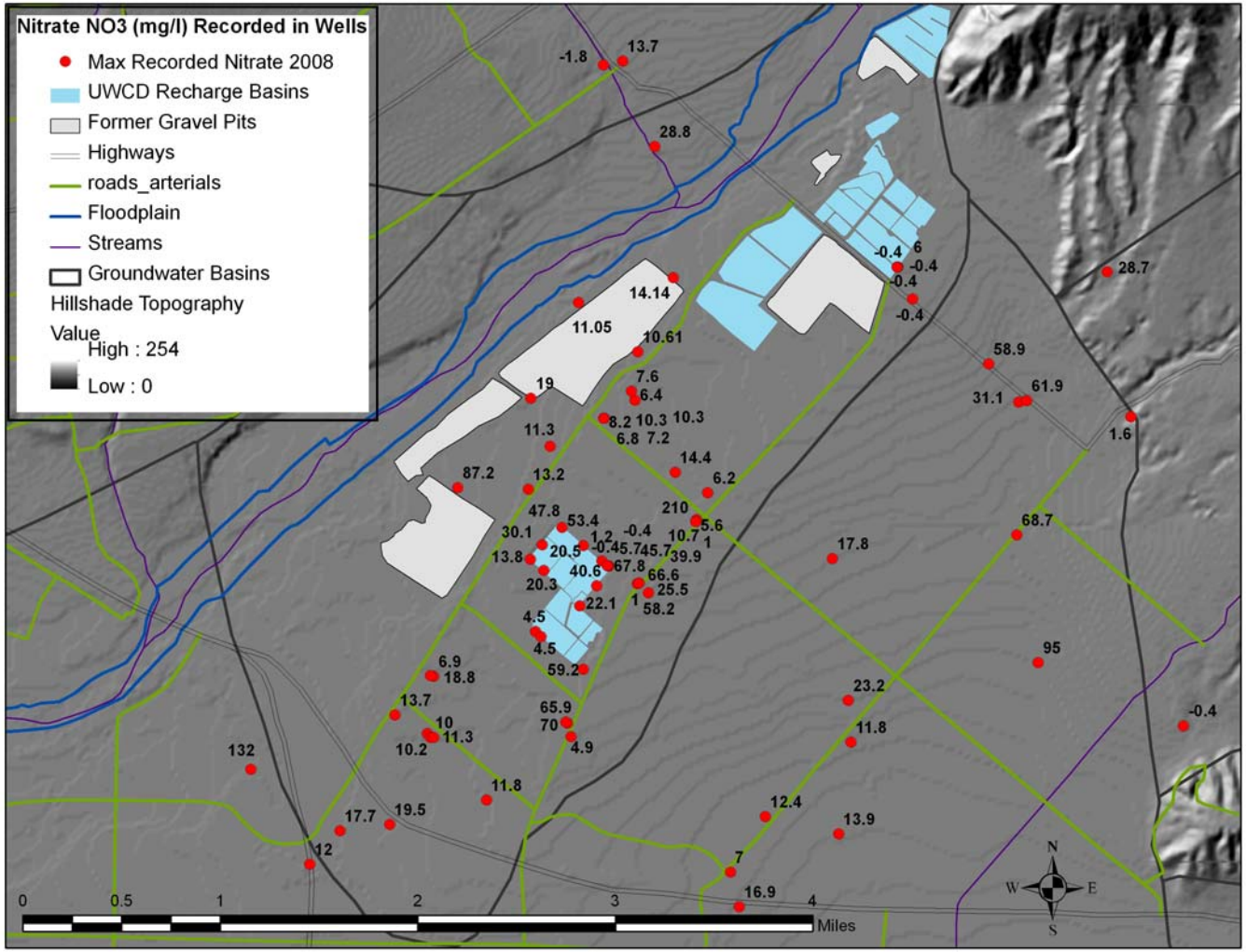

Figure 16 Maximum recorded nitrate concentration in monitored wells (2008)

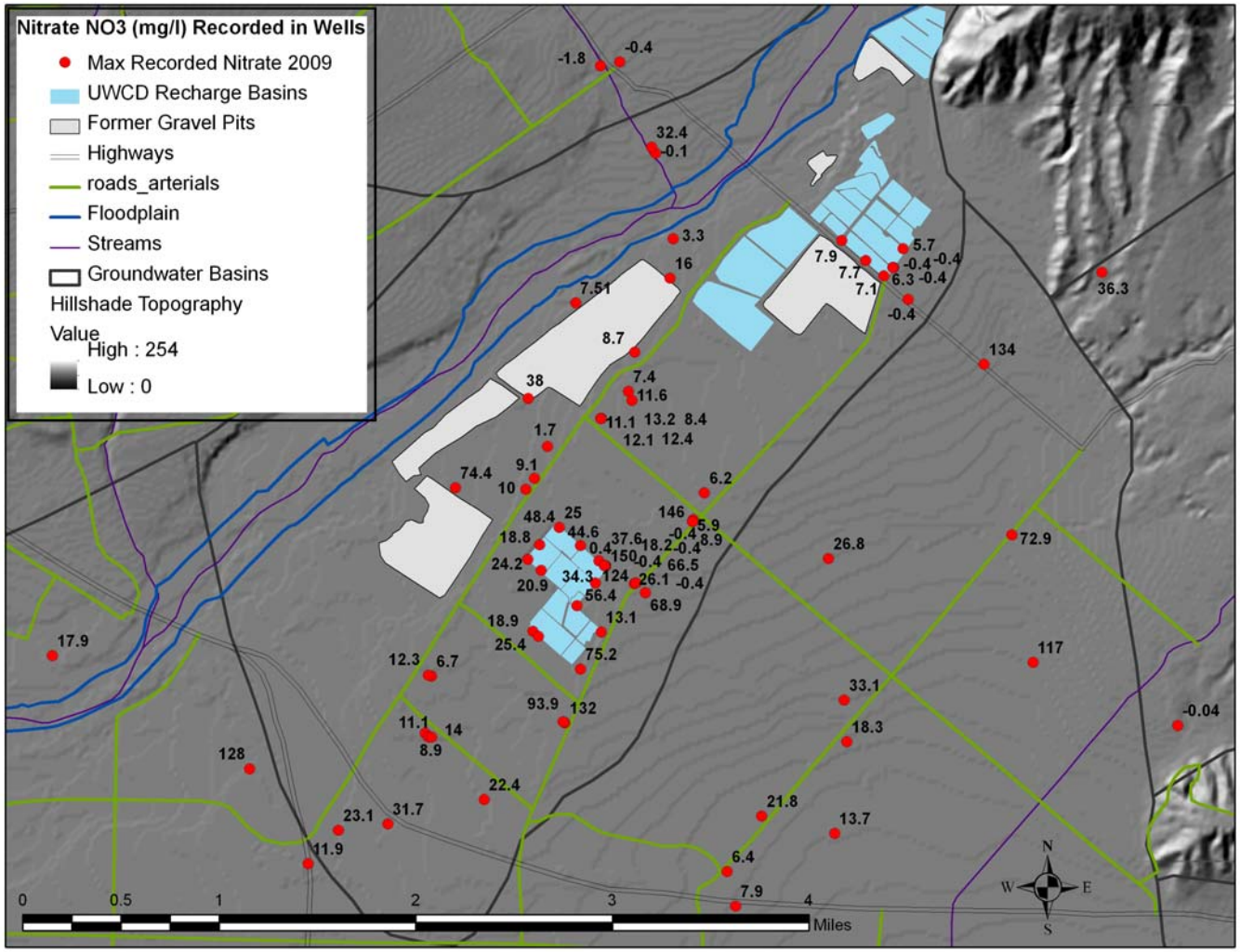

Figure 17 Maximum recorded nitrate concentration in monitored wells (2009)

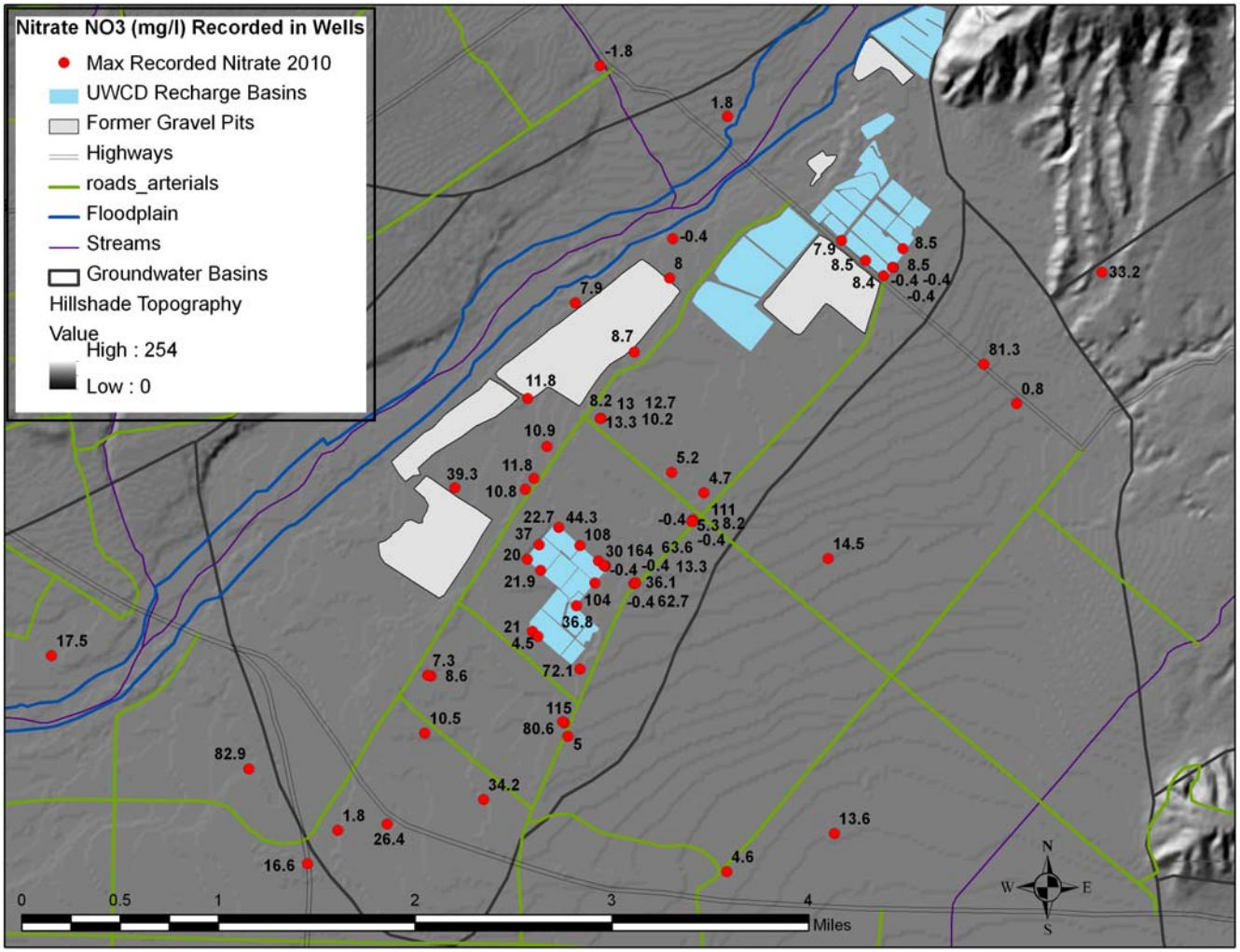

Figure 18 Maximum recorded nitrate concentration in monitored wells (2010)

5.2.2.2 Pathogenic Components

As discussed previously, the groundwater pumped from the El Rio wellfield is under the direct influence of surface water diverted from the Santa Clara River. Pathogenic components are common in surface waters, and are contributed by both natural and anthropogenic sources throughout the watershed. Although pathogenic components are considered to be present in the river water used for artificial recharge at the El Rio spreading basins, there has been no evidence of pathogenic components in the finished drinking water distributed from the O-H water system during this 5-year reporting period.

5.3 EXISTING WATER QUALITY

5.3.1 Monitoring Programs

UWCD complies with all drinking water monitoring requirements of the California Department of Public Health. Results of all analyses are sent directly to the Department of Public Health from the analyzing laboratory in a digital format, and therefore are not presented in this survey. All finished drinking water samples collected and analyzed during this reporting period were in compliance with state and federal primary drinking water standards. During this reporting period, United conducted monitoring to comply with the Long Term 2 Surface Water Treatment Rule. The average result of 24 Cryptosporidium samples was 0.029 oocysts/L which qualified United for a "Bin 1" classification. In addition to required monitoring, United has a regimented sampling program that is performed on a voluntary basis to monitor water quality throughout the watershed in both surface water and groundwater. A summary of results from surface water analyses conducted during this reporting period is presented in Appendix D. A map showing the location of each surface water sample site is presented in Figure 19.

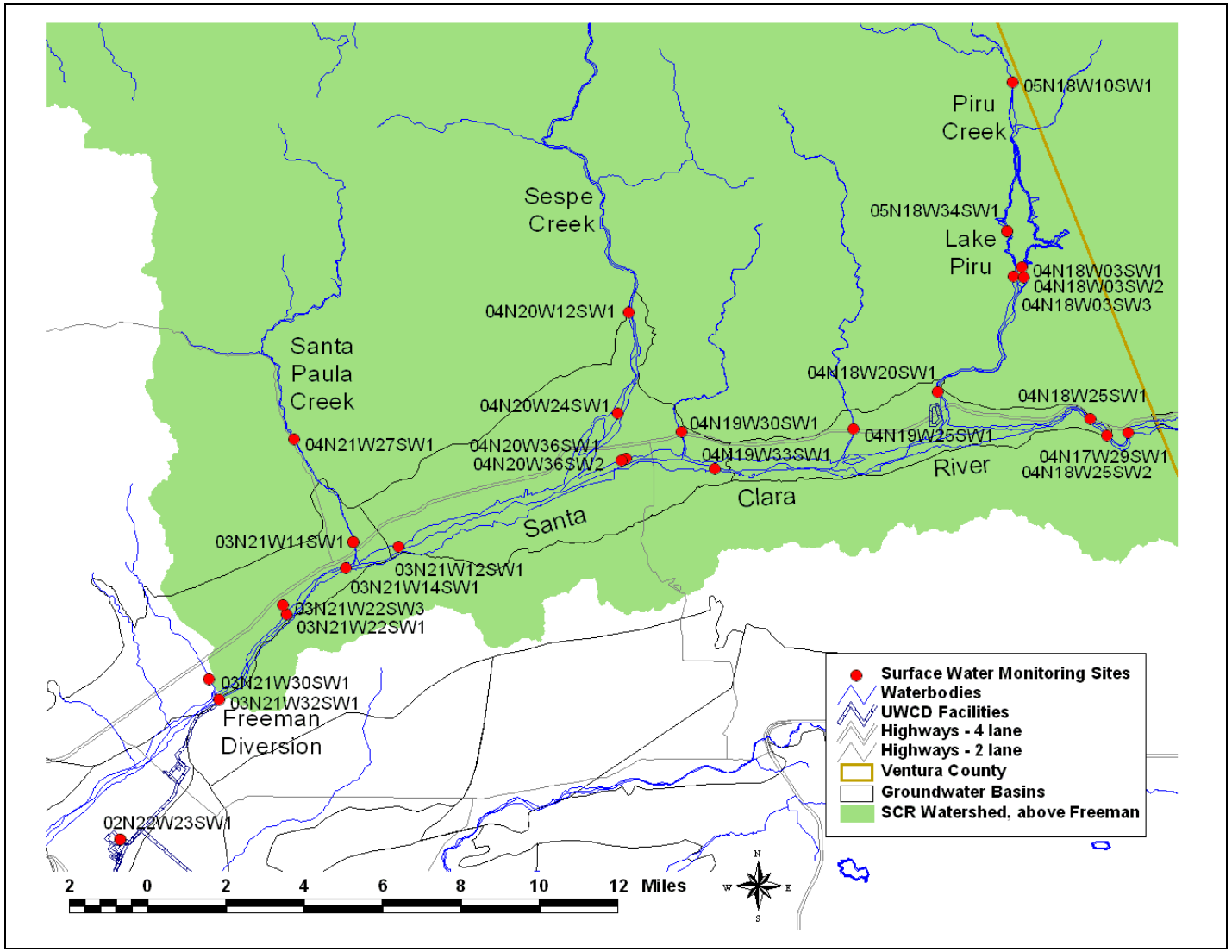

Figure 19 Locations of surface water sample sites

5.4 EVALUATION OF ABILITY TO MEET SURFACE WATER TREATMENT REGULATION REQUIREMENTS

Both the LPRA and O-H water systems have been in compliance with the SWTR during this 5-year reporting period. Both water systems meet SWTR design standards including reliability features. Both water systems have an operations plan and emergency disinfection plan. Both systems are operated by certified Water Treatment Operators, submit monthly operations reports, and regular sanitary surveys.

5.4.1 Lake Piru Recreation Area water system

The LPRA water system uses Lake Piru water as a source and complies with the SWTR by providing conventional filtration followed by disinfection. Laboratory analyses indicate that treatment procedures of the LPRA water system actuate a minimum of a 3 log removal or inactivation of Giardia, and a 4 log removal or inactivation of enteric viruses.

5.4.2 Oxnard-Hueneme water system

Source water for the Oxnard-Hueneme water system is classified as groundwater that is under the influence of surface water. The Oxnard-Hueneme water system complies with the SWTR by implementing an alternative treatment that utilizes natural filtration similar to slow sand filtration. Slow sand filtration is defined as a process involving passage of raw source water through a bed of sand (or equivalent) at rates not to exceed 0.10 gallons per minute per square foot resulting in substantial particulate removal by physical and biological mechanisms. Infiltration through the spreading basins at the El Rio recharge facility qualifies for reduction credits of 99 percent (2 log) removal of Giardia and 90 percent (1 log) removal for viruses. Disinfection achieves the additional requirement of a 1 log inactivation for Giardia and 3 log inactivation for viruses.

5.5 RECOMMENDED WATER QUALITY MONITORING PROGRAM

United performs extensive monitoring that surpasses the California Department of Public Health monitoring requirement. United is active in the watershed community and keeps abreast of monitoring activities by outside agencies and other entities. United participates with the Ventura County Watershed Protection District by allowing the County to monitor and maintain a mass emission station at the Freeman Diversion. Recognized constituents of concern are being strategically and appropriately addressed by United staff, and all distributed drinking water from United's water systems is of high quality. United's water quality monitoring program is effective at addressing water quality issues for the LPRA and O-H drinking water systems and no supplementary water quality monitoring is recommended.

6.0 CONCLUSION AND RECOMMENDATIONS

The Santa Clara River watershed is a relatively large, predominantly natural system. The drainage area above the Freeman Diversion is 1,550 square miles. Approximately 90% of the watershed is undeveloped open space. The most populated regions are located in the upper portion of the watershed in Los Angeles County. The Santa Clara River is more than 80 miles long and has several gaining and losing reaches upstream of the Freeman Diversion. During normal flow conditions, there is no connection between the Los Angeles and Ventura portions of the river, and contaminants that are introduced in the upper portions of the river are generally not transported to the El Rio spreading basins. Although United remains vigilantly aware of activities that occur throughout the entire watershed, we are most concerned with contaminants that are introduced downstream of the County line.

The periodic presence of excessive nitrate concentrations in El Rio wells continues to be a concern. United has conducted a series of studies to determine the extent and possible sources of nitrate contamination. Santa Clara River water is regularly monitored at the Freeman Diversion and exhibits low nitrate concentrations. Conversely, nitrate concentrations in monitoring wells in the vicinity of the El Rio facility are relatively high, indicating that the nitrate is being introduced by land uses within the forebay and traveling laterally through groundwater transport. The most probable sources of contamination are local septic systems and application of fertilizer to the agricultural fields that surround the El Rio wellfields.

Several improvements have occurred within the vicinity of United's operations during this reporting period. The three WRPs located between the county line and the Freeman Diversion have been replaced with upgraded facilities that discharge treated effluent to percolation ponds or underground discharge systems rather than discharging directly to the Santa Clara River. Actions by the Regional Water Quality Control Board and local government have resulted in the elimination of waste discharge to 1,361 septic systems in the immediate vicinity of United's El Rio facility. This movement to eliminate discharge to septic systems will continue during the next reporting period as final phases of the program are completed.

Recognized constituents of concern are being strategically and appropriately addressed by United's water treatment operations, and all distributed drinking water from United's water systems is of high quality. As a groundwater manager and water purveyor, United has established a regimented monitoring program that surpasses all governmental agency requirements. The exemplary policies and procedures implemented at United's water treatment facilities ensure the safety and high quality of our drinking water product. United is confident in our ability to continue to provide high quality drinking water and no additional improvements are recommended at this time.

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APPENDICES

Appendix A
Annual Crop Report; 2009
Ventura County Agricultural Commissioner

Appendix B
Water Quality Control Plan; Los Angeles Region; Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties
Regional Water Quality Control Board
Note: Chapter 1 is attached. Full version of the document can be accessed at: http://www.swrcb.ca.gov/~rwqcb4/html/meetings/tmdl/Basin_plan/basin_plan_doc.html.

Appendix C
Nitrate Observations in the Oxnard Forebay and Vicinity, 1995-2006
United Water Conservation District

Appendix D
Surface Water Quality Data Summary; January 2001 through November 2005