STATE OF THE WATERSHED – Report on Surface Water Quality

The Santa Clara River Watershed

November 2006

California Regional Water Quality Control Board – Los Angeles Region
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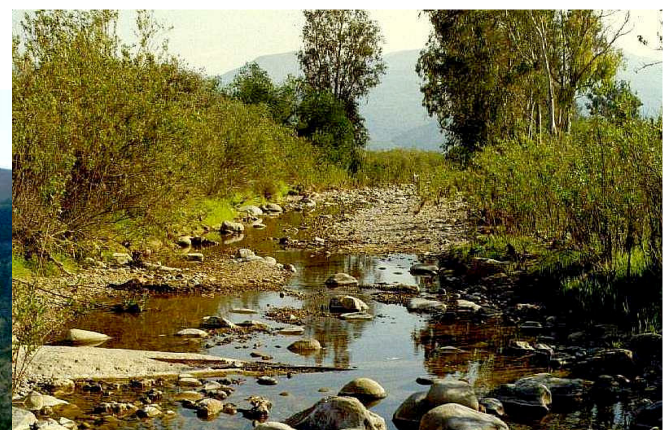

PREFACE

This report is a descriptive document and no policy or regulation is either expressed or intended. It is one in a series written by the Regional Board's watershed coordinator which summarizes and characterizes surface water quality data for the Region's watersheds. These reports may serve many functions but they are primarily written to educate the public on the kinds of water quality data available and what the data are generally saying. The Regional Board is often asked very basic questions about water quality in the Region and in many instances State of Watershed reports answer these questions. Some previous State of Watershed reports have been cited by other agencies in their environmental impact reports for various projects or have been used to justify pursuing grant funding to address problems noted. Another major purpose of the reports is to show how effectively or ineffectively we are all collectively doing monitoring and sharing data by going through the process of acquiring and merging data (including much historic data) from different sources and making these data accessible. Some of the people accessing them in the future may be Total Maximum Daily Load (TMDL) staff at the Regional Board but these reports are not pre-determining their conclusions, just reducing time spent on data/information assemblage and organization.

Reference to groundwater quality is made due to the close linkage in this watershed between surface water and groundwater quality. However, this report is not meant to be a thorough evaluation of groundwater quality or the interactions between surface and ground water. Much work by other Regional Board staff on the latter topic will be forthcoming in the near future. There is some discussion of the watershed's natural resources due to their extensive nature and since there are many wildlife-related beneficial uses sensitive to water quality problems; however, this report is not meant to be a complete documentation of these resources.

While a number of stakeholders in the watershed are currently involved in litigation on water issues, this topic has not been addressed in the report which is focused on a description of the watershed, descriptions of discharges and diversions of water, and an evaluation of surface water quality data.

The report does contain an evaluation of data by stream Reach; however, this is not an official Water Quality Assessment, merely a point of discussion. It should be noted that the Reach designations described here are as they appear in the Regional Board's Basin Plan; some Reaches may be described differently in the current 303(d) list. Hydrologic areas/subareas, and groundwater basins/subbasins are based on California Department of Water Resources descriptions as are the groundwater subbasin acreages.

An announcement of the draft report's availability for review and comment was made to the E-mail list previously assembled by UC Cooperative Extension for the Santa Clara Watershed U. Comments were received from the City of Santa Clarita, Castaic Lake Water Agency, County Sanitation Districts of Los Angeles County, Friends of the Santa Clara River, United Water Conservation District, and Ventura County Watershed Protection District. Prior to release of the public draft, in-house comments were provided by Regional Board staff.

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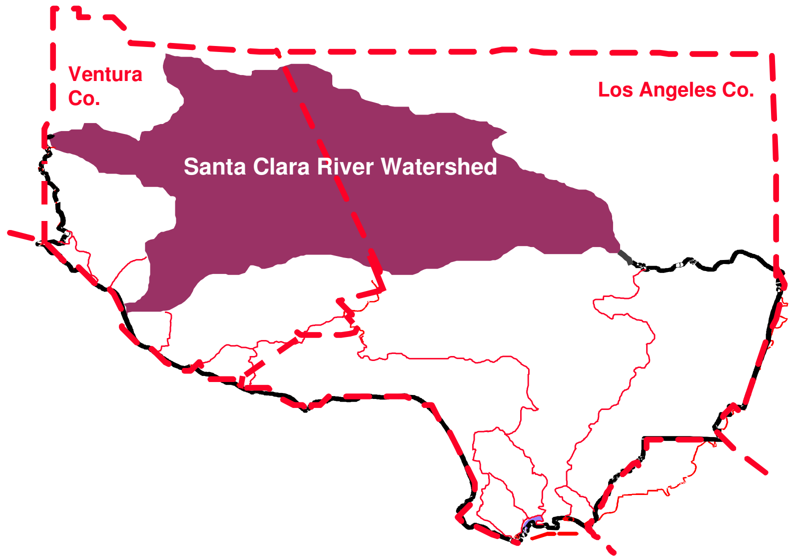
EXECUTIVE SUMMARY



The Santa Clara River is the largest in southern California (about 1,600 sq. mi.) that remains in a relatively natural state; this is a high quality natural resource for much of its length. The approximately 100miles long river originates in the northern slope of the San Gabriel Mountains in Los Angeles (LA) County, traverses Ventura County, and flows into the Pacific Ocean halfway between the cities of San Buenaventura and Oxnard (CRWQCB, 2004).

Extensive patches of high quality riparian habitat are present along the length of the river and its tributaries. The endangered fish, the unarmored stickleback, is resident in the river. One of the largest of the Santa Clara River's tributaries, Sespe Creek, is designated a wild trout stream by the state of California and supports significant spawning and rearing habitat. The Sespe Creek is also designated a wild and scenic river. Piru and Santa Paula Creeks, which are tributaries to the Santa Clara River, also support good habitats for steelhead. In addition, the river serves as an important wildlife corridor. A lagoon exists at the mouth of the river and supports a large variety of wildlife (CRWQCB, 2004).

Beneficial Uses in watershed:

Estuary	*Above Estuary*
Contact & noncontact water recreation	Contact & noncontact water recreation
Wildlife habitat	Wildlife habitat
Preservation of rare & endangered species	Preservation of rare & endangered species
Migratory habitat	Migratory habitat
Wetlands habitat	Wetlands habitat
Spawning habitat	Municipal supply
Estuarine habitat	Industrial service supply
Marine habitat	Industrial process supply
Navigation	Agricultural supply
Commercial & sportfishing	Groundwater recharge
	Freshwater replenishment
	Warmwater habitat
	Coldwater habitat

There are four major National Pollutant Discharge Elimination System (NPDES) dischargers (all Publicly-Owned Treatment Works [POTWs]), 11 minor dischargers, and 15 enrolled under general NPDES permits (non-stormwater). One hundred and fourteen facilities are currently enrolled under the general industrial stormwater NPDES permit. There are approximately 300 construction sites enrolled under the construction stormwater permit (the number of enrollees varies from year to year). And, there are eight facilities with Chapter 15 requirements while there are 54 facilities with non-Chapter 15 waste discharge requirements. Included in the latter facilities are POTWs which discharge to percolation or evaporation ponds (CRWQCB, 2004).

Various reaches of the watershed are currently 303(d)-listed (2002 list) as impaired for nutrients (and related effects), bacteria, salts (chloride, total dissolved solids [TDS]), and sulfate), trash (in lakes), and legacy pesticides (CRWQCB, 2004).

STATE OF THE WATERSHED

Physical Description of Watershed

The Santa Clara River is the largest river system in southern California remaining in a relatively natural state. Its headwaters begin at Pacifico Mountain in the San Gabriel Mountains near Acton and it flows in a westerly direction toward the Oxnard Plain before discharging to the Pacific Ocean near the Ventura Marina. The watershed area is 1,634 square miles. Major tributaries include Castaic and San Francisquito Creeks in Los Angeles County and Sespe, Piru, and Santa Paula Creeks in Ventura County. About 40% of the watershed is located in Los Angeles County and 60% is in Ventura County. Much of the watershed is in mountainous terrain within either the Angeles or Los Padres National Forests (AMEC, 2005) (Figure 1).

The river exhibits some perennial flow in its eastern-most stretches within the Angeles National Forest, then flows intermittently westward within Los Angeles County. The principal tributaries of the upper river are Castaic Creek, Bouquet Canyon Creek, San Francisquito Creek, and the South Fork of the Santa Clara River. Placerita Creek is a large tributary draining the westernmost end of the San Gabriel Mountains; it joins the South Fork which flows directly into the Santa Clara River (CDWR, 1993). Castaic Creek is a south-trending creek originating near Liebre Mountain that confluences with the Santa Clara River downstream of the City of Santa Clarita. The Castaic Lake Reservoir is located on Castaic Creek (CPUC website). San Francisquito Canyon Creek is an intermittent stream in the watershed adjacent to Bouquet Canyon to the southeast (CDWR, 1993).

Three small lakes are located in a normally enclosed valley in the northeastern portion of the watershed. Lake Elizabeth and Lake Hughes are maintained by seasonal runoff and may also be fed by subsurface flows trapped by the San Andreas Fault. Lake Elizabeth overflows occasionally through a meandering channel into Munz Lake and thence into Lake Hughes. Munz Lake, an artificial lake, is maintained by ground water pumped into it from a nearby well. A bedrock sill prevents surface outflow from Lake Hughes to Elizabeth Lake Canyon (and thence into Castaic Lake), except during heavy storms (CDWR, 1993).

Prior to the 1960s, the upper Santa Clara River (east of the County line) was largely rural/agricultural. By 1993, agricultural lands represented less than 7 percent of the developed lands. The city of Santa Clarita is the only incorporated city in the upper watershed (incorporated in 1987). Approximately 75% of the land in the upper Santa Clara River is within the Angeles National Forest (CDWR, 1993).

The braided streambed and floodplain of the Santa Clara River mainstem consists of sandy and gravelly material and is highly permeable over much of its length which results in large quantities of surface water infiltrating into the ground water (CDWR, 1993).

Because they are perennial, effluent discharges to the river may have a greater potential effect on ground water quality, particularly during dry seasons and dry years, whereas flood flows may pass quickly through the basin. Conversely, the ground waters generally contain higher concentrations of dissolved solids than surface waters at the same locality so greater discharge of ground water to the stream can greatly affect the quality of surface waters, particularly during low flows (CDWR, 1993).

The Saugus WRP discharges to the river below Bouquet Canyon (Reach 6) and has a dry weather design capacity of 6.5 millions of gallons per day (MGD). The Valencia WRP discharges to the river further downstream (Reach 5), about 1/3 mile downstream from the Old Highway Bridge and the Interstate-5 freeway near Rye Canyon Boulevard and has a dry weather capacity of 12.6 MGD (CRWQCB, 2004). Some of the treated effluent from the facilities is recycled for use in landscape irrigation. Ground water begins rising just upstream of the discharge, therefore, most of the effluent remains as surface flow and can be a large component of surface flow at the county line. Other sources of perennial flows besides rising groundwater and WRP effluent include tributary flows from Castaic Creek as well as agricultural return flows (CDWR, 1993).

The mainstem river continues to flow above-ground from the upper Santa Clara River until upstream of the confluence with Piru Creek where it generally becomes dry due to highly permeable soils. Perennial flow generally returns downstream of the confluence with Hopper Canyon Creek and continues through Piru, Sespe, and Santa Paula Creeks, and into the Oxnard Plain (Bachman, 2006). There are a total of eleven reaches defined in the Basin Plan by the Regional Board for the river and its tributaries (Figure 2) which very generally correspond to hydrologic areas (HAs) and subareas (HSAs) referenced frequently in documents produced by the Department of Water Resources (CRWQCB, 1994) (Figure 3).

Other wastewater treatment facilities in the lower reaches of the river which discharge to surface waters or to the ground include (CRWQCB, 2004):

- The Piru Wastewater Treatment Plant which serves the community of Piru. It has a design capacity of 260,000 gallons per day (gpd) and discharges secondary-treated effluent to two percolation ponds located about 500 feet from the Santa Clara River (Reach 4).
- The Fillmore Wastewater Treatment Plant which discharges secondary-treated wastewater (1.33 MGD design flow) to percolation/evaporation ponds and/or to a subsurface percolation field or to the Santa Clara River in Reach 3 if the groundwater table is high. The surface water discharge accounts for approximately 30% of the total effluent discharged annually.
- The Santa Paula Wastewater Reclamation Facility which discharges secondary-treated wastewater (2.55 MGD design capacity) to the Peck Road storm drain which flows into a natural, unlined channel and thence to the Santa Clara River in Reach 3.
- The Saticoy Sanitary District Treatment Facility which discharges a design capacity of 300,000 gpd treated municipal wastewater to evaporation/percolation ponds located on the north bank of the Santa Clara River (Reach 2).
- The Ventura Water Reclamation Facility which discharges tertiary-treated wastewater (14 MGD design capacity) from domestic, commercial, and industrial sources into the Santa Clara River Estuary.

Piru Creek

Piru Creek is a major tributary of the Santa Clara River that flows intermittently through portions of the Angeles and Los Padres National Forests. Piru Creek has its headwaters at approximately 5,200 feet above mean sea level (MSL) in Lockwood Valley located approximately 25 miles northeast of the City of Ventura. The subwatershed is characterized by both highly erodible and highly resistant rocks resulting in broad alluvial subbasins alternating with gorges incised in bedrock. The Piru Creek subwatershed encompasses approximately 318,000 acres (SCWRP website).

Several drainages in the upper subwatershed supply Piru Creek with year-round flows including Lockwood, Alamo, Seymour, Amargosa, and San Guillermo Creeks. The surrounding mountains contain metamorphic and granitic rocks. Historically, colemanite was mined in the headwater system and gold mines were established just south of Piru Creek. The creek meanders eastward approximately 30 miles while dropping 2,200 feet in elevation through a series of open valleys and steep gorges before reaching the Pyramid Lake Reservoir. Below the Pyramid Dam, the major tributaries within the lower subwatershed include Agua Blanca and Fish Creek located approximately a mile upstream from Blue Point Campground and 3 miles below Frenchman's Flat just south of Pyramid Lake, respectively. Most flow becomes subsurface in the lower reaches of these creeks. The creek below Pyramid Dam has an average slope of approximately two percent and contains scattered riffle-pool formations until reaching Lake Piru, behind Santa Felicia Dam. The creek then continues downstream through Piru Canyon, eventually merging with the Santa Clara River (SCWRP website).

Of the three major tributaries to the lower Santa Clara River, only Piru Creek has major structural controls on its flows (CDWR website).

Sespe Creek

Sespe Creek is a major tributary of the Santa Clara River that flows through the southern portion of the Los Padres National Forest. Sespe Creek contributes approximately 40 percent of the total natural runoff in the Santa Clara River basin, which typically occurs from January through April. Flow in the upper portions of Sespe Creek and its tributaries may be intermittent at times but generally the majority of the Creek flows year-round (CDWR, 1989). Approximately 75 percent of the Sespe Creek subwatershed is characterized by rugged slopes and canyon walls of southern Pine Mountains and the northern slopes of the Topatopa Mountains. Elevations range from approximately 2,500 to 7,510 feet above MSL. The Sespe Creek subwatershed encompasses approximately 207,700 acres (SCWRP website).

The Sespe Creek headwaters originate near the Ventura/Santa Barbara County boundary within the Transverse Range of southern California. Numerous small tributaries located within the Pine Mountains ridges supply Sespe Creek with year-round flows including Abadi, Adobe, Cherry, Ladybug, and Burro Creeks. The tributaries range from low-gradient, small channels with moderately dense riparian vegetation to steep, narrow, boulder-lined canyons with little or no riparian vegetation. The creek flows in an easterly direction through a narrow depression between the Pine Mountain and Santa Ynez Faults before flowing southward. Major tributaries include the Lion Canyon, Hot Springs Canyon, Timber, and West Fork (SCWRP website).

Sespe Creek supports a variety of land uses and vegetation types. Several campgrounds occur along the drainage that provide limited access and recreational opportunities. The lower portion of the drainage near the Santa Clara River valley contains urban (the City of Fillmore) and agricultural development (SCWRP website).

The creek has several designations aimed at preserving its unique resources. The approximately 219,700-acre Sespe Wilderness Area encompasses 31.5 miles of Sespe Creek. Established in 1992, the Wilderness Area contains a 53,000-acre Sespe Condor Sanctuary. Approximately 10.5 miles of upper Sespe Creek have been designated as Wild and Scenic. Furthermore, the stream is designated as a Wild Trout stream from the Lion Camp area in the upper subwatershed downstream to the Los Padres National Forest boundary near the City of Fillmore (SCWRP website).

Santa Paula Creek

Santa Paula Creek is another major tributary of the Santa Clara River Watershed. The Santa Paula Creek subwatershed occurs within the Transverse Ranges of southern California. The San Andreas Fault zone lies approximately 30 miles north of the creek. The perennial creek is fed by springs located on the southern slopes of the Topatopa Mountains within the Los Padres National Forest. From its headwaters located near Hines Peak at an elevation of approximately 6,704 feet above MSL, Santa Paula Creek flows in a southeasterly direction through extremely steep-walled canyons for the first 12 miles until it reaches the coastal plain near Sulphur Springs just above Steckel Park. The creek flows through Steckel Park along a gentle gradient and is relatively undisturbed. A series of riffles and pools occur in this area created by numerous granite boulders and unique channel morphology. From there the creek is joined by Mud Creek before continuing downstream approximately 5.5 miles to its confluence with the Santa Clara River. The drainage transitions from a braided stream morphology to a channelized system within the last 1,800 feet. The Santa Paula Creek subwatershed encompasses approximately 75,050 acres (SCWRP website).

The climate of the Santa Paula Creek subwatershed is typical of the moderately elevated interior of southern California with mean seasonal precipitation ranging from approximately 36 inches in the Topatopa Mountains to 18 inches near the mouth of the creek. Over 90 percent of the precipitation occurs from November to April within this region (SCWRP website).

Surface water diversions occur within the Santa Paula Creek streambed. The Santa Paula Water Works Diversion diverts surface water from the creek approximately 1,000 feet south of Steckel Park just below a United States Geological Survey (USGS) gauging station and just upstream of the confluence with Mud Creek. Diversions are made to a storage facility and used as a source of water for the City of Santa Paula and for agricultural irrigation. Built in 1923, the dam has gone through several repairs and reconstructions. The fish ladder was extended in 1950 and rebuilt in 2000 on the southern wall of the approximately 30-foot dam (however, the fish ladder was damaged during storms in 2005). Downstream of the dam, the creek is deeply eroded for approximately one mile. Beyond this, the gradient is reduced and numerous boulders are present that have developed riffle-pool formations (SCWRP website).

The subwatershed contains roadside springs which release hydrogen sulfide and active oil seeps (CDWR, 1989).

Estuary

Much of the estuary lies within the northern portion of McGrath State Beach. It is now much smaller, at about 230 acres, than its estimated size of 870 acres 150 years ago. The mouth of the estuary is typically open to the ocean during the winter and spring due to high flows following storms. Lack of rainfall, lower river flows, and smaller surf result in the estuary closing during the summer and early fall (Greenwald, 1999). The Ventura Water Reclamation Facility discharges tertiary-treated wastewater into the estuary. An extensive re-examination of the effect this discharge may be having on the estuary is currently underway (Nautilus, 2005).

Miscellaneous Information

- Santa Paula and Sespe have the most rainfall and drain into areas of lower rainfall (Downs, 2005).
- El Nino years have a very great impact on floods (order of magnitude or larger which leads to very spotty sediment transport) (Downs, 2005).
- There are higher rates of sediment production in the northwest part of watershed (Sespe and Santa Paula); over a 70 years period of time, this adds up to 1,400 metric tons/year (Downs, 2005).
- The watershed has an active geology; about 7,000 landslides were mapped after the 1994 Northridge earthquake, most occurred in mid-watershed (Downs, 2005).
- In March 1928 the St. Francis Dam collapsed; in addition to loss of life and large-scale flooding, the event released a tremendous sediment load on the watershed with long-term effects (Downs, 2005).
- Thirty-six percent of the watershed is controlled by dams; there's a 21% reduction in sediment discharge due to flood controls with the dams (Downs, 2005).
- The estuary is more a river mouth than an estuary (sediment drops out offshore) (Downs, 2005).
- The hydrology is biased by large floods; the river responds to the last large flood event – no bankful floods – as discharge increases, sediment transport increases rapidly and continuously (no peak) (Downs, 2005).

Groundwater Basins, Subbasins, and their Characteristics (Figure 4)

Author's note: There are brief discussions of groundwater at times in areas outside of and surrounding the basins and subbasins.

ACTON VALLEY GROUNDWATER BASIN

The Acton Valley Groundwater Basin is bounded by the Sierra Pelona on the north and the San Gabriel Mountains on the south, east, and west; the community of Acton is located in the area. It has a surface area of 8,270 acres (12.9 square miles). The valley is drained by the Santa Clara River. Groundwater in the basin is unconfined and found in alluvium and stream terrace deposits. The basin is recharged from deep percolation of precipitation on the valley floor and runoff in the river and its tributaries. The basin is also recharged by subsurface inflow. Groundwater flows toward the channel of the Santa Clara River and then westward. There are groundwater extractions for municipal and some agricultural use and there is some subsurface water outflow. Groundwater in the basin is generally calcium bicarbonate in character although water from some wells north of Acton are calcium magnesium sulfate or calcium magnesium bicarbonate in character. Water sampled from five public supply wells in the basin show an average TDS content of approximately 579 milligrams per liter (mg/l) with a range of 424 to 712 mg/l. High concentrations of TDS, sulfate, nitrate, and chloride in wells are an issue in some parts of the basin (CDWR, 2004b).

SANTA CLARA RIVER VALLEY GROUNDWATER BASIN AND SUBBASINS

East Subbasin

The East Subbasin has a surface area of 66,200 acres (103 square miles). The surface is drained by the Santa Clara River, Bouquet Creek, and Castaic Creek. Discharge from the subbasin is through pumping for municipal and irrigation uses, uptake by plants, and outflow to the Santa Clara River in the western part of the subbasin. Groundwater flow in the subbasin is southward and westward and follows the course of the Santa Clara River. The subbasin is comprised of two aquifer systems, the Alluvium and the Saugus Formation. The Alluvium generally underlies the Santa Clara River and its several tributaries, and the Saugus Formation underlies virtually the entire Upper Santa Clara River area (Black & Veatch, 2005). Groundwater in the alluvial aquifer varies from calcium bicarbonate character in the east to calcium sulfate character in the western part of the subbasin. Nitrate content decreases to the west and TDS content increases from about 550 to 600 mg/l in the east to about 1,000 mg/l in the west. Groundwater in the Saugus Formation aquifer is of calcium bicarbonate character in the southeast, calcium sulfate in the central, and sodium bicarbonate in the western parts of the subbasin. TDS content in the Saugus Formation aquifer ranges from about 500 to 900 mg/l (CDWR website). Most local wells draw water from the Alluvial Aquifer. A smaller portion of the Valley's water supply is drawn from the Saugus Formation, a much deeper aquifer than the Alluvial Aquifer (Black & Veatch, 2005).

Groundwater within Bouquet Canyon is calcium bicarbonate whereas in San Francisquito Canyon, calcium sulfate dominates. In Castaic Creek, groundwater changes from calcium sulfate in the upper reaches near Castaic Dam to calcium-bicarbonate-sulfate in the middle reaches near I-5 and then back to calcium sulfate in the lower reaches (Slade, 2002).

As with the Alluvium, the most notable groundwater quality issue in the Saugus Formation is perchlorate contamination. Perchlorate was originally detected in four Saugus wells operated by the retail water purveyors in the eastern part of the Saugus Formation in 1997, near the former Whittaker-Bermite industrial facility. Since then, the four Saugus municipal supply wells have been out of water supply service due to the presence of perchlorate as well as two Alluvium wells. Planning for remediation of the perchlorate and restoration of the impacted well capacity is underway (Black & Veatch, 2005).

Piru Subbasin

The surface area of the Piru Subbasin is 8,900 acres (13.9 square miles) (CDWR, 2004c). The boundary to the west is marked by a bedrock constriction near the Fillmore Fish Hatchery causing rising groundwater. The upstream extent of the groundwater subbasin is located 0.7 miles below the Blue Cut gauging station with its western boundary in the vicinity of Fillmore Fish Hatchery. Groundwater recharge to the subbasin is by percolation of runoff from Piru Creek, Hopper Creek, and the Santa Clara River (SCWRP website). Groundwater in this subbasin is generally calcium sulfate in character. TDS concentrations range from 608 to 2,400 mg/l, with an average of approximately 1,300 mg/l (CDWR, 2004c). The subbasin consists of recent and older alluvium that is recharged by percolation of surface flows along the Santa Clara River channel and its tributaries, and small amounts of subsurface flow at the upper end of the subbasin. The groundwater flow gradient within the unconfined subbasin tends to be in a westerly direction. This is considered to be an unconfined groundwater subbasin. The subbasin is replenished by rainfall, irrigation returns, and artificial recharge through spreading grounds and water conservation releases by United Water Conservation District (UWCD) (SCWRP website). The average annual artificial recharge at the Piru spreading grounds is quite variable in dry versus wet years but has been as high as 6,600 acre-feet (AF) per year in the late 1990s during a wet year (AMEC, 2005).

In general, the quality of the groundwater has historically ranged from poor to good; poor quality waters are found east of Piru Creek and near the western boundary of the subbasin located on the north side of the Santa Clara River and result from agricultural return waters, discharges from POTWs, or wells drilled into the Pico Formation. The character of the groundwater in the upper portion of the subwatershed (north of the Piru Subbasin) is either sodium bicarbonate or sodium-calcium sulfate. TDS, sulfate, fluoride, and nitrate concentrations are a problem in a few wells. Groundwater in the Santa Felicia HSA contains concentrations of boron and sulfate that exceed recommended state criteria but continue to be used in agricultural practices without significant crop damage. Further downstream, the quality of groundwater and local springs within the Hungry Valley HSA is very good. Only one parameter, fluoride, has historically exceeded the state quality standards for Basin Plan beneficial uses (SCWRP website).

Fillmore Subbasin

The lower 5.5 miles of Sespe Creek is underlain by the Fillmore Subbasin which covers an area of approximately 18,580 acres. The subbasin is located one mile upstream of the City of Fillmore. The eastern (upstream) boundary occurs at the Fillmore Fish Hatchery and the western boundary is located approximately one mile east of the City of Santa Paula in an area of geologic and hydrologic constriction (SCWRP website). The Santa Clara River and Sespe Creek drain the surface waters of the subbasin. Recharge to the subbasin is provided by percolation of surface flow in the Santa Clara River, Sespe Creek, underflow from the Piru Subbasin , direct percolation of precipitation, percolation of irrigation waters provide recharge, and releases by UWCD from Lake Piru. Groundwater in Fillmore Subbasin generally flows to the west, and the gradient decreases westward. Like the Piru Subbasin to the east, the Fillmore Subbasin recharges rapidly and fills to capacity in years of abundant precipitation. Water in this subbasin is calcium sulfate in character, although some groundwater in the Sespe Uplands area is calcium bicarbonate in character. TDS concentration ranges from 800 to 2,400 mg/l with an average of 1,100 mg/l. Data from nine public supply wells show a TDS content range of 660 to 1,590 mg/l, with an average of 967 mg/l (CDWR, 2006a).

Two areas of the Fillmore Groundwater Subbasin have been identified to contain high nitrate concentrations within the groundwater: the Bardsdale area near Fillmore and an area west of Fillmore on the west side of Sespe Creek (SCWRP website).

Groundwater in the Topatopa HSA (north of the subbasin) meet the state water quality requirements for existing and potential beneficial uses. However, concentrations of sulfate, chlorine, fluoride, boron, and TDS near Sespe Hot Springs (remote from the subbasin) generally exceed recommended limits for drinking water and irrigation. Groundwater quality in the lower subwatershed varies. High concentrations of TDS (greater than 1,000 mg/l) and sulfate (greater than 800 mg/l) were found in the Pole Creek Fan near the City of Fillmore. Recharge within this area is limited to the poor water quality of Pole Creek and urban runoff associated with the City of Fillmore. Elevated concentration of nitrate and fluoride may be associated with the native waters of the San Pedro Formation (SCWRP website).

This is considered an unconfined groundwater subbasin. The Santa Clara River and Sespe Creek are two major sources of recharge to the Fillmore subbasin, as is underflow from Piru subbasin. At the downstream end of the subbasin, there is some underflow into the Santa Paula Subbasin, although much of the water leaves the subbasin as rising groundwater which contributes to flow in the Santa Clara River (UWCD, unpublished records).

Santa Paula Subbasin

Santa Paula Creek is underlain by the Santa Paula Subbasin which has a surface area of 22,800 acres (35.7 square miles). The eastern edge of the subbasin is marked by a bedrock constriction. The western boundary of the subbasin separates it from the Mound and Oxnard subbasins (CDWR, 2004d). The subbasin is considered to be in hydraulic connection with the Fillmore Subbasin to the east. Although there is general agreement that there is some hydraulic connection between Santa Paula Subbasin and the Mound Subbasin, the degree of connection is uncertain (UWCD, 2001). Ground surface elevations range from 140 feet above sea level in the west to about 1,000 feet above sea level along the Santa Paula Creek drainage. The Santa Clara River and Santa Paula Creek drain the valley westward toward the Pacific Ocean. Groundwater in Santa Paula Subbasin flows generally toward the southwest. TDS concentrations range from 870 to 3,010 mg/l, with an average of 1,190 mg/l (CDWR, 2004d).

The subbasin encompasses an area along the Santa Clara River from the City of Saticoy to the west, the City of Santa Paula to the east, the Sulphur Mountain foothills to the north, and South Mountain to the south. The main water bearing formations are the San Pedro Formation, alluvial fan deposits, and recent river and stream sediments. Groundwater is unconfined in the western portion of the subbasin . Groundwater occurs within approximately 50 feet of the surface and is extracted from the subbasin for agricultural, municipal, industrial, and domestic uses. The primary recharge to the subbasin is by percolation from the Santa Clara River, Santa Paula Creek, and other tributaries, and by underflow from the Fillmore Groundwater Subbasin (SCWRP website). Recharge from the Santa Clara River is limited to reaches north of the Oak Ridge fault along a two-mile stretch near the City of Santa Paula. Where the river flows south of the Oak Ridge fault, it overlies impermeable Santa Barbara formation and recharge cannot occur. The location of the modern river channel severely restricts the amount of recharge the subbasin can receive in any one year (UWCD, 2001).

Mound Subbasin

The surface area of the Mound Subbasin is 14,800 acres (23.1 square miles). It underlies the northern part of the Ventura coastal plain in the western part of the Santa Clara River Valley. The subbasin is bounded on the northeast by the Santa Paula Subbasin and on the west by the Pacific Ocean. Depending on the relative groundwater levels, subsurface water may flow into or out of the subbasin across the border with Oxnard Subbasin. TDS concentrations range from 90 to 2,088 mg/l (CDWR, 2006b). The principal fresh water-bearing strata of the Mound subbasin are the San Pedro Formation and overlying Pleistocene deposits that may be correlative with the Mugu aquifer of the Oxnard Plain Subbasin. The subbasin extends several miles into the offshore (UWCD, 2001).

The majority of the recharge to the subbasin is likely from precipitation falling on the outcrops of the aquifer in the hills to the northeast of the Mound subbasin. When water levels are high in the subbasin, outflow may occur to the ocean some miles offshore. Groundwater flow in the Mound

Subbasin is generally to the west and southwest. However, during periods of drought and increased pumping, a pumping trough forms along the southern portion of the subbasin that significantly modifies groundwater gradients (UWCD, 2001).

Oxnard Forebay and Oxnard Plain Subbasin

The surface area of the Oxnard Subbasin is 58,000 acres (90.6 square miles). The groundwater system in the Oxnard Subbasin includes a main recharge area termed the Forebay, and a confined aquifer system that extends throughout the main part of the subbasin and under the Pacific Ocean (CDWR, 2006c).

The Oxnard Forebay is hydraulically connected with the aquifers of the Oxnard Plain Subbasin, which is overlain by a confining clay. Thus, the primary recharge to the Oxnard Plain Subbasin is from underflow from the Forebay rather than the deep percolation of water from surface sources on the Plain. When groundwater levels are below sea level along the coastline, there may also be significant recharge by seawater flowing into the aquifers (UWCD, 2001).

Three types of land use dominate the Forebay, agriculture, residential, and industrial (primarily gravel mining). Historically the Forebay was used for a large amount of citrus farming. Today, strawberry farming constitutes the majority of farming here. The Forebay has been extensively mined for sand and gravel resources. This mining left a number of gravel pits in the area. Surface waters are diverted into some of these gravel pits in order to recharge groundwater (CRWQCB, 1999).

Groundwater flow direction in the Forebay is generally towards the southwest but shows a high degree of local variation due to large-scale groundwater withdrawal and recharge operations (CRWQCB, 1999).

Groundwater/Surface Water Interactions

Just west of the LA-Ventura County line, is a geologic constriction called Blue Cut which forms the outlet for the Upper Santa Clara River HA (CDWR, 1993). The mainstem river flows above-ground from the Upper Santa Clara River HA until upstream of the confluence with Piru Creek where it generally becomes dry (during dry weather) due to highly permeable soils. Perennial flow generally return downstream of the confluence with Hopper Canyon Creek and continues through the Piru, Sespe, Santa Paula, and Oxnard Plain HAs (Bachman, 2006). There is a hydraulic interconnection between the Santa Clara River and the ground waters of the Santa Clara River Valley. There is also a hydraulic interconnection between the flows in the tributaries and the ground waters within the HSAs (CDWR, 1989). With a high water table, rising water occurs just east of the Fillmore fish hatchery at the western boundary of Piru Subbasin. Also, with a high water table, rising water is found along the reach of the Santa Clara River entering the eastern boundary of the Fillmore Subbasin (CDWR, 1989). Constrictions in the width of the unconsolidated deposits at these locations can cause ground water to resurface and become surface flow in the Santa Clara River (USGS, 1999). There is a tendency for the chemical character of waters to shift from bicarbonate to sulfate in these locations due to the chemical character of the rising groundwater. The groundwater component in the river can be quite large which results in a major presence of sulfate in surface waters. The duration of surface flow, rather than flow rate or volume, tends to control recharge and significant groundwater recharge occurs during flood events. This results in flood flows of water with lower concentrations of sulfate passing through the subbasin rather than recharging and having a diluting effect on the groundwater (CDWR, 1989).

Because they occur year-round, effluent discharges to the river may at times have a greater potential effect on ground water quality than does seasonal stream runoff. The concentrations of TDS in the hydraulically interconnected surface and ground waters are different which suggests other processes are occurring such as evaporation which concentrates salts in rising waters and agricultural return flows (CDWR, 1989).

Water Agencies and Water Use

WATER SUPPLIERS AND SUPPLIES

The water supply in the Upper Santa Clara River HA consists of a mix of local ground water and imported water. Local ground water is extracted by various water districts, companies, and by private wells. Water demands during 2005 in the Santa Clarita Valley were met by a combination of local groundwater resources (slightly more than one-half of the demand), State Water Project water (slightly less than one-half), and the remaining small amount by recycled water for landscape irrigation from the treatment plants operated by the County Sanitation Districts of Los Angeles County (Luhdorff & Scalmanini, 2006). Several hundred water wells have been historically drilled in the Santa Clarita Valley for domestic, agricultural, industrial, or municipal usage. There are also about two dozen high production agriculture supply wells. There are also potentially a large number of private, low capacity domestic supply wells (Slade, 2002) .

Castaic Lake Water Agency (CLWA) distributes imported State Water Project water within its service area, primarily the Santa Clarita Valley in the Upper Santa Clara River HA (CDWR, 1993). The CLWA is a public water agency that was originally formed in 1962 as the Upper Santa Clara Valley Water Agency. The agency covers the major areas of groundwater storage upstream of UWCD (Mann, 1968). The CLWA is a water wholesaler and services an area of 195 square miles. This water is treated and delivered to the local water retailers: LA County Water District #36, Newhall County Water District, CLWA Santa Clarita Water Division, and Valencia Water Company (Luhdorff & Scalmanini, 2006).

UWCD is the wholesale water district for the Ventura County portion of the Santa Clara River Valley that encompasses about 214,000 acres (CDWR, 1989). The UWCD is a mix of agriculture and urban areas, with prime agricultural land supporting high-dollar crops such as lemons, oranges, avocados, strawberries, row crops, nursery stock, and flowers. Approximately 300,000 people live within the District boundary, including those living in the cities of Oxnard, Port Hueneme, Santa Paula, Fillmore, and in eastern Ventura (UWCD, 2001).

The original founding organization for UWCD 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 grounds along the Santa Clara River. Sand dikes were constructed on the Santa Clara River near Saticoy to divert river water into spreading grounds (UWCD, 2001).

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. With the help of the City of Oxnard, 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. UWCD then constructed a number of water conservation projects, including (UWCD, 2001):

- 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 87,000 acre-feet in Lake Piru.
- A pipeline to new spreading grounds at El Rio.
- Wells at El Rio to produce water for the Oxnard-Hueneme (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 subbasin (the recharge area for the Oxnard Plain subbasin), rather than by pumping of individual wells in areas of the Oxnard Plain that could accelerate seawater intrusion.

The major issues of current concern for the District include groundwater overdraft and the intrusion of saline water in the Oxnard Plain and Pleasant Valley Subbasins, water quality of the Oxnard Forebay Subbasin, adjudication of the Santa Paula Subbasin, concerns related to groundwater management of the Piru/Fillmore subbasin, and chloride impacts to the Piru Subbasin.

The main water quality concern in the Forebay is the presence of nitrate at varying locations and times, in concentrations that exceed drinking water standards (UWCD, 2001).

High chloride levels were first detected on the Oxnard Plain in the vicinity of the Hueneme and Mugu submarine canyons in the early 1930s and became a serious concern in the 1950s (UWCD, 2001).

Major strategies to combat saline intrusion include increased recharge and pipeline deliveries to lessen groundwater pumping to coastal areas (UWCD), reduced pumping overall in the coastal basins (Fox Canyon Groundwater Management Agency), and switching pumping to less impacted aquifers (County of Ventura) (UWCD, 2001).

Following increasing intrusion of seawater from the 1950s to the 1980s, the UWCD 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 Diversion stabilized the riverbed after years of degradation caused by gravel mining in the river (UWCD, 2001).

The Pumping Trough Pipeline (PTP) was constructed in 1986 to convey diverted river water to agricultural pumpers on the Oxnard Plain, thus reducing the amount of groundwater pumping in critical areas. Lastly, the Noble spreading basins (1995) were constructed to store and recharge additional river water, particularly during wet periods (UWCD, 2001).

FACILITIES

The Castaic Lake Reservoir was completed in 1973 as part of the California State Water Project and stores water transported from northern California for use by state water contractors in southern California. It has a storage capacity of approximately 323,700 acre-feet (CPUC website). In Bouquet Canyon and Dry Canyon, small regulating reservoirs are operated by the City of LA Department of Water and Power (DWP) in conjunction with the LA Aqueduct (CDWR, 1993).

The Pyramid Dam was built in 1973 and impounds water from the State Water Project and subwatershed runoff. Water releases maintained throughout the summer artificially support flow within the creek below Pyramid Dam (SCWRP website). Water flowing from Pyramid Lake through the 7.2-mile-long Angeles Tunnel spins the turbines in Castaic Powerplant. The 30-foot-diameter tunnel carries water on its way to coastal Southern California to Castaic Lake, the final Project reservoir on the State Water Project's West Branch. Castaic Powerplant generates electricity during on-peak Periods (weekday daylight hours) when extra power is needed in Los Angeles (nights and Sundays) when local power is cheaper, the plant pumps water back into Pyramid Lake. The operation also reduces the cost of power required to move Project water from Northern to Southern California (CDWR website).

The Santa Felicia Dam was built in 1955 approximately eight kilometers (km) upstream of the confluence with the Santa Clara River and impounds runoff from the subwatershed. The 200-foot high dam was constructed by UWCD as part of a region-wide conservation project for the Santa Clara River watershed. The dam was designed to capture and store winter runoff on Piru Creek for controlled release during the dry season. Approximately 87,000 acre-feet of water are stored in Lake Piru (SCWRP website). Releases from Santa Felicia Dam may be diverted from Piru Creek via an earthen dike and screened intake structure located near the confluence of Piru Creek and the Santa Clara River to be recharged at the Piru Spreading Grounds, a 44-acre recharge basin (UWCD, 2001).

Besides the Lake Piru facility, UWCD also operates the Freeman Diversion and related recharge and conveyance facilities in the Oxnard Forebay groundwater subbasin. Santa Clara River water is diverted at the Freeman Diversion and used for artificial recharge at the Saticoy and El Rio Spreading Grounds in the Oxnard Plain and for direct delivery to waters users within the Oxnard Plain and portions of the Pleasant Valley groundwater basin located along the lower reaches of Calleguas Creek in the adjacent watershed (USGS, 1999). Water diverted from the river flows via canal and pipeline to a desilting basin, where water velocity slows, allowing sediment to settle out of the water column. From the desilting basin, water flows via pipe and canal to the Saticoy spreading grounds. From the main canal at the Saticoy spreading grounds, water can be directed to either percolation ponds or to the main supply pipeline. The main supply line transports water to the El Rio spreading grounds and the Pleasant Valley and the Pumping Trough Pipeline delivery systems (UWCD, 2001).

Average annual flow on Piru creek below Lake Piru during the previous 40 years has been 71 cfs which includes spills. Controlled releases have ranged from 2.5 to 650 cfs. Mean annual streamflow in the Santa Clara River at the Freeman Diversion has been 381 cfs for the previous 40 years. The current permitted diversion capacity of the Freeman Diversion is 375 cfs, with an annual total not to exceed 144,000 acre-feet. A daily average diversion of 199 cfs can be diverted annually through the Freeman Diversion (UWCD, unpublished records).

During studies in the early 1990s, under a zero-release condition from Lake Piru, the only flow in the river was from discharge of ground water at the Fillmore Narrows at the lower end of the Fillmore subbasin. This water was characterized by high specific conductance (2,000 microsiemens per centimeter [uS/cm]) and high sulfate (800 mg/l). Ground water discharge at Fillmore Narrows increased with increasing release rates from Lake Piru. Flow studies done during the mid-1990s under dry conditions, mostly during releases from Lake Piru, showed that all flow entering the Piru subbasin from Los Angeles County to the east infiltrates (or is diverted) before reaching the stretch just upstream of Piru Creek. During releases from Lake Piru, ground water recharge occurs along lower Piru Creek and in the middle part of the Piru subbasin. In the Fillmore subbasin there is some evidence of decreasing flow in the upper part of the subbasin but there is an increasing flow between the upper and lower subbasins indicating ground water (low sulfate) discharge associated with Sespe Creek (USGS, 1999).

Major Historical Events in Watershed

Pre-European inhabitation by Chumash and Tataviam (AMEC, 2005)
1782 establishment of first Spanish mission (AMEC, 2005)
1820s to 1860s cattle ranching a dominant land use (AMEC, 2005)
1860s oil production began (USMMS website)
1860s agriculture became a dominant land use (AMEC, 2005)
1920s beginning of larger scale agricultural activities (AMEC, 2005)
1928, March, St. Francis Dam broke
1955, Santa Felicia Dam completed (SCWRP website)
1973, Castaic Lake Reservoir and Pyramid Dam completed (SCWRP website)

Biological Setting

Mainstem

Prior to 1940, the Santa Clara was one of the largest steelhead runs in southern California, next to the Santa Ynez River, numbering in the thousands at times. Fewer than 100 adult fish run either of these rivers' waters now (Kelley, 2004).

A major difficulty during migrations are anthropogenic and natural barriers such as water diversions, road-crossings, and channel modifications for sand and gravel extraction or flood control purposes. The tributaries provide the majority of spawning and rearing habitat, while the mainstem of the Santa Clara River is primarily a migration corridor (Kelley, 2004).

The Santa Clara River estuary has been significantly altered, and these changes may be impacting southern California steelhead smolt survival. While it is unknown to what extent Santa Clara River smolts used the estuary historically, it has been demonstrated that northern and central coast steelhead smolts use estuaries to gain size and acclimate to the higher concentrations of salt in ocean water. The impact of these changes on Santa Clara River steelhead smolt survival is unknown (Kelley, 2004).

A number of recommendations have been developed to address the above difficulties. A priority action relating to water flow and balance in the river is to conduct a water balance and assessment of inflows and outflows to the Santa Clara surface and groundwater resources. Associated with this would be a hydrological analysis with models to assess the amount of water flow necessary in all lower segments of the river in order to provide sufficient water for steelhead passage during the winter months (Kelley, 2004).

Upper Watershed

Approximately 75% of the land in the Upper Santa Clara River HA is within the Angeles National Forest. This open space and the relatively undisturbed riverine environment provides habitat for three endangered species: California condor, unarmored threespine stickleback, and California least Bell's vireo. The endangered slender-horned spineflower as also been identified as occurring in the area (CDWR, 1993).

The Castaic Ranges cover 404,000 acres and include Liebre Mountain, Sawmill Mountain, and the Sierra Pelona. They lie northwest of the San Gabriel Mountains, between Soledad Canyon and Piru Creek in Los Angeles County. Geologically, they are considered part of the Transverse Ranges. The area has rugged topography but is relatively low in elevation, climbing above 5,000 feet only on Liebre and Sawmill mountains. The mountains and foothills north of Castaic are dominated by chaparral-covered hills, but they also contain several low elevation streams that have high-quality riparian and aquatic habitats. In addition, the upper elevations of Liebre and Sawmill mountains contain unique and important montane habitats. The geographic position of this region, which lies between the San Gabriel Mountains to the east, the Tehachapi Mountains to the north, and the Los Padres ranges to the west, makes it a key wildland linkage (Stephenson, 1999).

Although much of Castaic Creek is now covered by Castaic Lake, there are still areas of important riparian habitat. Arroyo toads occur upstream and downstream of the lake. A pond turtle population also exists in the upper reaches of Castaic Creek. Streamflows below Castaic Lake are controlled by releases from the dam. The lake contains a wide variety of non-native species that can disperse both up and down stream. Bullfrogs and warm-water fish in particular are a threat to arroyo toads and pond turtles (Stephenson, 1999).

Elizabeth Lake Canyon contains some high-quality riparian and aquatic habitat. Swainson's thrush and yellow-breasted chat are known to occur along this drainage. It is also a historic locality for the Tehachapi white-eared pocket mouse and the foothill yellow-legged frog. A paved road runs the length of this canyon and several campgrounds are located along it. The stream flows into Castaic Lake, which makes it more susceptible to infestations of bullfrogs and warm-water fish (Stephenson, 1999).

Soledad Canyon contains high-quality riparian and aquatic habitat. Portions of the upper Santa Clara River in this canyon are designated as critical habitat for the unarmored threespine stickleback fish. Santa Ana suckers, southwestern willow flycatchers, and summer tanagers also occur in this area. Invasive, non-native species are also a problem, particularly arundo and warm-water fish (Stephenson, 1999).

Placerita Canyon State Park, in Los Angeles County, was created to preserve and protect the site of the first discovery of gold in California, in 1842. Designated as a State Historic Landmark, the park is situated in the transition zone between the San Gabriel Mountains and the Mojave Desert, and contains sandstone formations, seasonal streams and riparian oak woodlands, as well as stands of cottonwood and native sycamore trees. The park's location provides significant linkages connecting the Angeles National Forest, the Santa Susana Mountains, the Simi Hills and the Santa Monica Mountains (CDPR website).

San Francisquito Creek contains high quality, low-elevation riparian and aquatic habitat. The unarmored threespine stickleback, California red-legged frog, southwestern willow flycatcher, Swainson's thrush, yellowbreasted chat, and Nevin's barberry all occur along this drainage. The primary factors affecting ecological integrity in the area are water diversions, encroachment of non-native species, and land uses associated with a major paved road that runs the length of this canyon (Stephenson, 1999).

Piru Creek Subwatershed

There is an abundance of wildlife in the Piru Creek subwatershed. Piru Creek historically was a major spawning tributary for southern California steelhead but Santa Felicia Dam now blocks steelhead access (Kelley, 2004). Steelhead trout populations have declined dramatically since the mid-1950s coincident with construction of dams and water diversions. Those portions of the Piru Creek subwatershed that occur within the National Forests include some of the most botanically diverse preserves in the United States. Most of the land experiences Mediterranean climate characterized by cool, wet winters and hot, dry summers. This climate coupled with elevational changes creates a unique assemblage of plant communities in which chaparral dominates. Oaks, pines, fir, and juniper species occur above 5,000 feet while cottonwood, and willow communities occur within the streambed and near springs. Seasonal grasses are dominant on the soils formed on finer grained sedimentary rocks and alluvium. Adjacent upland terraces are relatively arid, supporting oaks, grassland and chaparral (SCWRP website).

Vegetation throughout lower Piru Creek consists of white alders, California sycamores, arroyo willows, coast live oak, and mule fat. The dominant overstory is alders and sycamores, with some portions being dominated by coast live oaks. The midstory is composed of smaller willows, mule fat, and poison oak, with and understory of the aforementioned species as well as California wild rose, California blackberry, cattails, and other herbaceous species. The subwatershed contains a limited distribution of rural communities and may remain free of nonnative, exotic species such as *Arundo donax* or giant reed (SCWRP website).

The middle portion of Piru Creek (below the Pyramid Lake dam) is characterized by cobbly floodplain terraces that support sporadic willow clumps within the streambed and stands of alders along the edges. Episodic channel forming flood events can result in the removal of bordering alders within this reach (SCWRP website).

Black bear populations have maintained their numbers at a relatively constant level over the past few decades. The Upper Piru and Agua Blanca areas of the Ojai District have the highest bear concentrations within the subwatershed. This success is primarily a result of previous conservation actions taken to preserve the robust habitat of the upper subwatershed system (SCWRP website).

Sensitive species potentially occurring within the subwatershed include the southwestern willow flycatcher, least Bell's vireo, Cooper's hawk, arroyo toad, and California red-legged frog. Arroyo toads are known to occur on two short segments of Piru Creek, from lower Piru Gorge downstream to the vicinity of Blue Point Campground, and between Bear Gulch and the headwaters of Pyramid Lake. However, California red-legged frogs are believed to have been eliminated in part by off-road vehicle activities in Piru Creek above Pyramid Lake (SCWRP website).

Sespe Creek Subwatershed

The confluence of Sespe Creek with the Santa Clara River provides an important connection to upland systems and potential migration corridor for four endangered species: southwestern willow flycatcher, least Bell's vireo, arroyo toad, and California red-legged frog (SCWRP website).

As with Piru Creek, abundant and diverse wildlife occurs within the Sespe Creek subwatershed. The mountains of the Los Padres National Forest have created a unique assemblage of plant communities in which chaparral dominates. Southern coast live oak, southern cottonwood-willow, southern sycamore-alder, and southern mixed riparian forests dominate the drainage network. Examples of other plant communities encountered within the upper subwatershed include southern riparian scrub and California walnut woodland. The Sespe Creek subwatershed contains similar vegetation overstory and understory as the Piru Creek subwatershed including a limited distribution of rural communities and nonnative, exotic species such as *Arundo donax* or giant reed. Common wildlife species observed within the subwatershed include black bears, deer, mountain lions, bobcats, coyotes, rattlesnakes, red-tailed hawks, and golden eagles. Black bear populations have maintained their numbers at a relatively constant level over the past few decades and the Sespe Condor Sanctuary of the Ojai District has a high bear concentration. Sespe Creek also supports remnants of the historically abundant southern steelhead (SCWRP website).

Sespe Creek is one of the main southern California steelhead spawning tributaries; there are no dams on the creek (Kelley, 2004). Due to the endangered status of southern California steelhead, Sespe Creek has been closed to fishing from Alder Creek downstream to the confluence with the Santa Clara River. Approximately 15 miles of Sespe Creek from the mouth of the Tule Creek downstream to the Hot Springs Canyon vicinity supports the largest surviving populations of arroyo toad. This upper half of the Sespe Creek drainage contains large areas of excellent adult and breeding habitats for the toad (SCWRP website).

Santa Paula Creek Subwatershed

Sensitive species within the Santa Paula Subwatershed include arroyo toads, California red-legged frogs, southern California steelhead trout, least Bell's vireo, and southwestern willow flycatcher (SCWRP website). Santa Paula Creek is one of the watershed's main southern California steelhead spawning tributaries (Kelley, 2004). The natural communities present in the Santa Paula Creek subwatershed include riparian woodland, riparian scrub, coast live oak-walnut woodland, coastal sage scrub-grassland, and chaparral. Chaparral is found on the higher slopes of Santa Paula Canyon and mixed with coastal sage scrub and grassland along the drier, rocky slopes. Coniferous trees occur on the crests of the higher mountains. Riparian woodland and riparian scrub habitat are dominant in the upper portion of the subwatershed, but limited to narrow strips of variable size along the drainage further downstream. Upstream of Steckel Park, the riparian habitat is relatively undisturbed and characterized by a mix of black cottonwood, western sycamore, white alder, Fremont cottonwood, willow species, and mule fat. The understory is dominated by poison oak, mugwort, various brome grasses, cocklebur, wild celery, lotus, and locoweed (SCWRP website).

The portion of Santa Paula Creek which flows through Steckel Park is characterized by a mix of riparian habitats and oak-walnut woodlands. One clump of giant reed is present at Steckel Park. Alluvial scrub habitat occurs on the upper terraces of the existing banks and is composed primarily of shrubs including California sagebrush, laurel sumac, black sage, and buckwheat (SCWRP website).

In the alluvial valley below Steckel Park, the vegetation community is primarily agricultural. Citrus and avocado orchards occur along both banks of Mud Creek and a majority of the eastern bank of Santa Paula Creek. The remaining portion of the alluvial valley contains terraced hillsides that have been urbanized (SCWRP website).

Sensitive plant species that may occur within the area include the slender-horned spineflower, Gambell's waters cress, and the Santa Paula buckwheat (SCWRP website).

Least Bell's vireo historically nested along a majority of the Santa Paula Creek according to the U.S. Fish & Wildlife Service (USFWS) in 1982. However, the lower portion of the Santa Paula Creek does not currently contain suitable habitat for the least Bell's vireo or southwestern willow flycatcher (SCWRP website).

The Watershed's Designated Beneficial Uses

The various uses of waters described above are referred to as beneficial uses. The Regional Board designates beneficial uses of all waterbodies in the Water Quality Control Plan for the Ventura and Los Angeles Coastal Watersheds (usually referred to as Basin Plan). These beneficial uses are the cornerstone of the State and Regional Board's efforts to protect water quality, as water quality objectives are set at levels that will protect the most sensitive beneficial use of a waterbody. Together, beneficial uses and water quality objectives form water quality standards (CRWQCB, 1994).

Twenty-one beneficial uses for waters in the Santa Clara River Watershed are designated in the Regional Board's Basin Plan. These beneficial uses are listed by waterbody and hydrologic unit in the table below. Certain site specific water quality objectives, namely TDS, sulfate, chloride, boron, and--for surface waters--nitrogen, reflect background levels of constituents in the mid-1970s, in accordance with the State Board's Antidegradation Policy. Water quality objectives for these and for other constituents and parameters can be found in the Basin Plan (CRWQCB, 1994).

From: Table 2-1. Beneficial Uses of Inland Surface Waters. (CRWQCB, 1994)

Watershed[a]	Hydro Unit #	MUN	IND	PROC	AGR	GWR	FRSH	NAV	POW	REC1	REC2	COM	AQUA	WARM	COLD	SAL	EST	MAR	WILD	BIOL	RARE	MIGR	SPWN	SHELL	WET[b]
SANTA CLARA RIVER WATERSHED																									
Santa Clara River Estuary c	403.11							E		E	E	E					E	E	E		Ee	Ef	Ef		E
Santa Clara River	403.11	P*	E	E	E	E	E			E	E			E	E				E		E	E			E
Santa Clara River	403.21	P*	E	E	E	E	E			Ed	E			E					E		E	E			E
Santa Clara River	403.31	P*	E	E	E	E	E			Ed	E			E					E		E	E			E
Santa Clara River	403.41	P*	E	E	E	E	E			E	E			E					E		E	E			E
Santa Clara River	403.51	P*	E	E	E	E	E			E	E			E					E		E				E
Santa Clara River (Soledad Cyn)	403.55	E*	E	E	E	E	E			E	E			E					E		Ei				E
Santa Paula Creek	403.21	P	E	E	E	E	E			E	E			E	E				E		E	E	E		
Sisar Creek	403.21	P	E	P	E	E				E	E			E	E				E		Eg		E		E
Sisar Creek	403.22	P	E	P	E	E				E	E			E	E				E		Eg		E		E
Sespe Creek	403.31	P	E	E	E	E				E	E			E	E				E	E	E	E	E		E
Sespe Creek	403.32	P	E	P	E	E				E	E			E	E				E	E	Eg	E	E		E
Timber Creek	403.32	P*				E				E	E				E				E	E	E	E	E		E
Bear Canyon	403.32	P*				E				E	E			E	P				E	E	E	E	E		E
Trout Creek	403.32	P*				E				E	E			E	E				E		E	E	E		E
Piedra Blanca Creek	403.32	P*				E				E	E				E				E		E	E	E		E
Lion Canyon	403.32	P*				E				E	E			E	E				E			E	E		E
Rose Valley Creek	403.32	P*				E				E	E			E	E				E				E		E
Howard Creek	403.32	P*				E				E	E				E				E	E	E	E	E		E
Tule Creek	403.32	P*				E				P	E				P				E	E	E	E	E		E
Potrero John Creek	403.32	P*				E				E	E				P				E		E	E	E		E
Hopper Creek	403.41	P*	E		E	E	E			E	E			E	E				E		Eg				E
Piru Creek	403.41	P	E	E	E	E	E			E	E			E	E				E		Eg	E	E		E
Piru Creek	403.42	P	E	E	E	E	E			E	E			E	E				E		Eg		E		E
Lake Piru	403.41	P	E	E	E	E	P			E	E			E	E				E		E		E		
Lake Piru	403.42	P	E	E	E	E	P		P	E	E			E	E				E		E		E		
Pyramid Lake	403.42	E	E	E	E	E	P		E	E	E			E	E				E		E				
Cañada de los Alamos	403.43	I*			I	I	I			I	I			I	I				E		E				
Gorman Creek	403.43	I*			I	I				I	I			I	I				E		P				
Lockwood Creek	403.42	I*			I	I				I	I			I	I				E						
Lockwood Creek	403.44	I*			I	I	I			I	I			I	I				E						
Tapo Canyon	403.41	P*			P					P	E			E					E						
Castaic Creek	403.51	I	I	I	I	I	I			I	E			I					E		E				

From: Table 2-1. Beneficial Uses of Inland Surface Waters. (CRWQCB, 1994)

Watershed[a]	Hydro Unit #	MUN	IND	PROC	AGR	GWR	FRSH	NAV	POW	REC1	REC2	COM	AQUA	WARM	COLD	SAL	EST	MAR	WILD	BIOL	RARE	MIGR	SPWN	SHELL	WETb
Castaic Lagoon	403.51	E*	E	E	E	E	E			E	E			E					E						
Castaic Lake	403.51	E	E	E	E	E	E		E	E	E			E					E		E		E		
Elderberry Forebay	403.51	E	E	E	E	E	E		E	Ek	E			E					E		E		E		
Elizabeth Lake Canyon	403.51	I	I	I	I	I	I			I	E			I					E						
San Francisquito Canyon l	403.51	I	I	I	I	I	I			I	I			I					E		E		I		E
South Fork (Santa Clara River)	403.51	I*	I	I	I	I	I			I	I			I					E						
Drinkwater Reservoir	403.51	P*				E				Pk	E			P					E		E				E
Bouquet Canyon	403.51	E I	E I	P I	P I	E	P			Em	E			E	E				E				P		E
Bouquet Canyon	403.52	P	P	P	E	E	P			Em	E			E	E				E		E				E
Dry Canyon Creek	403.51	I	I	I	I	I	I			I	I			I					E						
Dry Canyon Reservoir j	403.51	E	E	E	E	P	P		P	Pk	E			E					E						
Bouquet Reservoir	403.52	E	E	E	E	E	E		P	Pk	E			E					E						
Mint Canyon Creek	403.51	I	I	I	I	I	I			Im	I			I					E						
Mint Canyon Creek	403.53	I*	I	I	I	I	I			Im	I			I					E						
Agua Dulce Canyon Creek	403.54	I*	I	I	I	I	I			I	I			I					E		E				
Agua Dulce Canyon Creek	403.55	I*			I	I	I			I	I			I					E						
Aliso Canyon Creek	403.55	P*			P	E				E	E			E					E						E
Lake Hughes	403.51	P	P	P	P	P	P			E	E			E					E						
Munz Lake	403.51	P*	P	P	P	E	P			E	E			E					E						
Lake Elizabeth	403.51	P	P	P	P	P	P			E	E			E					E		E				

E: Existing beneficial use
P: Potential beneficial use
I: Intermittent beneficial use
E, P, and I shall be protected as required
* Asterixed MUN designations are designated under SB 88-63 and RB 89-03 Some designations may still be considered for exemptions at a later date. (See pages 2-3, 4 for details).

Footnotes are consistent on all beneficial use tables.
a Waterbodies are listed multiple times if they cross hydrologic area or sub area boundaries Beneficial use designations apply to all tributaries to the indicated waterbody, if not listed separately.
b Waterbodies designated as WET may have wetlands habitat associated with only a portion of the waterbody. Any regulatory action would require a detailed analysis of the area.
c Coastal waterbodies which are also listed in Coastal Features Table (2-3) or in Wetlands Table (2-4).
d Limited public access precludes full utilization.
e One or more rare species utilize all ocean, bays, estuaries, and coastal wetlands for foraging and/or nesting.

f Aquatic organisms utilize all bays, estuaries, lagoons and coastal wetlands, to a certain extent, for spawning and early development. This may include migration into areas which are heavily influenced by freshwater inputs.
m Access prohibited by Los Angeles County DPW in the concrete-channelized areas.
n Area is currently under control of the Navy: swimming is prohibited.
o Marine habitats of the Channel Islands and Mugu Lagoon serve as pinneped haul-out areas for one or more species (i.e., sea lions).
p Habitat of the Clapper Rail.
q Whenever flow conditions are suitable.
r Public access prohibited by Calleguas MWD

Beneficial Use Definitions

Beneficial uses in the Los Angeles Basin are listed as defined below. The uses are listed in no preferential order.

Municipal and Domestic Supply (MUN)
Uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.

Agricultural Supply (AGR)
Uses of water for farming, horticulture, or ranching including, but not limited to, irrigation, stock watering, or support of vegetation for range grazing.

Industrial Process Supply (PROC)
Uses of water for industrial activities that depend primarily on water quality.

Industrial Service Supply (IND)
Uses of water for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, or oil well re-pressurization.

Ground Water Recharge (GWR)
Uses of water for natural or artificial recharge of ground water for purposes of future extraction, maintenance of water quality, or halting of saltwater intrusion into freshwater aquifers.

Freshwater Replenishment (FRSH)
Uses of water for natural or artificial maintenance of surface water quantity or quality (e.g., salinity).

Navigation (NAV)
Uses of water for shipping, travel, or other transportation by private, military, or commercial vessels.

Hydropower Generation (POW)
Uses of water for hydropower generation.

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

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

Commercial and Sport Fishing (COMM)
Uses of water for commercial or recreational collection of fish, shellfish, or other organisms including, but not limited to, uses involving organisms intended for human consumption or bait purposes.

Aquaculture (AQUA)
Uses of water for aquaculture or mariculture operations including, but not limited to, propagation, cultivation, maintenance, or harvesting of aquatic plants and animals for human consumption or bait purposes.

Warm Freshwater Habitat (WARM)
Uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.

Cold Freshwater Habitat (COLD)
Uses of water that support cold water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.

Inland Saline Water Habitat (SAL)
Uses of water that support inland saline water ecosystems including, but not limited to, preservation or enhancement of aquatic saline habitats, vegetation, fish, or wildlife, including invertebrates.

Estuarine Habitat (EST)
Uses of water that support estuarine ecosystems including, but not limited to, preservation or enhancement of estuarine habitats, vegetation, fish, shellfish, or wildlife (e.g., estuarine mammals, waterfowl, shorebirds).

Wetland Habitat (WET)
Uses of water that support wetland ecosystems, including, but not limited to, preservation or enhancement of wetland habitats, vegetation, fish, shellfish, or wildlife, and other unique wetland functions which enhance water quality, such as providing flood and erosion control, stream bank stabilization, and filtration and purification of naturally occurring contaminants.

Marine Habitat (MAR)
Uses of water that support marine ecosystems including, but not limited to, preservation or enhancement of marine habitats, vegetation such as kelp, fish, shellfish, or wildlife (e.g., marine mammals, shorebirds).

Wildlife Habitat (WILD)
Uses of water that support terrestrial ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.

Preservation of Biological Habitats (BIOL)
Uses of water that support designated areas or habitats, such as **Areas of Special Biological Significance (ASBS),** established refuges, parks, sanctuaries, ecological reserves, or other areas where the preservation or enhancement of natural resources requires special protection.

Stakeholder Groups

The term "stakeholder group" is subject to many different definitions. For the purposes of this document, the term is considered to include those groups consisting of individuals and agencies who meet on a fairly regular basis to address holistic watershed issues or who otherwise have contributed as a group to the knowledge of the watershed. It is acknowledged that many other groups address more focused activities relating to, in particular, water quality improvement and invasive plants removal.

Santa Clara River Enhancement and Management Plan (SCREMP) Steering Committee This group no longer actively meets but its 26-member Project Steering Committee completed an Enhancement and Management Plan during the 1990s. The Committee consisted of representatives of the following individuals and agencies:

Acton Town Council * Aggregate Producers Agriculture/Private Land Ownership Beach Erosion Authority for Operations & Nourishment * Castaic Lake Water Agency Cities of Fillmore/Santa Paula * City of Oxnard City of San Buenaventura * City of Santa Clarita * County of Ventura – Resource Management Agency * Friends of the Santa Clara River * (environmental organization umbrella group) Los Angeles County Flood Control District * Los Angeles County Sanitation District	Los Angeles Department of Regional Planning – APIS Newhall Land & Farming Company Santa Clara Valley Property Owners Association State of California Coastal Conservancy * State of California Department of Fish and Game * State of California Department of Parks and Recreation * State of California Department of Transportation * - District 7 State of California Water Quality Control Board – L.A. Region * United Water Conservation District U.S. Army Corps of Engineers * U.S. Fish & Wildlife Service * Valley Advisory Committee Ventura County Flood Control District *

- Additionally indicated support for the river study by signing a Memorandum of Cooperation

Six subcommittees worked with a consultant to collect the information necessary for a river management plan; they focused on agriculture, flood control, water resources, aggregate industry, recreation, and biology. These subcommittees worked on determining river dynamics and areas where the interests of diverse groups overlap along the river; the critical issues areas were identified. Reports were developed by the subcommittees that provide background information, goals, and recommendations for the river on the issue areas. A series of computer-based maps have been produced, which are currently being used in a GIS overlay process to identify conflicts and opportunities and facilitate decisions regarding use of the river floodplain. The SCREMP addresses management of the 500-year floodplain of the main river corridor. The SCREMP Water Resources Subcommittee also oversaw the development of a coordinated watershed monitoring plan which was finalized in Spring 2006. Copies of both the enhancement and monitoring plans are available at http://www.vcwatershed.org/Watersheds_SantaClara.html. The results of the SCREMP effort have been incorporated into Ventura County's Integrated Watershed Protection Plan which can be found at http://www.vcwatershed.org/Projects_IWPP.html . Additionally, a Santa Clara River Watershed Feasibility Study sponsored by the U.S. Army Corps of Engineers in conjunction with the Los Angeles County Department of Public Works and the Ventura County Watershed Protection District has begun to identify flooding and regional flood control solutions, erosion and sedimentation problems, opportunities to improve water quality, and riparian habitats that would benefit from restoration. Federal funding, however, may not be available in the immediate future. More information may be found at http://www.spl.usace.army.mil/santaclara/santaclarariverwatershed.htm.

Friends of the Santa Clara River This non-profit stakeholder group has been involved with watershed activities along the length of the river with a focus on the protection, enhancement, and management of the river's resources. More information about this group may be found at their website http://www.FSCR.org.

Southern California Wetlands Recovery Project (WRP) – Ventura County Task Force The WRP is a partnership of public agencies working cooperatively to acquire, restore, and enhance coastal wetlands and watersheds between Point Conception and the International border with Mexico. Using a non-regulatory approach and an ecosystem perspective, the WRP works to identify wetland acquisition and restoration priorities, prepare plans for these priority sites, pool funds to undertake these projects, implement priority plans, and oversee post-project maintenance and monitoring. The five County Task Forces help solicit projects for consideration for WRP funding by the Managers Group and Board of Governors. The Ventura County Task Force also serves as an active forum for presentations on the many technical studies currently underway including the Santa Clara River Parkway Floodplain Restoration Feasibility Study. More information about the WRP may be found on their webpage at http://www.scwrp.org and about the parkway project at http://www.santaclarariverparkway.org/wkb/projects/scrfeasibility.

Santa Clarita Organization for Planning the Environment (SCOPE) This group has been involved with educating the public about planning and environmental issues, including those involving the river, particularly in the area around the Santa Clarita Valley. More information about this group may be found at their website http://www.scope.org.

Santa Clara Estuary Work Group This group includes staff from the Regional Board, California Department of Fish and Game, California State Parks - Channel Coast District, and the Ventura Water Reclamation Plant. A Natural Resources Management Plan is being prepared for the State Parks land in and around the estuary.

Land Use Characteristics

The majority of the watershed is open space (Figure 5), most of which is National Forest or condor sanctuary. Large numbers of waterfalls or springs are shown on topographic maps in the upper Sespe. Along the mainstem of the river on the Ventura County portion (lower and middle sections of the river), agriculture predominates interspersed with residential and some industrial development. Besides the predominant open space, the upper portion of the watershed is characterized by a mix of residential, mixed urban, and industrial land uses with low density residential more common in the uppermost areas of the watershed while high density is more prevalent elsewhere. There are a number of cities and communities in the Santa Clarita Valley, in the upper watershed, including the city of Santa Clarita (which includes the communities of Valencia, Saugus, Canyon Country, and Newhall). Communities outside of the city limits include Castaic, Porter Ranch, Acton, Agua Dulce, Val Verde, and areas in unincorporated Los Angeles County. The cities and communities of the Santa Clara River Valley in Ventura County are, progressing westward, Piru, Fillmore, Santa Paula, Saticoy, and Ventura. A very large development of new homes has been proposed to be built on land owned by Newhall Land and Farming Company on the east side of the county line in unincorporated Los Angeles and Ventura Counties. A large number of new homes are also being constructed in the city of Fillmore along the river and in the city of Oxnard along the southern bank of the river.

Oil production is now a small part of the industrial land use compared to decades ago. Oil production in the watershed began in the late 1880s and only began to lag in the 1970s. Many oil production structures remain in place and are represented on topographic maps. These oil-producing sites, whether as natural seeps or as disused production wells, may be sources of visible oil and releases of brine. The eastern parts of the Sespe Creek Subwatershed, particularly Little Sespe and Tar Creeks, show oil wells and tanks on the topographic maps. Maps of the Santa Paula Creek Subwatershed also show large number of oil wells. Both Sespe and Santa Paula also show sulfur springs. The South Fork and its tributaries show a great many oil wells. Adams Canyon, just west of Santa Paula, also was known for its prolific oil production. Interestingly, a side canyon to Adams is called Salt Marsh Canyon. There is also a Salt Creek flowing into Castaic Creek. Hopper Canyon and Piru Creek are a few subwatersheds that do not show oil wells on topographic maps.

Piru Creek supports a variety of land uses and vegetation types. Several campgrounds occur along the drainage in the upper subwatershed that provide limited access and recreational opportunities. Cattle grazing occurs in certain areas immediately adjacent to Lake Piru. The lower portion of the drainage near the Santa Clara River valley contains urban and agricultural development along the creek and adjacent foothills (SCWRP website).

The Santa Clara River Valley continues to support one of California's major citrus grove areas. Other crops and land uses in this valley include avocado, pasture, small grains, alfalfa, and industries related to agriculture such as packing, processing, and trucking (SCWRP website).

The 500-year floodplain of the river has been the primary source of sand and gravel (aggregate) for several decades. The sand and gravel deposits are extracted for use as aggregate in the process that in California is generally referred to as surface mining. The last in-river mining activity on the Los Angeles County side had occurred in 1993, but which is now active, and the majority of the in-river mining in its Ventura County segment ceased in the late 1980s (AMEC, 2005). However, large-scale gravel mining operations have been proposed recently in the Santa Clarita area.

Discharges into the Watershed

Historical Discharges/Permits Timeline

1950s/1960s large amounts of brine discharges from oil fields
1957 first waste discharge requirements (WDRs) issued for Saticoy Sanitation District Wastewater Treatment Plant (WWTP)
1971 first WDRs issued for Piru WWTP
1977 first NPDES permit issued for Fillmore WWTP
1979 first WDRs issued for Montalvo WWTP
1979 first NPDES permit issued for Saugus WWRP
1979 first NPDES permit issued for Valencia WWRP
1980 first NPDES permit issued for Santa Paula WWRP
1980 first NPDES permit issued for Ventura Wastewater Reclamation Plant (WWRP)
1997 water softener ban lifted
2003 June-Sept nitrification/denitrification requirements go into effect at Valencia and Saugus WRPs and modifications are implemented
2003 residential water softener ban reinstated in Santa Clarita
2004 residential water softener ban enacted in Fillmore

NPDES Permits (not general construction or industrial stormwater-related)(CRWQCB, 2004)

There are four major discharges (all POTWs), 11 minor discharges, and 15 discharges covered by general permits. Of the five POTWs discharging to surface waters, one discharges into the estuary (San Buenaventura at 14 MGD design flow), two into Reach 3 (Santa Paula at 2.55 MGD design flow and Fillmore at 1.33 MGD design flow), one into Reach 5 (Valencia at 21.6 MGD design flow), and one into Reach 6 (Saugus at 6.5 MGD design flow).

Major discharges are defined as POTWs with a yearly average flow of over 0.5 MGD or an industrial source with a yearly average flow of over 0.1 MGD and those with lesser flows but with acute or potential adverse environmental impacts.

Minor discharges are defined as all other discharges that are not categorized as a Major. Minor discharges may be covered by a general permit, which are issued administratively, for those that meet the conditions specified by the particular general permit.

Twenty of the 30 NPDES discharges are to the mainstem of the Santa Clara River while the rest discharge to various tributaries or lakes.

Of the NPDES discharges under general permits:

- 10 are for miscellaneous wastes (dewatering, rec. lake overflow, swimming pool wastes, water ride wastewater, or groundwater seepage) that were nonhazardous prior to treatment,
- 5 are for domestic sewage and industrial wastes that were nonhazardous prior to treatment,
- 4 are for contaminated groundwater that were nonhazardous prior to treatment,
- 3 are for miscellaneous wastes that were inert prior to treatment,
- 2 are for process waste (produced as part of industrial/manufacturing process) that were nonhazardous prior to treatment, and
- One each are for stormwater runoff (nonhazardous before treatment), miscellaneous wastes (inert before treatment), contaminated groundwater (hazardous before treatment), and noncontact cooling water (nonhazardous before treatment).
- 4 are covered by NPDES Permit No. CAG994004 – for discharges of groundwater (treated or untreated) from construction and project dewatering to surface waters (threat/complexity rating to be determined)
- 3 each are covered by NPDES Permit No. CAG994005 – for discharges of groundwater from potable water supply wells to surface waters (threat/complexity rating to be determined) and NPDES Permit No. CAG994001 (being replaced by CAG994004) – for groundwater discharges from construction and project dewatering to surface waters (threat/complexity rating 3C)
- 2 are covered by NPDES Permit No. CAG914001 – for discharges of volatile organic compound contaminated groundwater to surface waters (threat/complexity rating 2B), and
- One each are covered by NPDES Permit No. CAG674001 – for discharges of hydrostatic test water to surface waters (threat/complexity rating 3C), NPDES Permit No. CAG834001 – for treated groundwater and other wastewaters from investigation and/or cleanup of petroleum fuel pollution to surface waters (threat/complexity rating 2B), and NPDES Permit No. CAG994003 – for discharges of nonprocess wastewaters not requiring treatment systems to surface waters (threat/complexity rating 3C).

NPDES Permits (general construction or industrial stormwater-related) (CRWQCB, 2004)

Of the 114 dischargers enrolled under the general industrial storm water permit in the watershed, the largest numbers are located in the cities of Santa Clarita and Santa Paula. There is a wide array of businesses represented with many being involved with auto wrecking and food packing. A similar number of sites are located in the upper and lower watershed.

There are approximately 300 sites enrolled under the construction storm water permit; the majority of these sites are located in the upper watershed, especially within the city of Santa Clarita and surrounding unincorporated Los Angeles County. About one-half of the sites are residential and about two-thirds are five acres or greater in size with six sites being at least 1,000 acres.

Non-NPDES Discharges (Chapter 15 and Non-Chapter 15) (CRWQCB, 2004)

There are eight facilities with Chapter 15 requirements (mostly landfills, some closed) while there are 54 facilities with non-Chapter 15 waste discharge requirements. Included in the latter facilities are POTWs which discharge to percolation or evaporation ponds. The Montalvo plant has a design capacity of 0.36 MGD and is located in Reach 1. The Saticoy plant has a design capacity of 0.3 MGD and is located in Reach 2. The Piru facility has a design capacity of 0.2 MGD and is located in Reach 5.

The following series of tables is a list of the facilities which discharge into the watershed.

Los Angeles Regional Water Quality Control Board
Santa Clara River Watershed Wastewater Permits - NPDES

Discharger's Name*	Facility Name	City	NPDES #	WDID #	CI #	Rating		Order #	Exp. or Review Date	Design Q (MGD)	Baseline Q (MGD)	Waste Type	Receiving Water
Majors													
LA Co Sanitation Districts	Valencia WRP	VALENCIA	CA0054216	4A190107023	4993	1	A	03-145	10/10/08	21.60	8.22	DDOMIND	SANTA CLARA RIVER
LA Co Sanitation Districts	Saugus WRP	SAUGUS	CA0054313	4A190107021	2960	1	A	03-143	11/6/08	6.50	6.50	DDOMIND	SANTA CLARA RIVER
San Buenaventura, City of	Ventura WWRP	VENTURA (CORPORATE NAME SAN BUENAVENTURA)	CA0053651	4A560107001	1822	1	A	00-143	9/10/05	14.00	10.50	DDOMIND	SANTA CLARA RIVER
Santa Paula, City of/OMI	Santa Paula WWRP	SANTA PAULA	CA0054224	4A560108001	1759	1	A	97-041	3/10/02	2.55	1.89	DDOMIND	SANTA CLARA RIVER
Minors													
Castaic Lake Water Agency	Earl Schmidt Filtration Plant	CASTAIC	CA0059030	4A190116001	6544	3	C	97-030	3/10/02	25.00	12.50	DMISCEL	CASTAIC LAKE
Dept of Water Resources	William E. Warne Power Plant	PYRAMID LAKE	CA0059188	4A190805002	6610	3	C	99-015	4/10/04	1.75	1.75	DPROCES	PYRAMID LAKE
Fillmore, City of	Fillmore WWTP	FILLMORE	CA0059021	4A560101002	6523	2	A	03-136	9/10/08	1.33	0.11	DDOMIND	SANTA CLARA RIVER
HR Textron Inc.	Valencia Facility	SANTA CLARITA	CA0003271	4A192332001	6024	3	C	96-066	9/10/01	0.10	0.07	DMISCEL	SANTA CLARA RIVER
Keysor-Century Corp	Pvc-Pva Copolymer Mfg, Saugus	SAUGUS	CA0057126	4A192000001	1954	2	C	98-032	5/10/03	0.10	0.05	DSTORMS	SOUTH FORK SANTA CLARA RIVER
LA Co Dept of Parks &Recreation	Val Verde Co. Park Swim Pool	SAUGUS	CA0062561	4A190107086	7140	3	C	97-062	3/10/02	0.01	0.00	DMISCEL	SANTA CLARA RIVER
Los Angeles City of DWP	Castaic Power Plant	CASTAIC	CA0055824	4A193500005	6112	2	B	98-020	2/10/03	13.20	13.40	DPROCES	ELDERBERRY FOREBAY
Los Angeles City of DWP	Tunnel No. 104	SANTA CLARITA	CA0058432	4B190106061	6313	3	B	03-089	6/10/08	0.02	0.02	DCNWTRS	NEWHALL CREEK
Metropolitan Water Dist. Of SC	Foothill Feeder Power Plant	CASTAIC	CA0059641	4A190115006	6743	3	C	98-066	9/10/03	0.07	0.07	DNONCON	CASTAIC LAKE
Santa Clarita, City of	Drainage Ben. Assess Area 6&18	SANTA CLARITA	CA0061638	4A191142001	6945	3	C	03-099	6/10/08	0.05	0.05	DMISCEL	SANTA CLARA RIVER
Six Flags Magic Mountain	Amusement Park, Valencia	VALENCIA	CA0003352	4A199002002	6045	2	B	98-005	1/10/03	1.00	0.10	DMISCEL	SANTA CLARA RIVER
General													
Augeas Corporation	Former Just Gas	OXNARD	CAG834001	4A566600184	8557	2	B	02-125	7/11/07	0.02	0.02	HCNWTRS	SANTA CLARA RIVER
Caltrans	Santa Clarita River Bridge Exp	VENTURA	CAG994004	4A566100092	8374			03-111	8/7/08	0.10	0.10	DCNWTRS	SANTA CLARA RIVER
Castaic Lake Water Agency	Three Prod. Well Aquifer Test	SANTA CLARITA	CAG914001	4B196800043	8440	2	B	02-107	5/23/07	0.43	0.43	DCNWTRS	SOUTH FORK SANTA CLARA RIVER
CH2M Hill	SCLLC Porta Bella Dev. Project	SANTA CLARITA	CAG914001	4A196800044	8455	2	B	02-107	5/23/07	0.07	0.07	DCNWTRS	SANTA CLARA RIVER
DOKKEN ENGINEERING	Bouquet Canyon Bridge Widening	SANTA CLARITA	CAG994004	4A197500007	8649			03-111	8/7/08	0.40	0.40	DMISCEL	SANTA CLARA RIVER
LA Co Sanitation Districts	Valencia WWRP	VALENCIA	CAG994004	4A196000102	7296			03-111	8/7/08	0.60	0.60	DMISCEL	SANTA CLARA RIVER
McDonald's Restaurant	Mcdonald's Restaurant	GORMAN	CAG994001	4A196000160	7464	3	C	97-045	4/10/02	0.01	0.01	DMISCEL	PYRAMID LAKE

Los Angeles Regional Water Quality Control Board
Santa Clara River Watershed Wastewater Permits - NPDES (cont'd)

Discharger's Name*	Facility Name	City	NPDES #	WDID #	CI #	Rating		Order #	Exp. or Review Date	Design Q (MGD)	Baseline Q (MGD)	Waste Type	Receiving Water
Newhall County Water District	Well Nos. 7 & 10	SANTA CLARITA	CAG994005	4A196000636	8603			03-108	8/7/08	0.49	0.49	NMISCEL	NEWHALL CREEK
Newhall Land and Farming Co.	Hart/Pony Baseball & Auto Mall	VALENCIA	CAG994004	4A197500001	8648			03-111	8/7/08	1.00	1.00		SANTA CLARA RIVER
Ogden Constructors	Santa Paula Improvement,Reach2	SANTA PAULA	CAG994001	4A566000472	8002	3	C	97-045	4/10/02	0.01	0.01	IMISCEL	SANTA CLARA RIVER
Santa Clarita Community College	College Of The Canyons	SANTA CLARITA	CAG994003	4A196400040	7324	3	C	98-055	5/10/03	0.28	0.00	DMISCEL	SANTA CLARA RIVER
Santa Paula, City of/OMI	Well #11	SANTA PAULA	CAG994005	4A566000580	8292			03-108	8/7/08	2.90	2.90	NMISCEL	SANTA CLARA RIVER
Southern California Gas Co.	Fair Oaks Ranch-Phase II	SANTA CLARITA	CAG674001	4A196300155	8593	3	C	97-047	4/10/02	0.00	0.00		SANTA CLARA RIVER
The Painted Turtle Camp	The Painted Turtle Camp	LAKE HUGHES	CAG994001	4A196000624	8468	3	C	97-045	4/10/02	0.01	0.01	DMISCEL	LAKE ELIZABETH
Valencia Water Company	Valencia Water Co. Well #206	CASTAIC	CAG994005	4A196000622	8476			03-108	8/7/08	4.00	4.00	NMISCEL	SANTA CLARA RIVER

***General permit dischargers will be reviewed and may not be "renewed" but allowed to continue with enrollment**

DCNWTRS 4	CAG674001 1	30 total
DDOMIND 5	CAG834001 1	
DMISCEL 10	CAG914001 2	
DNONCON 1	CAG994001 3	
DPROCES 2	CAG994003 1	
DSTORMS 1	CAG994004 4	
HCNWTRS 1	CAG994005 3	
IMISCEL 1		
NMISCEL 3		

Los Angeles Regional Water Quality Control Board
Santa Clara River Watershed Wastewater Permits – Non-Chapter 15

Discharger's Name	Facility Name	City	WDID #	CI #	Rating		Order #	Expiration	Design Q (MGD)	Baseline Q (MGD)	Waste Type
LA Co Sanitation Districts	Saugus WRP	SAUGUS	4A190107083	6188	1	A	87-049	4/27/90	5.00	5.00	DDOMIND
LA Co Sanitation Districts	Valencia WRP	VALENCIA	4A190107084	6186	1	A	87-048	4/27/90	4.50	4.50	DDOMIND
Newhall Land and Farming Co.	Natural River Management Plan	SANTA CLARITA	4A191290001	8099	1	A	99-104	10/28/14	0.00	0.00	IMISCEL
San Buenaventura, City of	Ventura WWRP	VENTURA	4A560107002	6190	1	A	87-045	4/27/90	14.00	0.45	DDOMIND
Fillmore, City of	Fillmore WWTP	FILLMORE	4A560101001	1076	2	A	97-038	4/5/07	1.33	0.73	DDOMIND
LA Co Dept of Public Works	Lake Hughes Community WWTP	LAKE HUGHES	4B190134001	6798	2	A	95-045	3/31/05	0.09	0.04	DDOMEST
Saticoy Food Corp	Vegetable Proc, Santa Paula	SANTA PAULA	4A562408001	5372	2	A	95-130	9/14/10	0.33	0.21	DWSHWTR
Ventura Co Water Works Dist. 1	Todd Road Jail Facility	SANTA PAULA	4A560121001	7418	2	A	94-084	8/21/99	0.09	0.09	DDOMEST
Ventura Regional San District	Saticoy S.D. WWTP	SATICOY	4A560109001	1761	2	A	01-155	10/25/06	0.30	0.12	DDOMIND
Golden Valley Muni. Water Dist	Gorman WWTP	GORMAN	4A190107001	1845	2	B	94-087	8/19/04	0.06	0.02	DDOMIND
LA Co Health Dept	Acton Rehabilitation Center	ACTON	4A190107024	5802	2	B	95-103	7/14/05	0.15	0.02	DDOMEST
LA Co Health Dept	Warm Springs Rehabilition Ctr.	CASTAIC	4A190107005	4242	2	B	94-017	2/26/04	0.03	0.03	DDOMEST
LA Co Probation Dept	Mendenhall-Munz Boys Camp WWTP	LAKE HUGHES	4A190107076	4759	2	B	94-101	9/23/04	0.02	0.02	DDOMEST
San Buenaventura, City of	Ventura WWRP	VENTURA	4A560311001	6190	2	B	80-03402	7/26/90	0.00	0.00	HSLDWST
Santiago Associates LLC	Paradise Ranch	CASTAIC	4A191030001	5671	2	B	89-029	3/27/99	0.10	0.04	DDOMEST
Thomas Aquinas College	Santa Paula College	SANTA PAULA	4A561000001	6410	2	B	94-018	2/28/99	0.03	0.01	DDOMEST
Ventura Co Water Works Dist. 1	Piru WWTP	FILLMORE	4A560114006	5714	2	B	04-032	1/30/07	0.20	0.09	DDOMEST
Ventura Regional San District	Montalvo WWTP	VENTURA	4A560102001	5068	2	B	97-037	4/5/07	0.36	0.27	DDOMIND
Acton Crescent Bay Development	Tract 52883	ACTON	4A196500020	8114	2	C	91-094	7/22/06	0.02	0.02	DDOMEST
Acton Plaza Shopping Center	Acton Plaza Shopping Center	ACTON	4A191149001	7266	2	C	93-022	4/4/03	0.01	0.00	DDOMEST
B & C Land and Water, LLC	Tract 50385	AGUA DULCE	4A196500013	7185	2	C	91-094	7/22/06	0.00	0.00	DDOMEST
Christopher Anthony, Inc	Discount Furniture Store	SAUGUS	4A192404002	6280C	2	C	P 8081	8/21/86	0.00	0.00	DMISCEL
Crown Valley Community Church	Crown Valley Community Church	ACTON	4A191147001	7172	2	C	92-041	5/30/02	0.00	0.00	DDOMEST
Curtis Sand and Gravel	Lang Station	CANYON COUNTRY	4A192030001	1955C	2	C	P 1945	5/21/87	0.00	0.25	DDREDGS
Forecast Homes, Inc.	Tract 49601	ACTON	4B196500022	8270	2	C	91-094	7/22/06	0.01	0.01	DDOMEST
Forecast Homes, Inc.	Tract 49601	ACTON	4B196500023	8271	2	C	91-094	7/22/06	0.00	0.00	DDOMEST
Forecast Homes, Inc.	Tract 49601	ACTON	4B196500024	8272	2	C	91-094	7/22/06	0.01	0.01	DDOMEST
Forecast Homes, Inc.	Tract 49240	ACTON	4B196500026	8273	2	C	91-094	7/22/06	0.01	0.01	DDOMEST
Forecast Homes, Inc.	Tract 49240	ACTON	4B196500027	8274	2	C	91-094	7/22/06	0.00	0.00	DDOMEST

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Santa Clara River Watershed Wastewater Permits – Non-Chapter 15 (cont'd)

Discharger's Name	Facility Name	City	WDID #	CI #	Rating		Order #	Expiration	Design Q (MGD)	Baseline Q (MGD)	Waste Type
Forecast Homes, Inc.	Tract 47788	ACTON	4B196500028	8275	2	C	91-094	7/22/06	0.01	0.01	DDOMEST
Forecast Homes, Inc.	Tract 49240	ACTON	4A196500025	8276	2	C	91-094	7/22/06	0.02	0.02	DDOMEST
Hale & Associates	22284/Todd Landis	ACTON	4A196500015	7256	2	C	91-094	7/22/06	0.00	0.00	DDOMEST
Hasa Chemicals, Inc	Swim Pool Chem Packing, Saugus	SAUGUS	4A199015001	6385C	2	C	P 8143	1/21/88	0.00	0.01	DMISCEL
Keysor-Century Corp	Pvc-Pva Copolymer Mfg, Saugus	SAUGUS	4A192000002	6485C	2	C	P 8230	10/19/89	0.00	0.00	DPROCES
Legacy Partners	Legacy Partners	SAUGUS	4A192066002	6656C	2	C	P 8461	2/25/93	0.00	0.03	DNONCON
Lubrication Company Of America	Blended Petro Products, Saugus	SAUGUS	4A192158001	6596C	2	C	P 8371	9/26/91	0.00	0.00	DSTORMS
Myron Wolter	Tt48818	ACTON	4A196500001	7083	2	C	91-094	7/22/06	0.00	0.00	DDOMEST
Newhall Refining Co., Inc	Process Water Hauling, Coper	NEWHALL	4A192473002	6442C	2	C	P 0994	10/20/88	0.00	0.03	DPROCES
Nova Development Company	Tract 52882	ACTON	4A196500019	8113	2	C	91-094	7/22/06	0.02	0.02	DDOMEST
Peter J. Alfieri	Tract 46647	ACTON	4A196500030	8308	2	C	91-094	7/22/06	0.00	0.00	ISLDWST
Sierra View Center	Commercial Development	ACTON	4A191148001	7213	2	C	92-078	10/17/02	0.00	0.00	DDOMEST
Triangle Rock Co.	L.A. Regional Soledad Plant	CANYON COUNTRY	4A192027001	6333C	2	C	P 4998	5/21/87	0.00	0.30	DDREDGS
Watt Enterprises LP Ltd.	Tract#46205	ACTON	4A196500031	8448	2	C	91-094	7/22/06	0.00	0.00	DDOMIND
Weary & Associates	Tract 52637	ACTON	4A196500021	8118	2	C	91-094	7/22/06	0.00	0.00	DDOMEST
Caltrans	5/126 Inter@Santa Clar Bridge	SANTA CLARITA	4A566700017	8636	3	A	93-010	1/25/08			
Greystone Homes	River Street Property	FILLMORE	4A566700013	8154	3	A	93-010	1/25/08	1.00	1.00	IMISCEL
River Park Legacy LLC	River Park Project	OXNARD	4A566700015	8441	3	A	93-010	1/25/08			
Shell Oil Products US	Shell Oil Co.	ACTON	4A192108021	7527	3	A	95-057	5/11/10	0.00	0.00	DDOMEST
Texaco Group Inc.	Pacific Coast Pipeline Site	FILLMORE	4A567200015	8510	3	A	02-030	1/24/07	0.01	0.48	
Valencia Water Company	Replacement well U6	SANTA CLARITA	4A196700016	8617	3	A	93-010	1/25/08			
Cen Fed Bank	Tract 49240	ACTON	4A561051001	7044	3	B	91-059	4/18/06	0.00	0.00	DDOMEST
Limoneira Co.	Limoneira&Olivelands Sewer Frm	SANTA PAULA	4A565014002	5322	3	B	02-139	8/29/07	0.11	0.11	DDOMEST
OXNARD UNION HIGH SCHOOL DIST	Rio Mesa High School	OXNARD	4A567400015	8645	3	B	97-10DWQ	11/18/03			DDOMEST
Pan American Seed Co.	Pan American Seed, Santa Paula	SANTA PAULA	4A565015001	4246	3	B	87-093	6/18/02	0.00	0.01	DPROCES
Sierra Height Mobile Home Est.	Mobile Home Estate	CANYON COUNTRY	4A561036001	6803	3	B	03-058	4/3/18	0.03	0.03	DDOMEST
Trans Technology Corp.	Placerita Canyon Facility	CANYON COUNTRY	4A192528002	6857	3	B	89-016	2/24/04	0.21	0.21	DCNWTRS
AES Placerita Oil Co.	Placerita Canyon	NEWHALL	4A192072001	6621C	3	C	P 8423	3/18/97	0.00	0.00	DDRIBRI
Alan Berman Trucking	Alan Berman Trucking	VALENCIA	4B199066001	6696C	3	C	P 8584	3/21/00	0.00	0.00	DMISCEL

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Discharger's Name	Facility Name	City	WDID #	CI #	Rating		Order #	Expiration	Design Q (MGD)	Baseline Q (MGD)	Waste Type
Albert, Jacob	Placerita Oil Field Coper	NEWHALL	4A192316001	6123C	3	C	P 2896	1/23/90	0.00	0.01	DDRIBRI
Arco Petroleum Products Co.	Placerita Oil Field,Coper	NEWHALL	4A192010013	0773C	3	C	P 1209	7/25/69	0.00	0.00	DDRIBRI
Arco Petroleum Products Co.	Newhall, Coper	NEWHALL	4A192010010	4377C	3	C	P 3086	4/13/78	0.00	0.00	DDRIBRI
Arco Petroleum Products Co.	Saugus Svc Station, Coper 8079	SAUGUS	4A192010007	6279C	3	C	P 8076	8/20/91	0.00	0.00	DWSHWTR
Black Hawk Resources Corp	Haul Oil Brines, Newhall Lease	DEL VALLE	4A192190001	6644C	3	C	P 8442	10/21/97	0.00	0.00	DDRIBRI
Briggs School District	Olivelands Elem. School	SANTA PAULA	4A567000042	8667	3	C	01-031	2/22/06	0.00	0.00	
California Dept of Parks & Rec	Hungry Valley SVRA	LEBEC	4A197000032	8527	3	C	01-031	2/22/06			DDOMEST
CALMAT Co.	Saticoy Facility	OXNARD	4A562003001	5135	3	C	88-130	11/25/03	0.55	0.55	DMISCEL
Chevron U.S.A. Inc.	Pico Cyn Field,Newhall	NEWHALL	4A192113022	2659C	3	C	P 2224	6/27/75	0.00	0.00	DDRIBRI
Chevron U.S.A. Inc.	Haul, Placerita-Elsmere Area	NEWHALL	4A192113024	6654C	3	C	P 8460	2/24/98	0.00	0.02	DDRIBRI
Corwin, Wilson T.	Newhall Field, Hammon	NEWHALL	4A192142001	1719C	3	C	P 1820	6/23/72	0.00	0.00	DDRIBRI
Crown Central Petroleum Corp	Placerita Field,I-1480-7	NEWHALL	4A192449001	2208C	3	C	P 0234	6/13/89	0.00	0.00	DDRIBRI
Crown Valley Bldg. Supply	Crown Valley Bldg. Supply	ACTON	4A561052001	7087	3	C	91-097	9/5/06	0.00	0.00	DDOMEST
Curtis Sand and Gravel	Lang Station	CANYON COUNTRY	4A192030002	6332C	3	C	P 8093	5/19/92	0.00	0.00	DWSHWTR
Curtis Sand and Gravel	12101 Soledad Cyn Rd, Coper	SAUGUS	4A192438001	2016C	3	C	P 1958	5/19/92	0.00	0.19	DDREDGS
Exxon Co., U.S.A.	Castaic Junction Field	LOS ANGELES	4A192181008	1921C	3	C	P 1921	2/2/73	0.00	0.00	DDRIBRI
Fm H Partnerships L.P.	E Z Burger	ACTON	4A191145001	7040	3	C	91-055	4/18/06	0.00	0.00	DDOMEST
Foodmaker Inc.	Jack In The Box # 3304	ACTON	4A567000004	8311	3	C	01-031	2/22/06	0.00	0.00	DDOMEST
Freeway Chevron-Mr. Zsmat	Freeway Chevron-Mr. Zsmat	NEWHALL	4A191015003	6345C	3	C	P 8085	5/19/92	0.00	0.00	DWSHWTR
Gate King Properties Inc	Needham #1, Newhall Of	NEWHALL	4A192148001	6606C	3	C	P 8397	11/19/96	0.00	0.00	DDRIBRI
Goodyear Tire	Goodyear Tire	NEWHALL	4A192344002	6400C	3	C	P 8055	1/19/93	0.00	0.00	DWSHWTR
Grace Petroleum Corp	Placerita Oil Field	NEWHALL	4A192118001	6514C	3	C	P 8264	3/21/95	0.00	0.13	DDRIBRI
HR Textron Inc.	Valencia Facility	SANTA CLARITA	4A192332004	8029	3	C	99-055	6/30/04	0.01	0.00	NCNWTRS
ISCO Machinery	ISCO Machinery	ACTON	4A197000007	8367	3	C	01-031	2/22/06			
Jay Rabadi	Jay's Shell	CASTAIC	4A191029001	6349C	3	C	P 4752	5/19/92	0.00	0.00	DWSHWTR
JMT Oil Co	Placerita Oil Field	NEWHALL	4A192025002	6124C	3	C	P 1728	1/23/90	0.00	0.00	DDRIBRI
LA Co Fire Dept	Fire Camp #11, Acton	ACTON	4A190107079	5710	3	C	93-039	6/10/08	0.02	0.01	DDOMEST
LA Co Probation Dept	Joe Scott Boys Camp,Saugus Cop	SAUGUS	4A190107058	2157C	3	C	P 2026	12/14/73	0.00	0.00	DMISCEL
LA Co Probation Dept	Mendenhall-Munz,Co-Per 3433	LOS ANGELES	4A190107077	4756C	3	C	P 3433	11/15/79	0.00	0.00	DFILBRI

Los Angeles Regional Water Quality Control Board
Santa Clara River Watershed Wastewater Permits – Non-Chapter 15 (cont'd)

Discharger's Name	Facility Name	City	WDID #	CI #	Rating		Order #	Expiration	Design Q (MGD)	Baseline Q (MGD)	Waste Type
LA Co Sheriff Dept	Wayside, Brine Disp, Per 3573	CASTAIC	4A190107081	6151C	3	C	P 3573	7/17/90	0.00	0.01	DFILBRI
Liquor Store	Liquor Store	CASTAIC	4A191122006	6350C	3	C	P 8091	5/19/92	0.00	0.00	DMISCEL
Long Beach Oil Development Co.	Castaic & Hasely Cyn Fields	CASTAIC	4A192146001	6577C	3	C	P 8333	7/23/96	0.00	0.00	DDRIBRI
Long Beach Oil Development Co.	Haul, Hasley Cyn Oil Field	CASTAIC	4A192168001	6603C	3	C	P 8393	11/19/96	0.00	0.00	DDRIBRI
Matt Azizi	Unocal	CASTAIC	4A191037003	6509C	3	C	P 8249	3/21/95	0.00	0.00	DWSHWTR
Mcdonalds Coporation	McDonalds Restaurant	ACTON	4B197000003	8309	3	C	01-031	2/22/06			DDOMEST
Napa Auto Parts/CB Sales-Serv	Napa Auto Parts	SAUGUS	4A191013001	6337C	3	C	P 8115	5/19/92	0.00	0.00	DMISCEL
National Ready Mixed Concrete	Saugus Concrete Dealer	CANYON COUNTRY	4A191140001	6630C	3	C	P 8421	3/18/97	0.00	0.00	DWSHWTR
Newhall Refining Co., Inc	Inj Refinery Wastes,Deep Well	NEWHALL	4A192473003	6597C	3	C	P 8372	9/24/96	0.00	0.13	DPROCES
Rio Cafe	Rio Cafe	SANTA CLARITA	4A197000002	8284	3	C	01-031	2/22/06	0.00	0.00	NDOMEST
River Park A LLC	River Park A, LLC	VENTURA	4A567700004	8692	3	C	03-03DWQ	4/30/13			
SAM Entreprises	Tapia Cyn Field, Newhall	NEWHALL	4A192449002	6607C	3	C	P 8398	11/19/96	0.00	0.01	DDRIBRI
Sand Canyon Mobil	Sand Canyon Mobil	CANYON COUNTRY	4A191028001	6348C	3	C	P 8105	5/19/92	0.00	0.00	DWSHWTR
Sun Production Co	Newhall	NEWHALL	4A192310003	1920C	3	C	P 0197	5/19/92	0.00	0.11	DDRIBRI
Sweetwater Veterinary Clinic	Sweetwater Veterinary Clinic	AGUA DULCE	4A197000024	8489	3	C	01-031	2/22/06	0.00	0.00	DDOMEST
Termo Comany	Oak Canyon Field	CASTAIC	4A192162003	0014C	3	C	P 9110	1/7/66	0.00	0.00	DDRIBRI
The Master's College	The Master's College	SANTA CLARITA	4A197000027	8429	3	C	01-031	2/22/06	0.01	0.01	
The Village Church	The Village Church	NEWHALL	4B567000031	8526	3	C	01-031	2/22/06			DDOMEST
Thompson Oil Company	Thompson Oil Co.	SAUGUS	4A192439002	6646C	3	C	P 8449	10/21/97	0.00	0.00	DDRIBRI
Thousand Trails Inc.	Car Wash, Acton Coper	ACTON	4B199068001	6693C	3	C	P 8587	3/21/00	0.00	0.00	DWSHWTR
Truck & RV Sales	Truck & RV Sales	CANYON COUNTRY	4B197000005	8321	3	C	01-031	2/22/06	0.00	200.00	IDOMEST
Unocal Corp.	Sand Canyon Unocal 76	SAUGUS	4A192131006	6253C	3	C	P 8053	6/25/91	0.00	0.00	DWSHWTR
Ventura Regional San District	Toland Road Landfill	SANTA PAULA	4A567000008	8446	3	C	01-031	2/22/06			DDOMEST
Veterans of Foreign of the U.S	Veterans of Foreign Wars	CANYON COUNTRY	4A197000001	8264	3	C	01-031	2/22/06	0.00	0.00	DDOMEST
Watt Enterprises LP Ltd.	Building A, Santiago Square	ACTON	4A191144001	7039	3	C	91-054	4/18/06	0.01	0.01	DDOMEST

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Discharger's Name	Facility Name	City	Status	Order #	CI #	WDID #	Waste Type	Rating		Adoption Date	Expiration
Ventura Regional San District	Bailard Landfill	OXNARD	Closed	02-190	4035	4A560300001	NSLDWST	1	B	12/12/02	12/12/07
Ventura Regional San District	Toland Road Landfill	SANTA PAULA		02-023	5644	4A560306002	NSLDWST	1	B	1/24/02	1/24/07
Oxnard, City Of	Santa Clara Disp Site, Oxnard	OXNARD	Closed	02-191	5664	4A560306005	NSLDWST	1	B	12/12/02	12/12/07
A Republic Waste Services Co.	Chiquita Canyon Landfill	VALENCIA		98-086	6231	4A190359001	NSLDWST	1	B	11/2/98	11/2/03
Ventura Regional San District	Coastal Landfill	OXNARD	Closed	02-191	6548	4A560306004	NSLDWST	1	B	12/12/02	12/12/07
LA Co Sheriff Dept	Peter Pitches Landfill	SAUGUS	Closed	01-133	6198	4A190322001	NSLDWST	2	B	9/19/01	9/19/11
North Star Minerals, Inc.	Acton Clay Quarries	ACTON		02-189	8516	4B192624001		3	C	12/12/02	12/12/07
Agri Service, Inc	Agri Service, Newhall	NEWHALL		03-125	8642	4A191292001		3	C	9/11/03	9/11/08

Waste Types Categories (prior to treatment or disposal)

CNSOIL – contaminated soil
CNWTRS – contaminated groundwater
CONTAC – contact cooling water
DOMEST – domestic sewage
DOMIND – domestic sewage & industrial waste
DRILLS – drilling muds
FILBRI – filter backwash brine waters
MISCEL – dewatering, rec. lake overflow, swimming pool wastes, water ride wastewater, or groundwater seepage
NONCON – noncontact cooling water
PROCES – process waste (produced as part of industrial/manufacturing process)
STORMS – stormwater runoff
WSHWTR – washwater waste (photo reuse washwater, vegetable washwater)

Hazardous – influent or solid wastes that contain toxic, corrosive, ignitable, or reactive substances (prior to treatment or disposal) managed according to applicable Department of Health Services standards
Designated – influent or solid wastes that contain **nonhazardous wastes** (prior to treatment or disposal) that pose a significant threat to water quality because of their high concentrations (e.g., BOD, hardness, chloride). Manageable hazardous wastes (e.g., inorganic salts and heavy metals) are included in this category.
Nonhazardous – influent or solid wastes that contain putrescible and nonputrescible solid, semisolid, and liquid wastes (e.g., garbage, trash, refuse, paper, demolition and construction wastes, manure, vegetable or animal solid and semisolid wastes) (prior to treatment or disposal) and have little adverse impact on water quality
Inert – influent or solid wastes that do not contain soluble pollutants or organic wastes (prior to treatment or disposal) and have little adverse impact on water quality. Such wastes could cause turbidity and siltation. Uncontaminated soils, rubble and concrete are examples of this category.

Discharge “Ratings” are alphanumeric codes where:

“A” = Any major NPDES facility or any small-volume complex facility
“B” = Any facility having a physical, chemical, or biological waste treatment system (except for septic systems with subsurface disposal)
“C” = Any facility not included in “A” or “B”
“1” = Major threat to water quality
“2” = Moderate threat to water quality
“3” = Minor threat to water quality

Non-Chapter 15 WDRs were revised in 1993 to reflect 40 CFR

Water Quality Impairments

IMPAIRMENTS: The current list of impaired waters (Section 303(d) of the Clean Water Act) is from 2002. The 2006 list is close to being finalized and may include a large number of changes, particularly relating to adopted TMDLs. However, as of the date this report was finalized, the Santa Clara River Estuary and Beach is on the 303(d) list for coliform while a portion of the river upstream of the estuary is listed for ammonia and coliform. Portions of the river also have chloride exceedances. The Estuary is also listed for toxaphene and residual amounts of other legacy pesticides (ChemA) in fish tissue. Three small lakes in the watershed are also on the 303(d) list for eutrophication, trash, DO, and/or pH problems. Two major spills of crude oil into the river have occurred in the early 1990s although recovery has been helped somewhat by winter flooding events. Natural oil seeps discharge significant amounts of oil into Santa Paula Creek (CRWQCB, 2004).

The table below gives examples of typical data ranges which led to the 2002 303(d) listings; however a few TMDLs have been adopted since 2002 and implementation of them has begun so some of these data ranges may not be reflective of current conditions.

Impairments	**Applicable Objective/Criteria**	**Typical Data Ranges Resulting in Impairment**	**303(d) Listed Waters/Reaches**
chloride	Basin Plan numeric objective: 80 – 100 mg/l	10 – 138 mg/l (mean of 105 ± 21)	Sespe Creek (tributary to Santa Clara River Reach 3) Santa Clara River Reach 8 (W Pier Hwy 99 to Bouquet Cyn Rd Bridge) Santa Clara River Reach 7 (Blue Cut to West Pier Hwy 99) Santa Clara River Reach 3 (Freeman Diversion to A Street)
ammonia	Basin Plan narrative objective Basin Plan numeric objective: varies depending on pH and temperature but the general range is 0.53 – 2.7 mg/l of total ammonia (at average pH and temp.) in waters designated as WARM to protect against chronic toxicity and 2.3 – 28.0 mg/l to protect against acute toxicity	ND – 4.9 mg/l (mean of 1.4 ± 1.3)	Santa Clara River Reach 3 (Freeman Diversion to A Street)
nitrate + nitrite	Basin Plan numeric objective: no greater than 10 mg/l	0.3 – 15.4 mg/l (mean of 5.7 ± 2.4)	Wheeler Canyon/Todd Barranca Torrey Canyon Creek Brown Barranca/Long Canyon Mint Canyon Creek Reach 1 Santa Clara River Reach 7 (Blue Cut to West Pier Hwy 99)
org. enrichment/ low DO	Basin Plan narrative objective Basin Plan numeric objective: annual mean greater than 7.0 mg/l no single sample less than 5.0 mg/l	0.8 – 11.0 mg/l (mean of 7.7 ± 2.5)	Elizabeth Lake
pH	Basin Plan numeric objective: 6.5 – 8.5 pH units	7.3 – 9.6 pH units (mean of 8.5 ± 0.7)	Elizabeth Lake Piru Creek (tributary to Santa Clara River Reach 4) Sespe Creek (tributary to Santa Clara River Reach 3)
odors	Basin Plan narrative objective		Lake Hughes
coliform	Basin Plan numeric objective: Inland: fecal coliform not to exceed log mean of 200 mpn/100ml in 30-day period and not more than 10% of samples exceed 400 MPN/100ml Beaches: total coliform not to exceed 1,000 MPN/100ml in more than 20% of samples in 30 days and not more than 10,000 MPN/100ml at any time	20 – 24000 MPN/100ml	Santa Clara River Reach 8 (W Pier Hwy 99 to Bouquet Cyn Rd Bridge) Santa Clara River Estuary Santa Clara River Reach 7 (Blue Cut to West Pier Hwy 99) Santa Clara River Reach 9 (Bouquet Cyn Rd to abv Lang Gaging)

Impairments	Applicable Objective/Criteria	Typical Data Ranges Resulting in Impairment	303(d) Listed Waters/Reaches
sulfate	Basin Plan numeric objective: 600 mg/l	310 – 850 mg/l	Hopper Creek Pole Creek (tributary to Santa Clara River Reach 3) Wheeler Canyon/Todd Barranca
Total dissolved solids	Basin Plan numeric objective: 1300	630 – 1700 mg/l	Wheeler Canyon/Todd Barranca Hopper Creek Pole Creek (tributary to Santa Clara River Reach 3) Santa Clara River Reach 3 (Freeman Diversion to A Street)
Eutrophication	Basin Plan narrative objective		Elizabeth Lake Lake Hughes Munz Lake
algae	Basin Plan narrative objective		Lake Hughes
fish kills	Basin Plan narrative objective		Lake Hughes
trash	Basin Plan narrative objective		Elizabeth Lake Munz Lake Lake Hughes
ChemA*	National Academy of Science Guideline (tissue): 100 ng/g		Santa Clara River Estuary
toxaphene	State Board numeric objective (tissue): Max. Tissue Residue Level 9.8 ng/g		Santa Clara River Estuary

ChemA refers to the sum of the chemicals aldrin, dieldrin. Chlordane, endrin, heptachlor, heptachlor epoxide, HCH (including lindane), endosulfan, and toxaphene

COMPLETED TMDLS

- Chlorides (upper river) (2005)
- Nitrogen compounds (2004)

Surface Water Quality Data Summaries from Previous Reports

Note: Brief summaries of previous reports are included since often these reports provide very useful analyses based on data that are not, at times, available electronically; however, it should not be construed that these reflect current conditions. Reference to reports of groundwater quality is made due to the close linkage in this watershed between surface water and groundwater quality.

Concentrations of nitrates in wells within the Mint Canyon subarea and particularly the Sierra Pelona subarea in the upper watershed have frequently exceeded Basin Plan objectives. This is an area that uses onsite septic systems for waste disposal. The now closed Space Ordnance Systems facility was located in the Mint Canyon subarea and is now undergoing cleanup (CDWR, 1993).

There are borates that occur in association with the Vasquez Formation near Lang in the upper watershed that would produce high boron concentrations during runoff periods. Pico Creek (leading to South Fork) and other tributaries draining the Santa Susana Mountains are a source of the poor quality waters (sulfate and TDS) in the South Fork watershed due to the local geology. Drainage from the San Gabriel Mountains improves the quality of the South Fork surface waters which is reflected by data from Placerita Creek although the latter is an area of historic oilfields with which elevated boron may be associated. Tick Canyon, in particular, and Oak Springs Canyon contribute flows to the Santa Clara River that are high in boron concentrations (CDWR, 1993).

Tributary inflows that drain the gypsum-rich Tertiary marine sediments of the Ventura Basin, west of the San Gabriel fault, impact the river above Old Highway bridge in the Santa Clarita Valley. Flows from Potrero Canyon and San Martinez Grande Canyon have high TDS (up to

10,000 mg/l) and sulfate (up to 6,000 mg/l) and sodium, fluoride, and boron concentrations are also high (CDWR, 1993). *Author's note: However, volumes of these inflows are likely relatively low since sampling results for many decades at the Old Highway Bridge do not reveal high or even greatly variable concentrations of salts (see later discussion on results at long-term stations).*

Elizabeth and Hugh Lakes are essentially closed basin lakes subject to seasonal variations in runoff; they may dry up during droughts and their quality may be very saline at times (CDWR, 1993).

Castaic Lake and Lagoon has thermal stratification and biochemical process that strongly influence the water chemistry. Castaic receives State Water Project water and is sodium chloride in chemical character. Bouquet and Dry Canyon Reservoirs both receive imported waters from the Los Angeles Aqueduct (Mono-Owens water). Dry Canyon is operated as a flow-through reservoir and local sources are insignificant. Bouquet has ranged from sodium-calcium bicarbonate to sodium bicarbonate in character (CDWR, 1993).

Generally, the chemical character of Piru Creek waters has been calcium-magnesium sulfate. As in the Santa Clara River, with some low flows, the predominant cation becomes sodium and calcium become secondary. The high boron concentrations in the Piru Creek watershed are thought to be mainly from colemanite (a calcium borate mineral) deposits in Lockwood Valley and from Agua Blanca Creek. The boron in Agua Blanca Creek may come from the Agua Blanca thrust fault. The high sulfate concentrations are the result of the solution of sulfate minerals found in the sedimentary rocks that form the subarea (CDWR, 1989).

Further downstream near Gold Hill Road (Upper Piru HSA), concentrations of boron and sulfate continue to increase. Below Lake Piru, surface water quality within Piru Creek is affected by both releases from the dam and local runoff. Historically, concentrations of TDS ranged from 548 to 1,610 mg/l); sulfate ranged from 211 to 924 mg/l, and boron ranged from 0.24 to 1.07 mg/l. These values represent an improvement in water quality as a result of inflows of the SWP flows into Lake Piru. However, the concentrations of sulfate, boron, and TDS sometimes exceed state water quality criteria for beneficial uses. The high sulfate concentrations are attributed to the minerals found in the sedimentary rocks of the subwatershed. Minor tributaries within the subwatershed that flow only during and after rains contribute additional calcium sulfate waters (SCWRP website).

The chemical character of Sespe Creek is typically calcium-magnesium-sodium sulfate to calcium-sodium-magnesium sulfate. A distinctive feature of the Sespe HA is the Sespe Formation which contain petroleum resources. The source of boron in Sespe Creek appears to be, in part, inflows from Hot Springs Creek in the Topatopa HSA. The past practice of direct discharge of oilfield brines to Sespe and Tar Creeks may also be a continuing source of boron and chloride. There is poor water quality in Little Sespe Creek which flows in an area of oilfields (CDWR, 1989). Overall, surface water quality is usually of good quality and provides significant increases to the Santa Clara River flows and recharge to the basin's groundwater (SCWRP website). *Author's note: In fact, review of data from a long-term sampling site on the lower Sespe Creek (see later discussion on long-term stations) shows considerable variability in boron and chloride concentrations over the decades-long dataset.*

Nitrate is absent or occurs in very low concentrations in the undeveloped drainages north of the Santa Clara River. At the Freeman Diversion, nitrate concentrations are consistently low, with a range of 1-11 mg/l (as NO_3) measured during 2000. Unlike a number of other constituents, nitrate concentration correlates poorly with the rate of flow in the river. Elevated nitrate concentrations are observed at a number of surface-water sampling sites downstream of developed areas within the watershed. Samples ranged from 9-35 mg/l nitrate at Blue Cut near the Los Angeles County line. During dry periods, effluent from the Saugus and Valencia WRPs are two consistent sources of surface flow in the Santa Clara River east of the County line. *Author's note: In 2003, nitrification/denitrification requirements were implemented at the Saugus and Valencia WRPs which have reduced nitrogen concentrations in the effluent and receiving water.* Elevated nitrate concentrations were again documented in Todd Barranca, which converges with the Santa Clara River just downstream of the Freeman Diversion. Mixed land uses exist in the Todd Barranca/ Wheeler Canyon watershed, including citrus orchards, cattle and horses, and residences with septic tanks (UWCD, 2001).

As with nitrate, chloride concentrations tend to be relatively low in undeveloped portions of the watershed and elevated in other places due to human activities. Water reclamation plants are perhaps the best-documented source of chloride in the area. Water softeners, which are common to the area, elevate chloride concentrations considerably, loading approximately 6 to 20 pounds of salt per unit per week to wastewater. The County Sanitation Districts of Los Angeles County operate the Saugus and Valencia WRPs in Los Angeles County. The water supply in this area is a blend of local water and State Water Project supplies. The chloride concentration of water from the State Water Project is commonly higher than in local groundwater basins, and after beneficial use and treatment, the effluent discharged to the river may be considerably higher in chloride than local waters. Average chloride concentrations of effluent from the Saugus and Valencia WRPs during the 2000 water year were 148 and 170 mg/l, respectively. Chloride concentrations ranging from 80 to 137 mg/l were observed at Blue Cut during the water year 2000. *Author's note: Average chloride concentrations in the effluent from the Saugus and Valencia WRPs during the 2005 water year were 135 and 154 mg/l, respectively. Lower chloride concentrations have been observed at Blue Cut in recent years.* High chloride concentrations were observed downstream of the Santa Paula WRP during low flows of the Santa Clara River. Santa Paula uses local groundwater for its water supply, but water softeners in private homes are believed to be a significant source of the chloride arriving at the City's water reclamation plant. The average concentration of chloride in the city's effluent was 154 mg/l, and concentrations ranging from 30 to 122 mg/l were observed during the 2000 water year a short distance downstream of the plant's point of discharge (UWCD, 2001).

TDS is a measure of the total mineral content of a unit of water, and is commonly used to provide a general indication of the quality of water. There is often a strong correlation between TDS and sulfate concentrations. Sulfate is often the dominant anion in local waters due in part to the prevalence of marine sediments within the watershed. In general, up to half the TDS of local waters is from sulfate ions. Elevated TDS was observed in several of the smaller drainages that are monitored during water year 2000, such as Hopper Creek, Pole Creek and Todd Barranca. The relative TDS contribution from natural sources versus the influence of agriculture and other practices in these small watersheds is undetermined. Water flowing from the larger drainages of Piru, Sespe and Santa Paula Creeks have relatively low TDS concentrations (UWCD, 2001). *Author's note: TDS concentrations in Santa Paula Creek are at times a problem – see later discussion of dataset reviewed for this report.* Factors that may contribute to the lower water quality at times in Santa Paula Creek include high amounts of suspended clays, presence of natural oil and sulphur seeps (Sulphur Springs HSA), and high biological oxygen demand believed to originate from anthropogenic sources (septic system leacheate and recreational uses at Steckel Park) (SCWRP website). A summer 2000 sample from Santa Paula Creek was collected under low-flow conditions, and recorded a TDS value (1520 mg/l) higher than previously documented in this water body. Total mineral content of surface water generally increases as water flows down the Santa Clara River. However, the hydrology of the Santa Clara River is complex which complicates surface water quality analysis. Surface water recharges the upstream portions of the groundwater basins of the Santa Clara River Valley, and older, more-mineralized rising groundwater commonly discharges to the river near the downstream boundaries of the basins (UWCD, 2001).

Mud Creek introduces a significant amount of suspended solids to Santa Paula Creek. Flow through the porous, sedimentary rock substrate characteristic of Mud Creek results in year-round turbidity within Santa Paula Creek downstream of the confluence with Mud Creek. Land is also in agricultural use within the lower subwatershed (SCWRP website).

Thirty sites sampled under the State's Surface Water Ambient Monitoring Program (SWAMP), were randomly selected to provide a broad baseline of the overall health of the watershed. Additionally, to evaluate the condition of specific tributaries, directed sampling was conducted at the base of each tributary above its confluence with the mainstem of the river. A total of 38 sites were sampled, comprised of 30 randomly selected sites and 8 directed sites. Sampling began in 2001 with a second round in 2003. Some sites were sampled multiple times. The 30 random sites were sampled for field measurements (DO, pH, depth, temperature, velocity, conductivity, and turbidity), conventional water chemistry: nutrients (ammonia, chlorophyll a, nitrate, nitrite, and phosphate), salts (sulfate, chloride, TDS, and boron), as well as, toxicity, and bioassessment. The directed sites were sampled for the previous parameters as well as trace organics, bioaccumulation, water column and sediment metals, sediment grain size, and enzyme-linked immunosorbent assays (ELISAs) for chlorpyrifos and diazinon. One of the directed sites, Bouquet Canyon Creek, was sampled bi-weekly from August 2002 through August 2003 for chlorpyrifos and diazinon using ELISA (Kamer, 2005).

Concerns with conventional water quality parameters were seen at some sites. DO saturation was <90% at 15 of 38 sites, which were distributed throughout the watershed. pH was high at four sites. Inorganic N concentrations exceeded Basin Plan objectives at 7 sites, total and un-ionized NH_3-N at 3 sites, total NH_3-N at one site, un-ionized NH_3-N at one site, and NO_3-N at two sites. Four of the 5 sites where NH_3-N exceeded Basin Plan objectives were clustered along the mainstem of the river; NO_3-N concentrations exceeded 1 mg/l in the same area. *Author's note: as mentioned previously, the Saugus and Valencia WRPs started nitrification/denitrification treatment which has resulted in reduced levels of nitrogen within the river at Reaches 5 and 6.* PO_4-P concentrations exceeded USEPA recommended concentrations at 13 sites. TDS concentrations exceeded Basin Plan objectives at 12 sites, many of which were in the Santa Paula and Piru subwatersheds. Sulfate exceeded Basin Plan objectives at 10 of the 12 sites where TDS was elevated. Chloride was elevated at 7 sites in the eastern half of the watershed and boron was elevated at three sites on Piru Creek (Kamer, 2005).

Metals in sediment, tissue and water were only measured at the tributary sites. However, if metals are found in these matrices at the bottom of subwatersheds sites at levels exceeding criteria or guidelines, it suggests that metals pollution may occur throughout the subwatershed. Water column aluminum concentrations exceeded USEPA criteria for toxicity to aquatic life at 4 sites but aluminum was not present at elevated levels in sediments or tissues. Tissue samples showed bioaccumulation of arsenic at levels exceeding Office of Environmental Health Hazard Assessment (OEHHA) screening values and USFWS guidelines at seven sites, and copper was also elevated at one of these sites (in Bouquet Canyon). Sediment metals were elevated above sediment quality guidelines at three sites: cadmium in Piru Creek, copper and lead in Castaic Creek, and a suite of metals in San Francisquito Canyon. Compared to other samples and sediment quality guidelines, sediment metals were very high in San Francisquito Canyon, which is downstream of a reservoir treated with metals to control biofouling. Sediment, tissue and water samples each indicated different metals that may be of concern (Kamer, 2005).

Organic compounds were also only measured at tributary sites. Similar to metals, the presence of organic compounds in water samples from tributary sites at levels exceeding established objectives suggests that organics pollution also occurs throughout the subwatershed. DDT and PCBs exceeded established criteria at all the integrator sites. Chlordane was elevated at three sites. Chlorpyrifos and diazinon were elevated Bouquet Canyon along with azinphos methyl, and they were elevated in Castaic Creek along with mirex. Chlorpyrifos was elevated at the estuary site, and diazinon and PAHs were elevated at Blue Cut. Sediments were analyzed for organics at only two sites: none were found in Bouquet Canyon, but DDE (p,p') and DDT (p,p') were elevated relative to sediment quality guidelines in the estuary. No organics in tissues were elevated above OEHHA screening values (Kamer, 2005).

Toxicity occurred at thirteen of the randomly-selected sites in the watershed and was primarily limited to two areas: the mainstem of the river and the northern portion of the Piru Creek subwatershed. The cause of toxicity at many of these sites is unknown because metals and organics were not sampled at the random sites. Toxicity was detected in samples from only two subwatershed sites: Bouquet Canyon and estuary. A number of factors could have contributed to toxicity at Bouquet Canyon but the toxicity identification evaluation (TIE) indicated that diazinon was the probable cause of toxicity. At the estuary, toxicity may have been caused by DDT, PCBs, chlorpyrifos, or arsenic (Kamer, 2005).

The bioassessment data indicate that ecological condition was at least fair at about half of the sites, with the condition at the other half being poor or very poor. Index of Biological Integrity (IBI) scores were Good at 6 sites, Fair at 13 sites, Poor at 11 sites and Very Poor at 7 sites. One site was not sampled for benthic invertebrates. At 41% of sites where IBI scores were low, chronic or acute toxicity was detected, however, toxicity was also detected at 37% of sites with Fair and Good IBI scores. Toxicity is not a likely cause of poor benthic community condition at the subwatershed sites, many of which had Very Poor or Poor IBI scores, because samples from only two of these 8 sites indicated toxicity. Other influences on benthic community structure throughout much of the watershed are unknown because metals and organics were not sampled at the random sites. It is also unlikely that decreased DO availability contributed to poor benthic community structure because 6 of the randomly selected sites with DO < 90 % saturation had fair or good IBI scores (Kamer, 2005). *Author's note: Some of the bioassessment sampling occurred soon after major winter storms which likely had some impact on the results. Additionally, some researchers have found a link between poor benthic community condition and invasive plants such as Arundo and Tamarisk which are found in abundance within the mainstem of the river.*

Los Angeles County sampled the benthic community in November 2003 in the unlined portion of the Santa Clara River at The Old Road as part of their stormwater monitoring program. The IBI score for the site rated it as a poor site which is the same result found at the nearest SWAMP station sampled both in spring of 2001 and 2003 (BonTerra Consulting, 2004).

Discussion of Combined Surface Water Quality Dataset

Note: This discussion is based on all readily available electronic data that could be acquired with a reasonable amount of effort and that included locational information, preferably latitude and longitude, rather than simply descriptive station names. In some cases it includes datasets upon which some of the above report summaries were based, but in most cases the data are not necessarily associated with formal reports. As is discussed further below, some datasets go back to the 1920s for a few constituents at a few sites (mostly collected by water districts) while others are sporadic over a shorter period of time. Some of the more consistent and widespread data were collected by the California Department of Water Resources but, presumably due to budget cuts, these data end at most sites in the late 1980s/early 1990s. The Regional Board also had an extensive network of sampling locations in this watershed maintained into the early 1990s when budget shortfalls resulted in similar reductions in sampling (eventually replaced by the Surface Water Ambient Monitoring Program which rotates between watersheds on a five-year cycle). Water districts and sanitation agencies have maintained focused sampling in their areas' of interest for many years. This data collection effort co-occurred with that being conducted for development of the Santa Clara River Comprehensive Monitoring Plan. The two efforts resulted in databases that are similar but not the same; however, since each effort was undertaken with different products as a desired end-point, the efforts should be viewed as complementary and additive.

Graph scales were set to display ranges of concentrations in a similar manner among graphs displaying the same constituent (generally ranging around concentrations of interest such as water quality objectives) within a particular Reach or at a long-term sampling station. Since some graphs are based on data exhibiting extreme variability, this has resulted in occasional excursions of graph lines outside of the main body of the graph. Not all of the graphs created are referenced in this report; they are, however, in the Excel data files which are available. All nitrate as NO3 data were converted to nitrate as N data using a multiplier of 0.226.

General Discussion

It is clear that the mainstem of the Santa Clara River has lower quality water than most of its large tributaries. For many constituents, concentrations increase from the top to the bottom of the mainstem. Figure 6 shows the trend with sulfate as an example. The reverse is occurring, however with chloride and nitrate (Figures 7 And 8). Additionally, almost all of the SWAMP bioassessment sites in the mainstem exhibited poor quality benthic invertebrate communities (low Index of Biological Integrity (IBI) scores) while tributary sites were generally marginal or good with a few exceptions (Figure 9). However, some of the SWAMP sampling took place after a major storm event and the benthic invertebrate communities may not have had a chance to recover, particularly in the mainstem which carries very large flows during storms. Limited sampling has taken place in Todd Barranca, a smaller tributary, but what little data there are indicates potentially serious water quality problems (see Figure 6).

As mentioned previously, the groundwater component in the river can be quite large which results in a major presence of sulfate in surface waters in areas of rising groundwater; these occur above Santa Paula Creek (Reach 9) and near Todd Barranca (Reach 2, downstream of Freeman Diversion) and may help explain the high TDS values and correspondingly high sulfate numbers in these areas, at times exceeding Basin Plan objectives (Figure 10).

Despite their comparatively good overall water quality, there are elevated levels of salts in some large tributaries which may be in some cases from natural sources or in others may be remnant discharges of brine from abandoned oilfields. Chlorides are elevated in Sespe (Reach 10), for example, and Sespe Creek is 303(d)-listed as impaired for chloride (Figure 11).

The SWAMP sampling found water column toxicity at sites sampled in the mainstem of the river during 2001 and 2003, the northern portion of the Piru Creek subwatershed, Bouquet Canyon, and in the estuary. Toxicity identification evaluations found that diazinon was the probable cause of toxicity in Bouquet Canyon while toxicity in the estuary may have been caused by DDT, PCBs, chlorpyrifos, or arsenic. DDT and PCBs would have been used historically in the watershed but they are very persistent chemicals and the estuary will be a site of some deposition after storms so their presence at that site would not be considered unusual. Diazinon and chlorpyrifos are both water-soluble pesticides used for ant/termite control around residential and agricultural areas; as of the end of 2004, diazinon can no longer be sold for residential use. Both aluminum and arsenic may have anthropogenic sources but they are also natural in origin and are found in the soil.

Although somewhat variable throughout the watershed, pH levels do not appear to be a problem. Supersaturation of oxygen may be occurring at some locations which may cause respiratory problems in aquatic organisms. Dissolved oxygen results are highly dependent on the time of day sampling occurs so results may be quite variable due to the sampling approach. On the other hand, it is clear that nitrate concentrations in the mainstem are higher than a USEPA guideline for unimpacted streams of 1.0 mg/l (NOAA, 1988) (Figure 12).

Discussion of Dataset by Basin Plan Reach

Mineral objectives are established by Reach and are a reflection of local geologic conditions. Data collected in each Reach since 1990 were evaluated against the objectives utilizing however many sample locations happened to be in each Reach. Some Reaches had much less data than others (for the most part, no sampling programs collected data with the goal of evaluating water quality by Reach). Data available over a longer period of time were used to evaluate long-term trends in Reaches. This, however, is not an official Water Quality Assessment, merely a point of discussion. It should be noted that the Reach designations described here are as they appear in the Basin Plan; some Reaches may be described differently in the current 303(d) list.

- Reach 2; includes Todd Barranca and mainstem below Freeman Diversion down to Highway 101 bridge
    - Sulfate (BP objective 600 mg/l)
        - 1997 to 2000 – all above objective; this Reach is currently listed as impaired for sulfate
    - TDS (BP objective 1200 mg/l)
        - 1997 to 2000 – all above objective; this Reach is currently listed as impaired for TDS
    - Nitrate (as N) (BP objective 10 mg/l)
        - 1993 to 2000 – highly variable with some samples over 10 mg/l; this Reach is currently listed as impaired for nitrate + nitrite

- Reach 3; includes the mainstem from above Freeman Diversion to just above Sespe Creek as well as the lower stretches of Santa Paula and Sespe Creeks
    - Chloride (BP objective 100 mg/l)
        - 1990 to present – underlying trend line is below 100 mg/l but multiple spikes over 100 mg/l in late 1990s and early 2000s; this Reach is currently listed as impaired for chloride
        - Longer-term – early 1980s below objective then generally an increasing trend
    - Sulfate (BP objective 650 mg/l)
        - 1990 to present – highly variable but mostly below objective; exceedances mostly in summer; this Reach is currently listed as impaired for sulfate
    - TDS (BP objective 1300 mg/l)
        - 1990 to present – highly variable; many above objective (Figure 13); this Reach is currently listed as impaired for TDS
    - Nitrate (as N) (BP objective 5 mg/l)
        - 1990 to present - some high spikes over 5 mg/l in early 2000s, all in the lower stretch of Santa Paula Creek (Figure 14)
        - Longer-term – underlying trend is gradual increase from 1950s to 1970s then gradual decrease (mostly under 5 mg/l)

- Reach 4; includes the mainstem from just above Sespe Creek to just before the County Line as well as Hopper Canyon Creek and the lower stretch of Piru Creek
    - Chloride (BP objective 100 mg/l)
        - 1990 to present – some exceedances in early 1990s then low concentrations until 2004 (Figure 15)
        - Longer-term - data exist from 1929; high concentrations start in 1950s
    - Sulfate (BP objective 600 mg/l)
        - 1990 to present – highly variable but generally below objective; Hopper Cyn Creek in this Reach is currently listed as impaired for sulfate
    - TDS (BP objective 1300 mg/l)
        - 1990 to present – variable with a few over the objective; Hopper Cyn Creek in this Reach is currently listed as impaired for TDS
    - Nitrate (as N) (BP objective 5 mg/l)
        - 1990 to present - low concentrations until higher spikes close to 5 mg/l beginning in 2003 (Figure 16); Torrey Cyn Creek in this Reach is currently listed as impaired for nitrate + nitrite
        - Longer-term – data exist from 1952; consistently low concentrations (mostly below 1 mg/l) throughout until 2003

- Reach 5; includes the mainstem from just west of the County Line to the I-5 freeway bridge as well as the Castaic Creek subwatershed
    - Chloride (BP objective 100 mg/l)
        - 1990 to present – gradual increase from some exceedances to mostly all exceeding; this Reach is currently listed as impaired for chloride
    - Sulfate (BP objective 400 mg/l)
        - 1990 to present – variable but generally below objective
    - TDS (BP objective 1000 mg/l)
        - 1990 to present – variable with a few over the objective
    - Nitrate (as N) (BP objective 5 mg/l)
        - 1990 to present – highly variable with many spikes over 5 mg/l; the more recent concentrations have been much lower (below 5 mg/l); this Reach is currently on the 2002 303(d) list for nitrate + nitrite
        - Longer-term – data exist from 1951; highly variable, underlying trend is gradual increase starting in early 1960s until decrease starting in early 2000s; many high spikes in later years of over 5 mg/l

- Reach 6; includes a short section of the mainstem between San Francisquito and Bouquet Canyon Creeks as well as those subwatersheds and the South Fork
    - Chloride (BP objective 100 mg/l)
        - 1990 to present – gradual increase over time; now mostly exceedances (Figure 17); this Reach is on the 2002 303(d) list as impaired for chloride
    - Sulfate (BP objective 300 mg/l)
        - 1990 to present – mostly below objective; more variable recently (past year) and more exceedances
    - TDS (BP objective 1000 mg/l)
        - 1990 to present – mostly below objective
    - Nitrate (as N) (BP objective 10 mg/l)
        - 1990 to present – all below 10 mg/l
        - Longer-term – data exist from 1951; gradual increase from 1950s into 1970s when results became extremely variable, then gradual decrease beginning in early 1980s; many samples over 10 mg/l in 1970s but below 10 mg/l beginning in 1990s

- Reach 7; includes the mainstem from Bouquet Canyon Creek to the Lang gauging station as well as Mint and Pole Canyon Creeks
    - Sulfate (BP objective 150 mg/l)
        - 1997 to present – mainstem sites all exceed the objective while Pole Creek sites are below objective
    - TDS (BP objective 800 mg/l)
        - 1997 to present – mainstem stations mostly over objective while Pole Creek below objective

- Reach 9; includes the upper stretches of the Santa Paula Creek subwatershed
  - Chloride (BP objective 45 mg/l)
    - 1990 to 1999 – few data, some exceedances
    - Longer-term – data exist from 1963; a lot of variability with many exceedances
  - TDS (BP objective 600 mg/l)
    - 1990 to present – few samples; gradual decreasing trend but most samples over 600 mg/l (Figure 18)
  - Nitrate (as N) (BP objective 5 mg/l)
    - 1990 – 1999 – low concentrations throughout
    - Longer-term – data exist from 1963; low concentrations throughout, generally below 1 mg/l

- Reach 10; includes the upper stretches of the Sespe Creek subwatershed
  - Chloride (BP objective 60 mg/l)
    - 1990 to 2000 – few data, about half exceedances
    - Longer-term – data exist from 1962; a lot of variability, about half exceedances
  - TDS (BP objective 800 mg/l)
    - 2001, 2003 – very few samples, some over 800 mg/l
  - Nitrate (as N) (BP objective 5 mg/l)
    - 1990 to 2000 – very low concentrations throughout (below 1 mg/l) (Figure 19)

- Reach 11; includes the Piru Creek subwatershed above Santa Felicia Dam
  - Chloride (BP objective 60 mg/l)
    - 1990 to present – few data points; decrease over time, few recent exceedances (Figure 20)
  - Sulfate (BP objective 400 mg/l)
    - 1990 to present – variable and mostly below objective except for some samples upstream of Pyramid Lake
  - TDS (BP objective 800 mg/l)
    - 1990 to present – mostly below objective except for some samples at sites above Pyramid Lake
  - Nitrate (as N) (BP objective 5 mg/l)
    - 1990 to 2000 – generally low concentrations throughout (below 1 mg/l) except for a few spikes

Discussion of Historical Trends in Constituents at Long-Term Stations

"Long-term" is generally defined here as a site started in the 1970s (or earlier) and sampled at least yearly until present day or at least into the late 1990s. Some long-term sites were only sampled for certain constituents long-term and the frequency may have been quite variable. Some mainstem sites appeared to be popular multi-agency sites due to jurisdictional boundaries, geologic conditions, or easy access (although with little apparent coordination between agencies). Data from these multi-agency sites were grouped together. DWR and UCWD maintained the longest record of data at a very few long-term sites (some starting as early as the 1920s). A caveat is that this analysis likely does not include all the electronically available data; in addition, it is possible considerable amounts of older data are only available in paper copy; no attempt was made to locate any non-electronic copies of data. There are only about 9-10 stations in the watershed that can be termed "long-term" as defined above. Many long-term stations are located adjacent to water diversions or at reservoir release points and, as might be expected, many constituents sampled are related to water supply protection. This positioning of sample sites could of course skew the results due to a predominance of imported water in these areas. A number of these long-term stations are on the mainstem while a few are adjacent to water facilities on Piru and one each is on lower Sespe and Santa Paula. Only DWR and the Regional Board had sites in the upper parts of the subwatersheds and none of these were long-term or consistent over time. Looking at long-term stations can be useful for gathering trend information, particularly with regards to salts and nutrients, and possibly establish some historical baselines but it is infeasible for comparing against water quality objectives due to the age of the data. However, looking at these results and the pattern of sampling may serve to demonstrate the extremely uncoordinated nature of sampling in this watershed over the years and the opportunity to assemble a more effective dataset in the future as is now being pursued through the development and implementation of a comprehensive monitoring plan for the watershed..

With regards to nitrates, it's clear the major tributaries have maintained consistently low concentrations over the long-term with little variability; higher concentrations and considerable variability are common to the mainstem stations. The salts in the watershed, however, have been much more variable both in the tributaries and in the mainstem. This widespread variability appeared to decrease beginning in the late 1960s/early 1970s following the prohibition of the surface discharge of industrial brines and passage of the federal Clean Water Act in 1972.

Nitrate (as N)

- At Old Highway 99 Bridge DWR Site Z2170200
    - Sampled from 1967 – 1998; monthly, then quarterly, and later semiannually
    - Extremely variable (many high spikes) in mid to late 1970s
    - Much less variable and lower concentrations (below 10 mg/l) after early 1980s; concentrations drop greatly in late 1990s (Figure 21)

- At County Line DWR Site Z3113500 and UWCD Site 4N17W29SW1 (04N17W29SW1)
    - Sampled from 1951 – 2005, mostly monthly
    - Low concentrations early on then general increasing trend starting in early 1960s with a decreasing trend beginning around 2002
    - A few high spikes close to 10 mg/l

- Above Lake Piru DWR Site Z2348000 and UWCD Site 5N18W10SW1 (but below Pyramid Lake)
    - Sampled from 1957 – present, quarterly
    - Generally low concentrations (below 1 mg/l) with little variability except for a few high spikes in summer

- At Lake Piru DWR Site Z2337500 and UWCD Site 4N18W03SW1
    - Sampled from 1957 – 1998, monthly then quarterly
    - Very low concentrations (below 1 mg/l) with little variability

- Below Lake Piru DWR Site Z2324000 and UWCD Site 4N18W03SW2
    - Sampled from 1952 – 2000, monthly
    - Low concentrations (generally below 1 mg/l) with little variability

- Sespe Creek at Gage (Fillmore) DWR Site Z2215000 and UWCD Site 4N20W24SW1
    - Sampled from 1951 – present, monthly to quarterly
    - Low concentrations (generally below 1 mg/l) with little variability

- Santa Paula Creek at Gage DWR Site Z2130000
    - Sampled from 1963 – 1991, monthly or quarterly until early 1970s then infrequently
    - Low concentrations (generally below 1 mg/l) with little variability

- Mainstem at Santa Paula 12th St Bridge DWR Site Z2136010 and UWCD Site 3N21W14SW1 (latter site sampled by City of Santa Paula for NPDES permit)
    - Sampled from 1951 – present, generally monthly
    - Variable with concentrations increasing from the 1950s into the 1970s then decreasing in the 1990s
    - Mostly 1 – 4 mg/l

- At Freeman Diversion UWCD Site 3N21W32SW1 (03N21W32SW1)
    - Sampled from 1936 –present; biweekly, monthly, or quarterly
    - Data mostly clumped in 1930s, 1960s, and 1990s to present
    - Concentrations trend somewhat higher over time but generally below 3 mg/l

Boron

- At Old Highway 99 Bridge DWR Site Z2170200
    - Sampled from 1967 – 2000, quarterly into early 1990s then semiannually
    - Somewhat variable but generally below 1.0 mg/l in recent years

- At County Line DWR Site Z3113500, UWCD Site 4N17W29SW1 (04N17W29SW1), and Regional Board Site 403SC76000
    - Sampled from 1951 – 2005, monthly initially then quarterly
    - Highly variable up to early 1970s with many samples over 1.0 mg/l, thereafter below 1.0 mg/l

- Below Lake Piru DWR Site Z2324000
    - Sampled from 1961 – 2000, quarterly
    - Quite variable but in later years generally below 1.0 mg/l

- Sespe Creek at Gage (Fillmore) DWR Site Z2215000 and UWCD Site 4N20W24SW1
    - Sampled from 1951 – 2001, monthly to quarterly
    - Very variable (near zero to over 3 mg/l) with no pattern

- Santa Paula Creek near gage DWR Site Z2130000 and UCWD Site 4N21W34SW1
    - Sampled from 1963 – 2003 (mostly in 1960s), monthly through early 1970s, then infrequently
    - Less variable in recent years and below 0.5 mg/l

- Mainstem at Santa Paula 12th St Bridge DWR Site Z2136010
    - Sampled from 1951 – 2000, monthly then quarterly through 1991, then infrequent
    - Somewhat variable but generally below 1.0 mg/l

- At Freeman Diversion UWCD Site 3N21W32SW1 (03N21W32SW1)
    - Sampled from 1984 – 2005, quarterly
    - Some variability but lower concentrations recently (below 1.0 mg/l)

Total Dissolved Solids

- At Old Highway 99 Bridge DWR Site Z2170200 and Regional Board Site 403SC76000
    - Sampled from 1967 – 2000, quarterly until mid-1990s then infrequent
    - Quite variable until early 1980s then in 750 mg/l range

- At County Line DWR Site Z3113500 and UWCD Site 4N17W29SW1 (04N17W29SW1)
    - Sampled from 1953 – 2005, monthly or quarterly at times
    - Extremely variable until early 1970s then gradual downward trend of mostly below 1,000 mg/l (Figure 22)

- Below Lake Piru DWR Site Z2324000
    - Sampled from 1961 – 2000, quarterly
    - Some variability but generally below 1,000 mg/l

- Sespe Creek at Gage (Fillmore) DWR Site Z2215000 and UWCD Site 4N20W24SW1
    - Sampled from 1951 – present, monthly to quarterly
    - Variable in 1960s then less so (under 1000 mg/l generally)

- Santa Paula Creek near Gage DWR Site Z2130000 and UCWD Site 4N21W34SW1
    - Sampled from 1963 – 2000, quarterly
    - Low variability; generally below 1000 mg/l

- Mainstem at Santa Paula 12th St Bridge DWR Site Z2136010 and UCWD Site 3N21W14SW1 (latter site sampled by City of Santa Paula for NPDES permit)
    - Sampled from 1951 –present, quarterly
    - Extremely variable until early 1970s
    - Then less variable and generally below 1500 mg/l

- At Freeman Diversion UWCD Site 3N21W32SW1 (03N21W32SW1)
    - Sampled from 1925 – present; biweekly, monthly, or quarterly
    - Quite variable with no trend; concentrations tied to flows
    - Generally below 1500 mg/l

Sulfate

- At Old Highway 99 Bridge DWR Site Z2170200 and Regional Board Site 403SC76000
    - Sampled from 1967 – 2000 (one sample from 1951), monthly then quarterly to infrequent in later years
    - Quite variable until early 1980s then generally around 200 mg/l

- At County Line DWR Site Z3113500 and UCWD Site 4N17W29SW1 (04N17W29SW1)
    - Sampled from 1951 – 2005, monthly then quarterly
    - Extremely variable until early 1970s
    - Trending downward somewhat since then
    - Recently mostly below 400 mg/l

- Below Lake Piru DWR Site Z2324000 and UWCD Site 4N18W03SW2
    - Sampled from 1961 – 2000, monthly then quarterly
    - Some variability but mostly below 300 mg/l
    - Downward trend (slight) since 1960s

- Sespe Creek at Gage (Fillmore) DWR Site Z2215000 and UWCD Site 4N20W24SW1
    - Sampled from 1951 – present, monthly to quarterly
    - Fairly variable until early 1970s then below 400 mg/l

- Santa Paula Creek near Gage DWR Site Z2130000 and UWCD Site 4N21W34SW1
    - Sampled from 1963 – 2000, monthly then quarterly to semiannually
    - Low variability; generally around 300 mg/l

- Mainstem at Santa Paula 12th St Bridge DWR Site Z2136010 and UWCD Site 3N21W14SW1 (03N21W12SW1) (latter site sampled by City of Santa Paula for NPDES permit)
    - Sampled from 1951 – present, generally monthly
    - High variability with slight downward trend
    - Mostly 300 – 600 mg/l

- At Freeman Diversion UCWD Site 3N21W32SW1 (03N21W32SW1)
    - Sampled from 1925 – present, biweekly, monthly, or quarterly
    - Data mostly clumped in 1930s, 1960s, and 1990s to present
    - High variability with slight downward trend
    - Mostly 300 – 600 mg/l

Chloride

- At Old Highway 99 Bridge DWR Site Z2170200
    - Sampled from 1967 – 2000, monthly then quarterly
    - High variability until early 1980s
    - Upward trend into early 1990s, then downward trend
    - Now mostly below 100 mg/l (Figure 23)

- At County Line and Near Blue Cut DWR Site Z3113500 and UCWD Site 4N17W29SW1 (04N17W29SW1)
    - Sampled from 1951 – 2005, mostly monthly
    - Extreme variability and very high concentrations (over 300 mg/l) until early 1970s
    - Upward trend since then; now mostly over 100 mg/l (Figure 24)

- Below Lake Piru DWR Site Z2324000 and UWCD Site 4N18W03SW2
    - Sampled from 1961 – 2000, monthly or quarterly
    - Some variability over the long-term with a major peak in late 1980s/early 1990s
    - Except for peak, generally below 50 mg/l

- Sespe Creek at Gage (Fillmore) DWR Site Z2215000 and UCWD Site 4N20W24SW1
    - Sampled from 1951 – present, quarterly
    - High variability with no trend
    - From 20 – 200 mg/l (Figure 25)

- Santa Paula Creek near Gage Paula DWR Site Z2130000 and UWCD Site 4N21W34SW1
    - Sampled from 1963 – 2000, quarterly
    - Some variability but generally below 50 mg/l

- Mainstem at Santa Paula 12th St Bridge DWR Site Z2136010 and UWCD Site 3N21W14SW1 (03N21W12SW1) (latter site sampled by City of Santa Paula for NPDES permit)
    - Sampled from 1951 – present, generally monthly
    - Some variability; mostly between 50 – 100 mg/l

- At Freeman Diversion
    - Sampled from 1925 – present; biweekly, monthly, or quarterly
    - Data in clumps mostly from 1930s, 1960s, and 1990s to present
    - Slight upward trend over time with considerable variability
    - Mostly below 100 mg/l

Hardness

- At Old Highway Bridge 99 DWR Site Z2170200
    - Sampled from 1971 – 2000, monthly then quarterly
    - High variability until early 1980s then mostly below 400 mg/l

- At County Line DWR Site Z3113500 and UCWD Site 4N17W29SW1 (04N17W29SW1)
    - Sampled from 1970 – 2000, quarterly
    - High variability but mostly downward trend to a little above 400 mg/l

- Below Lake Piru DWR Site Z2324000
    - Sampled from 1970 – 2000, quarterly
    - Some early variability but mostly around 400 mg/l

- Sespe Creek at Gage (Fillmore) DWR Site Z2215000
    - Sampled from 1970 – present
    - Little variability; around 400 mg/l

- Santa Paula Creek near Gage DWR Site Z2130000
    - Sampled from 1970 – 2000
    - Some variability; mostly around 300 mg/l

- Mainstem at Santa Paula 12th St Bridge DWR Site Z2136010
    - Sampled from 1970 – 2000, quarterly
    - Considerable variability around 600 mg/l

- At Freeman Diversion UWCD Site 3N21W32SW1 (03N21W32SW1)
    - Sampled from 1984 – present, quarterly
    - Considerable variability around 600 mg/l

Recommendations for Future Water Quality Monitoring

Figure 26 shows the sampling sites of multiple agencies. It is clear that sampling sites over the years have been highly clumped in certain locations of the mainstem. Until recently, sampling sites have rarely been located in the tributaries except near water diversions. As mentioned previously, this is partly due to the greatly differing goals of the monitoring agencies, ranging from evaluating raw surface water destined to become drinking water after infiltration, to the need to follow receiving water monitoring programs developed by the Regional Board that focus on compliance. The Regional Board had at one time a widespread network of fixed sites used to evaluate support of beneficial uses; the random sampling approach being taken by SWAMP now takes its place, albeit on a five-year rotating schedule.

A report prepared by AMEC Earth & Environmental, Inc. in March 2006 describes the spatial clustering of recent sampling locations largely due to requirements of various permits. Although not utilizing exactly the same dataset as this report (since the purposes of the report were somewhat different, including setting the stage for a recommended comprehensive monitoring program through identification of data gaps), the AMEC report also notes the widely disparate types, locations, and frequencies of data collected and similarly cautions against the dataset's use in a detailed analysis. A preliminary sampling design of monthly sampling at 38 sites is presented in the report which encourages the distribution of monitoring costs among a number of agencies currently conducting monitoring. A group of agencies and organizations is currently meeting to develop a final sample design. It is hoped by combining the resources of multiple agencies to develop a monitoring program with agreed-upon goals, while eliminating duplicative monitoring sites, the result will be a combined dataset more easily utilized for assessment and protection of the watershed's water resources (AMEC, 2006).

A tremendous amount of time and effort was needed to track down and consolidate electronically-available data for this report and present it in such a way that surface water quality trends could be characterized despite the differing monitoring goals associated with the data. This effort has been only partially successful but clearly points out the great need for the coordinated monitoring and consolidated reporting work which is underway.

As finalization of this report was occurring during September and into early October, a large part of the watershed in the Los Padres National Forest was burning from a massive brushfire. Water quality will likely be dramatically altered in the near-term following storms. It is hoped coordinated monitoring by the watershed's interested parties will document what changes do occur.

Regional Board Activities Addressing Water Quality Issues

Conditional Waiver for Irrigated Lands

The California Water Code authorizes State and Regional Water Quality Control Boards to conditionally waive waste discharge requirements (WDRs) if this is in the public interest. Over the years, the Regional Water Boards issued waivers for over 40 categories of discharges. Although waivers are always conditional, the historic waivers had few conditions. In general, they required that discharges not cause violations of water quality objectives, but did not require water quality monitoring. Senate Bill 390, signed into law on October 6, 1999, required the Regional Water Boards to review their existing waivers and to renew them or replace them with WDRs. Under SB 390, waivers not reissued automatically expired on January 1, 2003. To comply with SB 390, the Regional Water Boards adopted revised waivers.

The Los Angeles Regional Water Quality Control Board adopted the Conditional Waiver for Irrigated Lands at its November 3, 2005, Board meeting.

Statewide monitoring has shown the presence of chemicals associated with agriculture operations in waters of the state. And, in Ventura County, the Regional Board has observed water quality impairments related to agriculture. Under Section 13269 of the Porter Cologne Water Quality Control Act, waivers are appropriate when they are consistent with other water quality control plans and are in the public interest and are not to exceed 5 years in duration. The overall goal of the Conditional Waiver program is to improve and protect water quality in the Region through extensive water quality monitoring and implementation of Best Management Practices (BMPs). If the monitoring results show an exceedance of a water quality benchmark, development of a Water Quality Management Plan (WQMP) is triggered which will include the implementation of BMPs to mitigate the impairment.

The first year has focused on enrollment and initiation of the program and identified the location of the Dischargers and monitoring sites. Once enrollment documents are reviewed, the Regional Board's Executive Officer will issue the Notice of Applicability (NOA), which is the formal notice that the enrollment documents are approved. The NOA will be issued to enrollees by December 31, 2006 and water quality monitoring will start in January 2007.

Dischargers can enroll in the program as an Individual or as a member of a Discharger Group. The majority of growers have enrolled as members of a Discharger group. The waiver program also requires 8 hours of educational training for growers.

There are currently two established Discharger Groups participating in the Conditional Waiver program. The Group representing growers in Ventura County is the Ventura County Agriculture Irrigated Lands group which consists of 1,080 landowner members representing 73,697 acres. There are 27,000 acres enrolled in the Santa Clara River Watershed.

Seven monitoring sites have been selected to characterize agriculture inputs in the watershed within Ventura County. The monitoring locations are generally located at the lower end of mainstem tributaries or agricultural drainages and were selected in areas that were primarily influenced by irrigated agriculture and unlikely to receive inputs from other land uses.

The Nursery Growers Association – Los Angeles County Irrigated Lands Group is the Discharger Group formed to represent growers in Los Angeles County.

TMDLs

- Upper Santa Clara River Chloride TMDL – implementation plan underway
- Nutrient (nitrogen compounds) TMDL - identified wastewater treatment facilities as the major contributor of nitrogen compounds loadings with nonpoint sources and minor point sources contributing a much smaller fraction of these loads.
- For more information see http://www.waterboards.ca.gov/losangeles/html/meetings/tmdl/tmdl_ws_santa_clara.html

Permits

- Fillmore Wastewater Treatment Plant – Administrative civil liability assessed for violations, some of which may go toward development of a constructed wetland using effluent from the facility. Surface water discharge will phase out by 2008 and become a groundwater discharge (percolation) or a reclamation plant treating nitrates to 3 ppm.
- Santa Paula Wastewater Reclamation Plant – Will become Title 22 compliant and go to full reclamation some time after 2008, in the meantime, there is ongoing enforcement action toward a consent decree.
- San Buenaventura Wastewater Reclamation Plant – Administrative civil liability assessed for metals and coliform effluent violations; cleanup and abatement order in place. Reduced problem metals by 50% and now treats to tertiary standards. Facility discharges to the estuary, in the late 1970s the City demonstrated enhancement as required under the Bays and Estuaries Policy based on an original 5 MGD discharge. The facility now discharges 10 MGD and the City has been asked to re-evaluate the enhancement issue.
- Valencia Water Reclamation Plant – Administrative civil liability assessed in 2006 for cyanide, nitrate plus nitrite (as nitrogen), and chloride effluent violations. The matter will be heard before the Regional Board at a future meeting in 2007.

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