UPPER SANTA CLARA RIVER

SUBDIVISON OF SANTA CLARA RIVER REACH 4

DRAFT STAFF REPORT

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD - LOS ANGELES REGION

August 2007

Executive Summary

The Upper Santa Clara River (USCR) Chloride Total Maximum Daily Load (TMDL) became effective on May 4, 2005, and was revised to accelerate the Implementation Schedule on August 3, 2006 (Resolution No. 06-016). The TMDL includes special studies to determine the chloride threshold levels for salt-sensitive crops and endangered and threatened species, and the chloride loading from surface water to underlying groundwater basins. Based on the revised TMDL, the Regional Board reconsideration of a site specific objective (SSO) for chloride is scheduled for May 2008 when the results of special studies and an antidegradation analysis are available. Dividing Reach 4 of Santa Clara River (SCR) into two reaches with the equivalent spatial extent as the existing reach is the first of several administrative actions that the Regional Board may consider to implement the TMDL. This proposed action is based on current understanding of the water quality differences between the western and eastern portions of Reach 4 due to the significant alterations to land uses and waste discharges within the USCR watershed.

Staff finds that Reach 4 of the SCR contains unique hydrogeologic conditions that support the separation of the reach into two separate reaches, 4A and 4B, divided at the confluence of Piru Creek. First, Reaches 4A and 4B are different in terms of channel morphology, loss in transit, and inflows from tributaries. All flow in Reach 4B infiltrates to groundwater in the eastern-most portion of this reach, creating the beginning of the "Dry Gap" upstream of Piru Creek. In Reach 4A, rising groundwater re-surfaces in the middle of Reach 4A due to unique geologic conditions. Second, surface water quality in Reaches 4A and 4B is significantly different due to groundwater-surface water interaction in this reach. Surface water quality in Reach 4B is affected by discharges from water reclamation plants while surface water quality at west of dry gap in Reach 4 is affected by groundwater in west Piru Subbasin. Third, influence from small tributary inflows to the SCR east of Piru Creek are significantly smaller than influence from significantly larger flows from Piru Creek, Hopper Creek and other tributaries to the SCR west of Piru Creek. Fourth, the revised reaches would better coincide with the underlying groundwater basins. Chloride levels are different in east and west Piru subbasins due to human activities. Water quality objectives (WQOs) are different for groundwater upstream and downstream of the confluence of Piru Creek.

Staff developed two alternatives for Regional Board consideration, including a no-action alternative that maintains the present reach definitions and boundaries, and an alternative that divides Reach 4 of SCR into two separate reaches at the confluence of Piru Creek. The upstream and downstream boundaries of the divided reaches are unchanged from the boundaries of the existing reach. Staff's recommendation is to divide Reach 4 into two separate reaches at the confluence of Piru Creek. Staff finds that this action will allow the development of more geographically precise SSOs in the future, if necessary.

List of Acronyms

AGR – Agricultural Supply Beneficial Use
AWQC – Ambient Water Quality Criteria
cfs – cubic feet per second
Districts – Sanitation Districts of Los Angeles County
DWR – California Department of Water Resources
ESP – Endangered Species Protection
GWR – Groundwater Recharge Beneficial Use
GSWI – Groundwater and Surface Water Interaction Model
LRE – Literature Review and Evaluation
MGD – million gallons per day
mg/L – milligrams per liter
MODHMS - Modular Hydrogelogical Model System
ppd – pounds per day
RARE – Rare and Endangered Species Habitat Beneficial Use
SCR – Santa Clara River
SCV – Santa Clarita Valley
SRWS – Self-Regenerating Water Softener
SSO- Site Specific Objective
SWP – State Water Project
TAP – Technical Advisory Panel
TDS – Total Dissolved Solids
TMDL – Total Maximum Daily Load
TWG – Technical Working Group
USACE – United States Army Corps of Engineers
USCR – Upper Santa Clara River
USEPA – United States Environmental Protection Agency
USGS – United States Geological Survey
UWCD – United Water Conservation District
WQO – Water Quality Objective
WRP – Water Reclamation Plant

1. INTRODUCTION

This item considers a revision to the *Water Quality Control Plan Los Angeles Region* (Basin Plan) to subdivide Reach 4 of the Upper Santa Clara River (USCR) as two separate Reaches, Reach 4A and Reach 4B. Reaches are sections of surface waters that exhibit consistent hydrological, water quality, or adjacent land use characteristics. Reaches are defined in Chapter 2, "Beneficial Uses," of the Basin Plan for surface waters in Region 4, and were first defined for Los Angeles Region surface waters in the 1978 Basin Plan. Over the intervening years, reaches have been redefined throughout the Region by the Regional Board based on new information or significant alterations of hydrology, land uses, monitoring locations, or water quality.

For the Santa Clara River (SCR), this item proposes Reach 4A as the western portion of the existing Reach 4, from Fillmore to the confluence of Piru Creek; Reach 4B is proposed as the eastern portion of the existing Reach 4, from the confluence of Piru Creek to the existing reach break at the Blue Cut, approximately one-mile west of the Los Angeles - Ventura County line. This proposed action is based on current understanding of the water quality difference between the western and eastern portions of Reach 4 due to the significant alterations to land uses and waste discharges within the USCR watershed.

Several factors that affect water quality in Reach 4 have become increasingly more significant since 1978 when Reach 4 was first defined: 1) Oilfield production in the USCR watershed has declined since 1975. Further, in the mid to late 1970s discharge of oilfield brines into the underlying aquifers of the USCR watershed was prohibited, and the degradation of groundwater quality from this source has diminished; 2) The Santa Clarita Valley (SCV) has experienced significant population growth since 1975 with increasing wastewater discharges into Reaches 5 and 6 of the USCR which flow directly to Reach 4; 3) The flows of imported state water through Lake Piru and into the underlying Piru Basin, which affect groundwater quality have been relatively consistent since 1975.

The key hydrological feature of Reach 4 is a dry gap where, during the dry season, the entire surface flow is infiltrated into the underlying eastern Piru groundwater basin (Piru Basin). Surface flow reappears approximately 6 miles downstream, past the confluence of Piru Creek, the largest tributary to Reach 4 and over the western portion of the Piru Basin. Water quality is markedly different from upstream of the dry gap to downstream of the dry gap, the eastern side of Reach 4 to the western side of Reach 4. The 1978 Basin Plan recognized the water quality differences in groundwater upstream and downstream of the confluence of Piru Creek but set forth a single reach and single water quality objective (WQO) for surface water. Since 1975, the effect of increased wastewater discharges on surface water quality in the eastern part of Reach 4 justifies a redefinition of Reach 4.

This proposed action is part of the USCR chloride Total Maximum Daily Load (TMDL) implementation plan which was adopted by the Los Angeles Regional Water Quality Control Board (Regional Board) on August 3, 2006 and approved by the State Water Resources Control Board (State Board) on May 22, 2007. The TMDL Implementation Plan requires the Regional Board to evaluate the results of several special studies, described in this Staff Report, by May 2008 and consider adopting SSO for chloride within the USCR. The TMDL requires the Regional Board to reconsider the WQOs for chloride before planning, design and construction of a remedy is initiated. The Regional Board reconsideration of a SSO for chloride is scheduled for 2008 when the results of special studies related to the interaction of surface and groundwater, evaluation of chloride levels necessary to support habitat for endangered and threatened species, and an antidegradation analysis are available. This action is the first of several administrative actions that the Regional Board may consider to implement the TMDL and this proposed action itself does not modify WQOs for chloride nor adopt a SSO. As described above, this action will allow the development of more geographically precise SSOs, if necessary, and provide greater flexibility to consider different types of implementation actions to comply with the TMDL when the results of the special studies are available.

This staff report first describes the regulatory history of reach definition in the SCR and proposed Reach 4 redefinition. The staff report then provides background information regarding the physical setting of the USCR, land uses in the USCR, and surface and groundwater quality. The report then provides the status of special studies of the chloride TMDL. Finally, alternatives and recommendation for board action are provided.

2. REACH 4 DEFINITION

2.1. Regulatory History

The 1975 Basin Plan established mineral WQOs, including chloride, measured at specific surface water monitoring stations within the SCR where water quality and flow data were available. The water monitoring stations were located at United States Highway 101, Saticoy Diversion, Santa Paula Bridge, A Street of Fillmore, Los Angeles – Ventura County Line, and West Pier Highway 99, respectively. No reach definition was provided in the 1975 Basin Plan.

In March 1978, The Regional Board amended the 1975 Basin Plan to revise certain mineral objectives and to add or revise reach designations of the SCR. The 1978 Amendments to the Basin Plan modified the description to include reach definition and identify the upstream and downstream boundaries for reach segments of the SCR where WQOs were to apply. One additional station was added at Lang to reflect presumably newly available sampling water quality data from Lang station. Another station (at United States Highway 101) was deleted. The reaches of the SCR in the 1978 Amendments are: (1) between Santa Paula Bridge and Saticoy Diversion, (2) between A Street, Fillmore and Santa Paula Bridge, (3) between Los Angeles-Ventura County Line and A Street, Fillmore, (4) between West Pier Highway 99 and Los Angeles-Ventura County Line, (5) between Lang and West Pier Highway 99, and (6) above Lang. The 1978 Amendments to the Basin Plan did not designate reach numerically.

In June 1994, the Regional Board amended the Basin Plan as the *Water Quality Control Plan – Los Angeles Region; Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties* (1994 Basin Plan). The 1994 Basin Plan formally numbered the reach designations revised in the 1978 Amendments to the Basin Plan. The 1994 Basin Plan contained the most significant revisions to the reach boundary designations for the SCR. First, the Regional Board formally numbered these reaches. Second, the Regional Board split the "Reach bounded by Lang and West Pier Highway 99" into two distinct reaches: (1) "Between Bouquet Canyon Road Bridge and West Pier Highway 99"; and (2) "Between Lang Gauging Station and Bouquet Canyon Road Bridge." Third, the Regional Board combined the reaches bound by "A Street, Fillmore and Santa Paula Bridge" and "Santa Paula Bridge and Saticoy Diversion" into one single reach known as "Between A Street Fillmore and Freeman Diversion 'Dam' Near Saticoy". Fourth, the Regional Board revised the reach description for the Los Angeles – Ventura County Line, with "Blue Cut Gauging Station". "Blue Cut" is the common name used to refer to the U.S. Geological Survey (USGS) river gauging station number 11108500, *SCR AT L.A.-VENTURA CO. LINE CA*, established in 1952. Fifth, the Regional Board added two additional reaches: (1) "Between Highway 101 Bridge and SCR Estuary", and (2) "Between Freeman Diversion 'Dam' Near Saticoy and Highway 101 Bridge". The numbered reach descriptions of the SCR, include the following in the 1994 Basin Plan:

- Reach 1: Between Highway 101 Bridge and SCR Estuary
- Reach 2: Between Freeman Diversion "Dam" near Saticoy and Highway 101 Bridge
- Reach 3: Between A Street, Fillmore and Freeman Diversion "Dam" near Saticoy
- Reach 4: Between Blue Cut Gauging Station (approx. 1 mile west of LA/Ventura county line) and A Street, Fillmore
- Reach 5: Between West Pier Highway 99 and Blue Cut Gauging Station
- Reach 6: Between Bouquet Canyon Road Bridge and West Pier Highway 99
- Reach 7: Between Lang Gauging Station and Bouquet Canyon Road Bridge
- Reach 8: Above Lang Gauging Station
- Reach 9: San Paula Creek above Santa Paula Water Works Diversion Dam
- Reach 10: Sespe Creek above gauging station, 500' downstream from Little Sespe Creek
- Reach 11: Piru Creek above gauging station below Santa Felicia Dam

Attachment 1 provides a graphical depiction of the revised reach boundary designations as a result of the 1994 Basin Plan Amendments.

2.2. 1994 Amendments to Basin Plan Reach Boundary Designations

The 1994 Basin Plan Amendments redefined the original reach of the SCR from Lang to the Old Highway Bridge (as designated in the 1978 Basin Plan) into two separate reaches, one between Lang and the confluence of Bouquet Canyon and another between Bouquet Canyon and West Pier Highway 99. The rationale for dividing this reach is that the original reach is too long to be fully protective of water quality and there are many factors that influence the water quality along the reach. Specifically, the hydraulic regime along this entire reach is different in terms of channel morphology, loss in transit, inflows from tributaries, and other factors (DWR, 1989; Districts, 2006).

The 1994 Basin Plan combined the reach bounded by A Street, Fillmore, and Santa Paula Bridge, and the reach bounded by Santa Paula Bridge and Saticoy Diversion Dam, into one new reach, Between A Street, Fillmore and Freeman Diversion “Dam” near Saticoy (Reach 3). The rationale for this change was that the number of stations sampled on the SCR has been greatly reduced since the early 1970s and current available data no longer support two separate reaches (DWR, 1989; Districts, 2006)

The 1994 Basin Plan renamed the reach descriptor “Los Angeles – Ventura County Line” (for the eastern end of Reach 4 and Western end of Reach 5) to “Blue Cut Gauging Station”. The 1975 Basin Plan established surface WQOs at specific surface water stations for which data were available, including the objectives at the location identified as the “station at Los Angeles and Ventura County Line.” The station referred to was the U.S. Geological Survey’s river station No. 11108500 SCR at LA-Ventura Co. Line CA, commonly referred to as Blue Cut, which was removed from service in October 1996. WQOs were based in part on historical water quality and flow data from this gauging station, and the 1994 Basin Plan renamed the reach descriptor “Los Angeles – Ventura County Line” (for the eastern end of Reach 4 and Western end of Reach 5) to “Blue Cut Gauging Station” to reflect this historic location (Districts, 2006).

2.3. Present Reach 4 Definition

The present Reach 4 was defined in the 1994 Basin Plan: Reach 4 is between the Blue Cut Gauging Station and A Street, Fillmore.

2.4. Alternative Reach 4 Definition

The proposed subdivision of Reach 4 is one component of several regulatory actions that the Board will be asked to consider in order to implement the TMDL. Implementation of the TMDL requires the Board to consider SSOs for chloride in the USCR based on the results of a groundwater surface water interaction model (GSWI). These results are scheduled in 2008. The current action allows consideration of several alternatives for SSOs, rather than a single objective for reach 4.

The Sanitation Districts of Los Angeles County (Districts) submitted a white paper and proposed alternatives on Reach 4 boundary re-designation based on local hydrogeological characteristics, surface water quality, and land use conditions. The alternatives proposed by the Districts includes: (1) dividing Reach 4 into two separate reaches, 4A and 4B; (2) revising the Reach 4 & 5 boundary to Los Angeles/Ventura County Line; and (3) making no changes to the existing reach boundaries. The white paper was distributed to stakeholders on the Technical Working Group (TWG) meeting to solicit comments. After reviewing the white paper and the comments, Regional Board staff found it beneficial to redefine reach 4 by dividing Reach 4 of the SCR into Reach 4A (between Confluence of Piru Creek and A Street, Fillmore) and Reach 4B (between the Blue Cut

Gauging Station and Confluence of Piru Creek). Figure 1 provides a graphical depiction of existing and proposed reach boundaries.

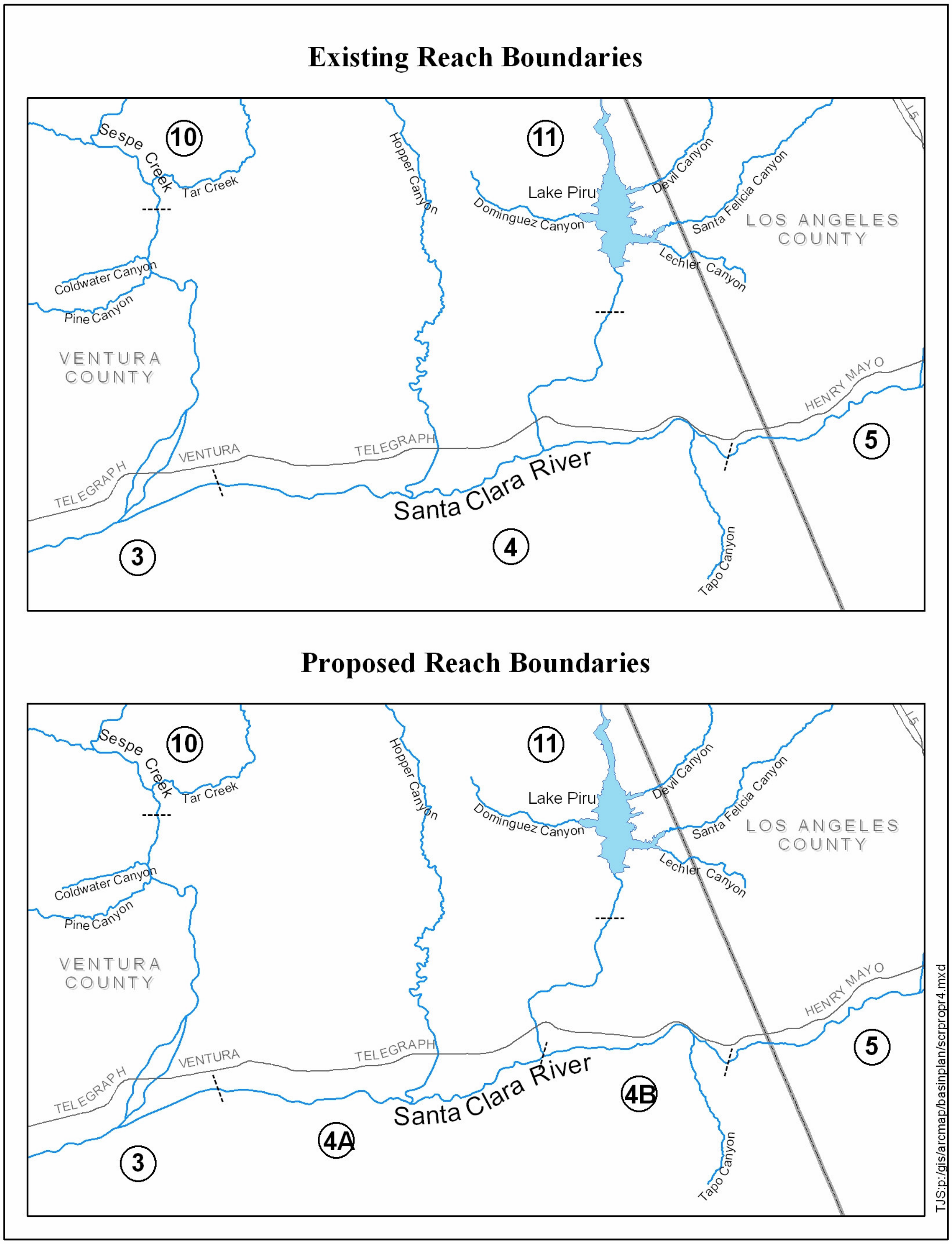

Figure 1. Existing and proposed reach boundaries.

Below are specific justifications for the re-definition of Reach 4 as provided in the white paper.

- Re-designation of the Reach 4 Boundary would better reflect hydrological conditions

Reach 4 of the SCR contains unique hydrogeologic conditions that support the separation of the reach into two separate reaches. The DWR 1989 report describes the condition of the river within the reach as containing an unsaturated zone separating the surface stream channel from the underlying water table. This condition exists from approximately one mile east of the Las Brisas Bridge (east of the confluence with Piru Creek) and extends about 6 miles west (about 2 miles east of the Fillmore Fish Hatchery) where rising groundwater occurs, due to the pinching of the aquifer at the interface between the Piru and Fillmore Subbasins. This stretch of the SCR is known as the "Dry Gap", as shown in Figure 1-6 of Attachment 2.

Additionally, the revised reaches would better coincide with the underlying groundwater basins. The 1975 Basin Plan established WQOs for the groundwater in the Santa Clara – Piru Creek area separately for the lower area east of Piru Creek and the lower area west of Piru Creek. Re-designation of the existing reach boundary into two separate reaches (4A and 4B) would bring the reach into better correlation with respect to the underlying groundwater basins. Currently, the WQO for underlying groundwater in the lower area west of Piru Creek is 1200 mg/L for TDS and 100 mg/L for chloride. The WQOs for underlying groundwater in the lower area east of Piru Creek are considerably higher for TDS and chloride, 2500 mg/L and 200 mg/L respectively, reflecting the historical high TDS and chloride levels caused by oil field brine discharge in the East Piru area. The Districts' white paper states that the Pico Formation, a Pliocene marine sandstone and shale is contributing to high Chloride and TDS concentrations in the East Piru area as well as surface water near Blue Cut, which the Regional Board staff disagrees. In the GSWI Task 2A Report the Pico Formation is described as non-water-bearing rocks with fine-grained texture and low permeability, which can not contribute to chloride and TDS concentrations of the USCR. While the Pico formation may underlie and flank the eastern Piru basin and contain groundwater of poor quality, there is no evidence that this unit is contributing significant quantities of water to the basin.

Additionally, the reach redefinition would better represent the unique hydraulic regime between Reaches 4A and 4B. Reach 4B is different in terms of channel morphology, loss in transit, and inflows from tributaries as compared to Reach 4A. All flow in Reach 4B infiltrates to groundwater in the eastern-most portion of this reach, creating the beginning of the "Dry Gap" upstream of Piru Creek. In Reach 4A, rising groundwater re-surfaces in the middle of Reach 4A due to unique geologic conditions that cause the aquifer to pinch and narrow. Also, similar to the rationale used for splitting the reach between Lang and West Pier Highway 99 to two reaches in the 1994 Basin Plan, influence from small tributary inflows to the SCR east of Piru Creek are significantly smaller than influence from significantly larger flows from Piru Creek, Hopper Creek and other tributaries to the

SCR west of Piru Creek. The flows of imported state water through Lake Piru and into the underlying Piru Basin, which affect groundwater quality have been relatively consistent since 1975.

- Re-designation Would Better Reflect Water Quality Differences Between East and West Piru Subbasins

As discussed in Sections 3.5 and 3.6 and shown in Figures 3, 4, and 5, surface water quality varies in the SCR east of Piru Creek compared to surface water quality in the SCR west of Piru Creek, and groundwater water quality varies between East and West Piru Subbasins.

Hence, the Re-designation of Reach 4 boundary into two subreaches, 4A and 4B, would bring these subreaches into correlation with the difference between groundwater and surface water quality west and east of Piru Creek, respectively.

3. BACKGROUND

3.1. Physical Setting

The SCR is the largest river system in Southern California that remains in a relatively natural state. The river originates on the northern slope of the San Gabriel Mountains in Los Angeles County, traverses Ventura County and flows into the Pacific Ocean between the cities of San Buenaventura (Ventura) and Oxnard. Municipalities within the watershed include Santa Clarita, Newhall, Piru, Fillmore, Santa Paula, Oxnard and Ventura. Its total length is approximately 100 miles with its watershed covering approximately 1,200 square miles.

Extensive patches of high quality riparian habitat exist along the length of the river and its tributaries. Two endangered fish, the unarmored stickleback and the steelhead trout, are resident in the river. One of the SCR's largest tributaries, Sespe Creek, is designated a wild trout stream by the state of California and a wild and scenic river by the United States Forest Service. Piru and Santa Paula Creeks, tributaries to the SCR, also support steelhead habitat. In addition, the river serves as an important wildlife corridor. The SCR drains to the Pacific Ocean through a lagoon that supports a large variety of wildlife.

Figure 2 is a schematic map of the SCR Watershed. The SCR Watershed is generally characterized as consisting of upper and lower watersheds, with the upper watershed described as areas upstream (east) of the City of Fillmore. The GSWI Task 2A Report Figures 1-5 and 1-6 as shown in Attachment 2 show key groundwater basins underlying the USCR: the East Subbasin and the Piru Subbasin.

The predominant land uses in the SCR watershed include agriculture, open space, and residential uses. Revenue from the agricultural industry within the SCR watershed is estimated at over $700 million annually. Residential use is increasing rapidly both in the upper and lower watershed. The population within the SCV alone is expected to grow from 187,172 in 1998 (Santa Clarita Magazine, DDS Marketing) to more than 350,000 by 2025 (Santa Clarita Community Profile, SCAG).

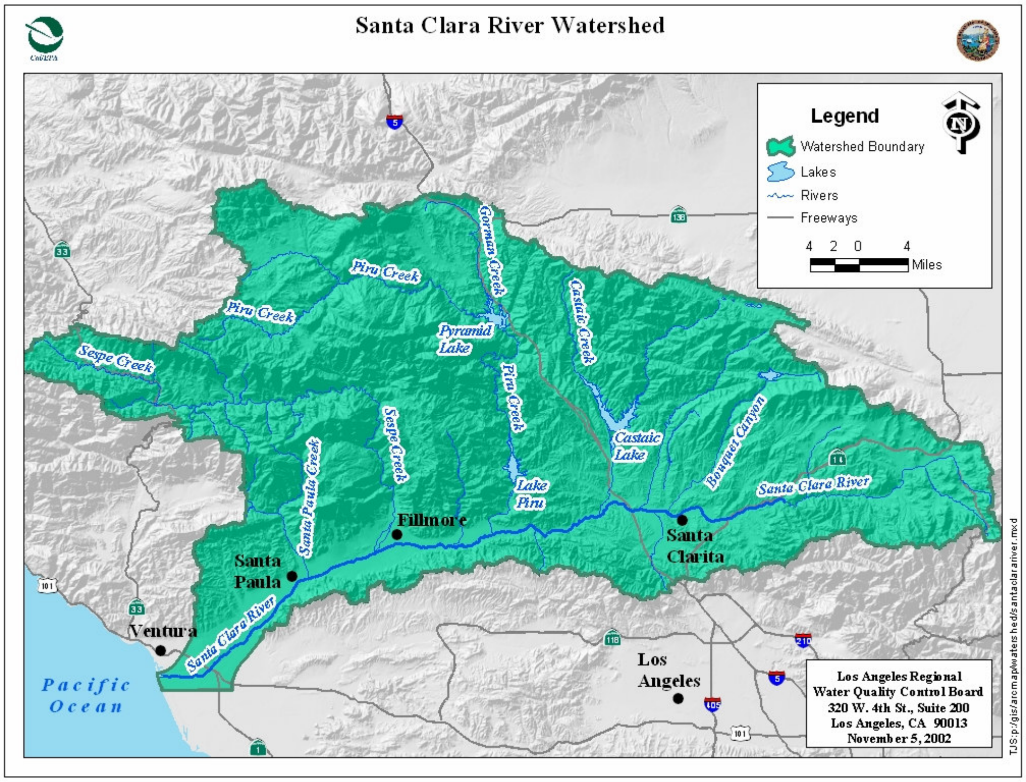

Figure 2. Schematic Map of the Santa Clara River Watershed.

The upper SCV was also the first location of significant oil production in Southern California. The development of the Newhall oil field and the Pioneer Oil Refinery (the predecessor of Chevron Oil) in 1874 initiated oil boom in the area (EIP Associates, 2004). Oil production in the watershed only began to lag in the 1970s and is now a small part of the industrial land use compared to decades ago. There are oil wells and tanks in the eastern parts of the Sespe Creek Subwatershed, particularly Little Sespe and Tar Creeks. The Santa Paula Creek Subwatershed has large number of oil wells. 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. Hopper Canyon and Piru Creek are a few subwatersheds that do not show oil wells on topographic maps. Those oil-producing sites, whether as natural seeps or as disused production wells, may be sources of visible oil and releases of brine (Birosik, 2006).

3.2. Hydrogeology

The headwaters of the Santa Clara and all of its major tributaries originate on National Forest lands. The estuary at the river mouth is protected as a natural preserve within McGrath State Beach. The portion of the river in Los Angeles County is designated as a “significant ecological area” by Los Angeles County. Elevations in the SCR watershed range from 8,831 feet above sea level on Mount San Piños to sea level at McGrath State Beach. Streamflows into the SCR are highly variable. Average discharge measured at Montalvo (three miles upstream of the estuary) ranges from no flow for many days during the summer to winter flood flows over 100,000 cubic feet per second (cfs).

The SCR occupies a comparatively narrow, sinuous channel, and the river and its tributaries are underlain by an unconfined alluvial aquifer. The sandy channel is highly permeable over much of its length, and in places large quantities of water infiltrate through the streambed to the alluvial aquifer (DWR, 1993).

Streamflow in the SCR consists of stormflow and base flow. Base flow is composed of ground water, effluent from Water Reclamation Plants (WRPs), bank seepage, and nonpoint discharge from uncontrolled agricultural and urban runoff (USGS, 2003). Streamflow was measured at the Los Angeles-Ventura County Line, USGS gauging station (11108500), during water years 1953 to 1996. This gauge was discontinued in 1996 because of unsafe conditions caused by bank erosion.

During dry weather conditions, most of the flow in the USCR below the SCV is due to discharges from the Saugus and Valencia WRPs. During most of the year, all stream water percolates into the streambed before the beginning of the Dry Gap in eastern Ventura County (Fig. 1-6 in Attachment 2). Below the Dry Gap, the SCR becomes perennial at the confluence with Piru Creek. Annual precipitation varies with location in the study area and ranges from 7 to 22 in/yr.

The GSWI study Task 2A report described various aspects of the geology and hydrogeology within portions of the USCR watershed. Discussion of the geology and hydrogeology in the GSWI model begins with the SCV East Subbasin (hereafter referred to as the East Subbasin) and ends with the Piru and Eastern Fillmore Subbasins to the west, which covers area underlying Reach 4 of SCR. Detailed descriptions on geology and hydrogeology of SCV East Subbasin and Piru Subbasins from the GSWI Task 2A report are provided in Attachment 2. Figures 1-5 and 1-6 in Attachment 2, which are project maps of GSWI study, show a general geologic map for the GSWI study area.

3.3. Surface Water Flow

The East Subbasin has a surface area of 66,200 acres (103 square miles). The surface is drained by the SCR, Bouquet Creek, and Castaic Creek. Discharge from the subbasin is through pumping for municipal and irrigation uses, uptake by plants, and outflow to the SCR in the western part of the subbasin (Birosik, 2006).

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. 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 (Birosik, 2006).

Major surface water input to Piru basin include Piru creek, Hopper creek, and SCR, in addition there are some minor inputs including the rainfall percolation.
The soil and sediments of Piru basin have a very high percolation capacity and high permeability near the land surface, therefore almost all the surface water flow infiltrates into the ground, and recharges the groundwater. This high percolation capacity causes the infiltration of SCR during much of the year and creating about 6 miles of dry gap between the one mile west of Las Brisas Bridge and the vicinity of Cavin Road two miles east of Fillmore Fish Hatchery. With a high water table, rising water occurs just east of the Fillmore fish hatchery. Also, with a high water table, rising water is found along the reach of the SCR entering the eastern boundary of the Fillmore Subbasin (DWR, 1989). Constrictions in the width of the unconsolidated deposits at the vicinity of Cavin Road cause groundwater to resurface and become surface flow in the SCR (USGS, 1999).

Piru Creek is a large tributary to the basin from the north. Lake Piru releases are nearly continuous with daily mean releases of up to 650 cfs. From CYs 1975 through 2005, this reservoir did not release water approximately 2 percent of the time. Combined daily scheduled releases and unscheduled spills have been as high as 8885 cfs since 1975. The sediments of the Piru Creek fans are highly permeable causing the infiltration of the piru Creek's water into the ground and recharging the groundwater (GSWI Task 2A Report, 2006).

3.4. Groundwater Flow

3.4.1. East subbasin

Groundwater in alluvial deposits of the East Subbasin exists under unconfined conditions. Groundwater flow in the alluvium generally flows from east to west, coincident with the flow of the overlying streams. It is estimated that the amount of groundwater in storage in the Alluvial Aquifer has historically fluctuated between approximately 100,000 and 200,000 acre-feet (GSWI Task 2A Report, 2006).

Saugus Formation groundwater is thought to be present under unconfined conditions in the shallowest water-bearing zones where the Alluvial Aquifer is absent, and under semiconfined and confined conditions at greater depths. The available groundwater level data, which are concentrated in localized areas, indicate that the direction of groundwater flow in the Saugus is toward the center of the valley from the highlands. The data indicate that Saugus groundwater flows toward the western end of the SCV where it discharges naturally into the Alluvial Aquifer. Although few wells have been drilled into the Saugus Formation at or north/northeast of the San Gabriel Fault, there is evidence of limited Saugus groundwater flow across the fault (GSWI Task 2A Report, 2006).

3.4.2. Piru and Eastern Fillmore Subbasin

There is limited information available that differentiates conditions between groundwater systems of the Alluvium and the San Pedro Formation in the Piru and Eastern Fillmore Subbasins. The Alluvial (Upper) Aquifer generally exists under unconfined conditions, and the San Pedro Formation (Lower Aquifer) is semiconfined with an increasing degree of confinement with depth. Groundwater flow paths in Piru basin appear to vary little from year to year, with the dominant flow moving westerly down the axis of the basin. Recharge sourcing from Piru Creek and Hopper Creek result in groundwater flow with a more southerly component in the north-central portion of the basin. This effect is most apparent during wet years when recharge from the tributaries is greater. In the eastern and western portions of the basin, where there is no significant recharge from sources along the edges of the basin, groundwater flow is consistently interpreted to be straight down the basin, parallel with the SCR channel. United Water Conservation District's (UWCD's) interpretation of available groundwater elevation data reveal that flow paths vary little between years, largely due to high permeability of the aquifers, the relatively even distribution of pumping for irrigated agriculture throughout the basin, and the lateral constraints on the flow system (UWCD, 2006).

While the direction of groundwater flow varies little through time, groundwater gradients tend to vary with climatic conditions. In the wettest years, the high percolation capacity of the basin allows it to rapidly fill to capacity, and the slope of the water table becomes fairly consistent across the entire basin. This consistency in slope is also fairly persistent under all climatic conditions in the two-mile reach between Cavin Road and the downstream end of the basin, where the sides of the basin are nearly parallel and the aquifers of the basin discharge rising groundwater to the river. This groundwater discharge to the river maintains a fairly steady flux of groundwater exiting the basin. Steep groundwater gradients are common in the eastern portion of the basin where the basin is narrow, basin fill is believed to be thinner, and the upstream portions of the alluvial and San Pedro aquifers remain saturated by the constant recharge of SCR water sourcing from Los Angeles County. As the basin becomes wider in the area just east of Piru Creek, flowpaths diverge, and the groundwater gradient becomes less steep. Where Piru Creek enters the basin from the north, the basin is at its widest, depths to groundwater are greater, and groundwater flow fields are more variable and dynamic due to the intermittent inputs from Piru Creek. The central third of the basin between Piru Creek and Hopper Creek is where much of the variable storage in the basin occurs. Water levels in this area are observed to decline during dry periods, and groundwater gradients become less steep (UWCD, 2006).

The estimated groundwater storage of the Piru Subbasin ranges from 960,000 acre-feet to 1,979,000 acre-feet (DWR, 2003).

3.5. Surface Water Quality

3.5.1. Chloride Levels - East of Dry Gap in Reach 4

There is a long record of surface water quality data in the USCR available from the USGS, UWCD, and the Districts. The discussion focuses on chloride levels prior to 1968, from 1968 to 1997, and from 1997 to present.

Based on staff's review of historical chloride levels, chloride concentrations tend to be relatively low in undeveloped portions of the SCR watershed. Chloride levels are elevated generally due to human activities such as water importation, water softening, water recycling and irrigation. Water importation, water softening and water recycling

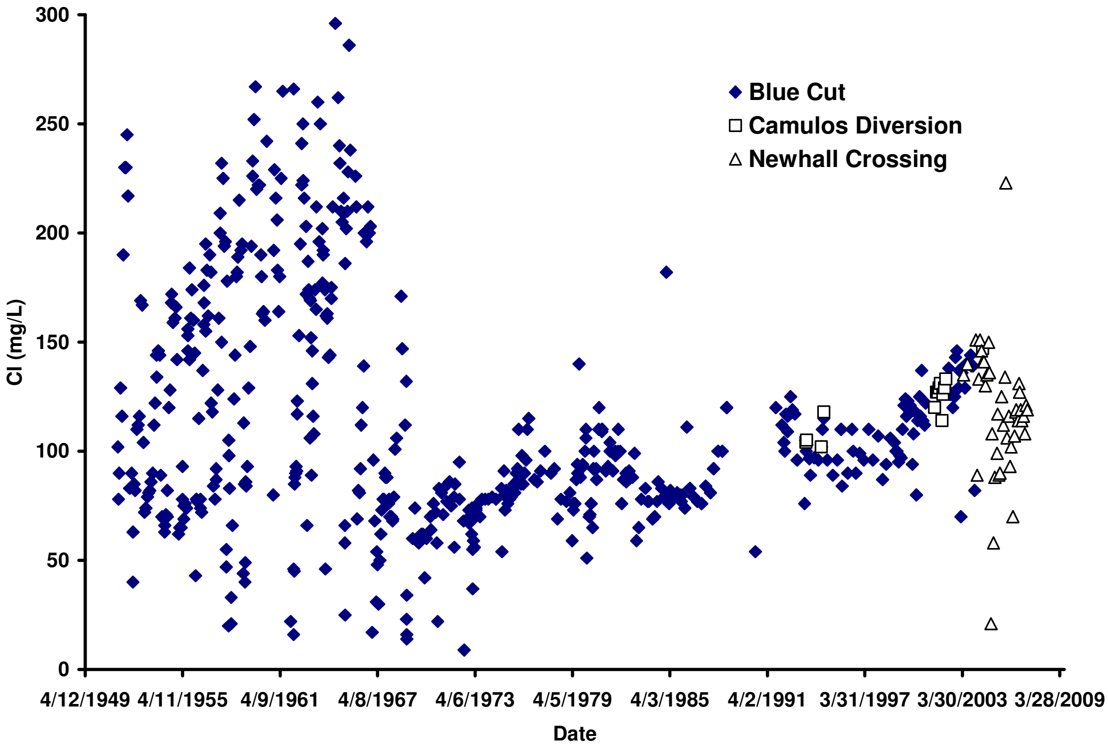

Figure 3. Chloride levels in SCR measured at or near Blue Cut Gauging Station.

add chloride load (mass) to the surface water, and irrigation concentrates chloride salts in shallow soils. Figure 3 shows chloride levels in SCR measured at or near Blue Cut Gauging Station.

Between 1951 and 1968 high chloride concentrations were reported in the river. The source of chloride was the Del Valle, Newhall-Potrero and Castaic Junction oilfields near the SCR between Interstate 5 and the county line, which discharged the brines into the SCR. Flow at Blue Cut during this period was considerably less than flow recorded in recent decades (UWCD, 2006).

Between 1969 and 1975 chloride concentrations exceeding 100 mg/l were not recorded in the SCR at Blue Cut. Between 1975 and 1999 measured chloride concentration generally ranged from 70 to120 mg/l, with the average chloride concentration of 93 mg/l. The time period from the mid-1970s to the late-1990s was also a period of increasing flow in the SCR, corresponding to population growth in the Santa Clarita area and increased imports of water from the State Water Project (SWP) (UWCD, 2006).

The third distinct period, is the period from 1999 to present, characterized by increasing chloride concentrations in the SCR at Blue Cut. During the early summer of 1999 chloride concentrations exceeded 120 mg/l, and chloride concentrations of 150 mg/l were recorded during the winter, spring and the fall of 2004. The year 2005 was considered as a wet year causing dilution of the surface water and the groundwater with lower chloride concentrations. Concentrations of 125 and 134 mg/l were recorded in August and November 2005, respectively indicating the short term affect of the dilution in 2005 (UWCD, 2006)

WRPs are the best-documented source of chloride in the area for the third period. As discussed in Section 3.3, groundwater begins rising just upstream of the discharge of the WRPs, therefore, most of the effluent remains as surface flow and can be a large component of surface flow at the county line. The water supply in this area is a blend of local water and SWP supplies. The chloride concentration of water from the SWP 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. Self-Regenerating Water Softeners (SRWSs), which are common to the area, elevate chloride concentrations considerably. The chloride loads from SRWSs increased markedly from 1997 to 2003, when a ban on residential SRWSs was struck down by legislative action in 1997. A prospective ban on installation of new SRWSs was reinstated in 2003. Correspondingly, chloride levels measured at Blue Cut Gauging Station had been increased from approximately 100 mg/L in 1999 to approximately 140 mg/L in 2004.

3.5.2. Chloride Levels - West of Dry Gap in Reach 4

As discussed in Section 3.3, constrictions in the width of the unconsolidated deposits at the vicinity of Cavin Road cause groundwater to resurface and become surface flow in the SCR. Therefore, surface water chloride levels at west of dry gap in Reach 4 are similar to chloride levels of groundwater in west Piru Subbasin. As shown in Figure 4 (Second Figure in Figure 6 of White Paper), the chloride concentrations measured at ¼ mile distance of Fillmore Fish Hatchery are steadily at the level of approximately 60 mg/L from 1992 to 2005 (Districts, 2007).

3.5.3. Chloride in Piru Creek

Piru Creek is one of the largest tributaries to the USCR. Piru Creek joins the USCR in Reach 4, in the area of the dry gap. Surface flow in Piru Creek is managed by releasing water from Lake Piru, which is fed by releases from Pyramid Lake. During dry weather conditions, most of the water from Piru Creek is infiltrated into the Piru Basin.

Pyramid Lake was completed in the upper Piru Creek watershed in 1973 by the California Department of Water Resources, as part of SWP. The reservoir receives large volumes of SWP water sourcing from the Sacramento River in northern California. As a result, the water released downstream to Lake Piru often reflects the chemical character of SWP water. SWP water is prone to elevated chloride concentrations in certain years, most notably when northern California is experiencing dry climatic conditions (UWCD, 2006).

Water quality trends generally follow climatic cycles in northern California, with chloride increasing during drier conditions. The water quality record shows a pronounced peak in chloride concentration during and following the drought of the late 1980s-early 1990s, when local inflow to the lake was low and chloride concentrations in the SWP were high. A trend of increasing chloride was also observed in the years following the record wet year of 1998, reaching a maximum-recorded concentration of 77 mg/l in 2004. Chloride concentrations in Lake Piru dropped to 30 mg/l following the significant rains of 2005 (UWCD, 2006).

3.6. Groundwater Quality

The Piru basin readily accepts great volumes of recharge water from the channel of the SCR. One major source of recharge to the basin is the continuous percolation of surface water discharge from Los Angeles County, with daily average flows commonly ranging from 20 to 30 cfs since the early 1980s. A second major source of recharge is the downward percolation runoff during significant winter storms, which inundate broad areas of the SCR floodplain with floodwaters of low chloride concentration (Birosik, 2006).

Chloride data correlation between the wells located in the eastern third of the basin to chloride records from Blue Cut provides strong evidence of the influence surface water quality has on groundwater in this portion of the basin. The correlation between chloride concentrations of surface water and groundwater near the Fillmore fish hatchery indicates the groundwater discharge into the surface water near the downstream of Piru basin (UWCD, 2006).

As shown in Figure 5 (Figure 4 in White paper), chloride in the majority of the Piru basin has historically ranged from approximately 30 to 65 mg/L. However, the eastern portion of the basin, east of the confluence of Piru Creek, has historically recorded groundwater chloride concentrations exceeding 150 mg/l between the years 1957 and 1966. The high chloride in the eastern portion of the basin in the 1950s and 1960s is attributed to the discharge of oil field brines into tributaries to the SCR prior to the enactment of the federal Clean Water Act.

West of Piru Creek, chloride concentrations remained well below 100 mg/l during that same time period, and reflect historic chloride concentrations in the basin. Following the prohibition of the improper disposal of oilfield brines in Ventura and Los Angeles counties, chloride concentrations remained below 100 mg/l for about 15 years. The historical range of groundwater chloride concentrations in the Piru basin prompted the Regional Board to set a WQO of 100 mg/l west of Piru Creek and 200 mg/l east of Piru Creek. This standard for the eastern portion of the basin remains unchanged even as water quality improved in the basin once oilfield brines were no longer discharged into the river. Since 1999, chloride in the eastern portion of the Piru basin has steadily increased from approximately 80-100 mg/l to levels as high as 176 mg/l (UWCD, 2006).

3.7. Beneficial Uses and WQOs

Key beneficial uses and WQOs for the USCR are described in the Basin Plan and include agricultural supply (AGR), groundwater recharge (GWR) and rare and endangered species habitat (RARE). A full description of each of these beneficial uses is included in the Basin Plan. AGR is designated as existing or potential for all reaches of the SCR, including Reach 4, except the headwaters. GWR is designated as an existing or potential beneficial use for the entire SCR. RARE is an existing and potential designated beneficial use for all the main stem reaches. Two types of endangered and rare aquatic species are known to reside in the watershed: steelhead trout and unarmored three-spine stickleback.

Beneficial uses for the ground waters in Piru Subbasin include Municipal and Domestic Supply (MUN), Industrial Process Supply (PROC), Industrial Service Supply (IND), and AGR. Beneficial use for the ground waters in the Saugus Aquifer of East Subbasin only includes MUN.

The WQO for chloride in Reach 4 of the SCR is 100 milligrams per liter (mg/L). The groundwater quality objectives for the Santa Clara – Piru Creek area are: 200 mg/L chloride in the Upper area (above Lake Piru), 200 mg/L in the Lower area east of Piru Creek, and 100 mg/L west of Piru Creek. There are no objectives for the Saugus Aquifer.

3.8. Regulatory History

The Regional Board adopted five resolutions that regulated chloride in the USCR, starting with Resolution 75-21 in 1975, which established WQOs throughout the region.

In 1990, the Regional Board adopted the Drought Policy, Resolution 90-04. This resolution was intended to provide short-term and temporary relief to dischargers who were unable to comply with limits for chloride due to the effects of drought on chloride levels in supply waters imported to the Region. The Regional Board temporarily reset limits on concentration of chloride at the lesser of: (i) 250 mg/L, or (ii) the chloride concentration of supply water plus 85 mg/L. The Regional Board renewed the Drought Policy in 1993 and again in 1995 because the chloride levels in supply waters remained higher than the chloride levels before the onset of the drought. The Regional Board did not revise the chloride WQO in the SCR and Calleguas Creek because of the potential to affect present and anticipated AGR.

In 1997, the Regional Board adopted the Chloride Policy, Resolution No. 97-02. The Chloride Policy revised the chloride objective for the Los Angeles River, Rio Hondo, and San Gabriel River. Due to concerns expressed about the potential for future adverse impacts to agricultural resources in Ventura County, WQOs for chloride in the SCR and Calleguas Creek were not revised. Rather, the chloride policy provided surface water interim limits of 190 mg/L in the SCR that extended for three years following approval of the amendment. The Regional Board did not revise the chloride WQO in the SCR and Calleguas Creek because of the potential to affect existing and anticipated AGR. Similarly, the Regional Board did not revise the groundwater objectives for chloride.

The Regional Board first adopted a TMDL for chloride in the USCR (Chloride TMDL) in October 2002 (Resolution No. 2002-018). The TMDL contained an 8-1/2 year implementation plan to attain chloride WQOs. Upon petition by the Districts, the State Board remanded the Chloride TMDL (State Board Resolution No. 2003-0014) to the Regional Board in February 2003. In response to the remand, the Regional Board revised the TMDL Implementation Plan to extend the interim wasteload allocations and final compliance date to 13 years after the TMDL effective date. It also included two additional special studies and several mandatory reconsiderations of the TMDL by the Regional Board. The Regional Board adopted the revised TMDL in July 2003 (Resolution No. 2003-008).

The TMDL was amended in 2004 (Resolution No. 04-0004) to conform the interim wasteload allocations for the Saugus and Valencia WRPs to the effluent limits in 1994 Time Schedule Orders associated with National Pollutant Discharge Elimination System (NPDES) permits. In May 2004, the Regional Board and Districts signed a Settlement Agreement and Stipulation Concerning Chlorides in the UCSR. The Regional Board and Districts agreed that, if or when new or revised NPDES permits are subsequently issued to the Saugus or Valencia treatment plants prior to the date that a revised WQO or final wasteload allocations take effect in accordance with the Chloride TMDL Amendments, interim chloride effluent limitations reflecting the interim wasteload allocations in the TMDL, including any revisions thereto, will be included in the revised permits.

The Regional Board revised the Implementation Schedule for the TMDL in Resolution No. 04-004 on August 3, 2006 (Resolution No. 06-016). The revised TMDL accelerates the schedule from 13 years to 11 years and adds implementation milestones for TMDL planning. On May 22, 2007, a State Board Hearing was held to consider approving the Regional Board Resolution No. 06-016. During the hearing, the State Board approved Regional Board Resolution No. 06-016 and directed the Regional Board to: (a) consider variability in the Site Specific Objective (SSO) for chloride to account for the effects of drought on source water quality; and (b) reconsider the SSO for chloride after May 4, 2008 and no later than May 4, 2010 if, and only if, additional information becomes available after May 4, 2008 that could not reasonably have been provided by the Districts prior to May 4, 2008. If the SSO is revised, the Regional Board shall modify the TMDL Implementation Schedule appropriately.

3.9. Future Growth

Presently, there is extensive residential growth planned for the USCR watershed over the next several decades. The population of the SCV is growing very rapidly. The City of Santa Clarita is projected to grow from 151,800 residents in 2000 to 243,104 residents in 2010. The Districts master plan shows effluent flow from wastewater treatment plants will grow from approximately 20 MGD presently to about 36 MGD in 2035. The effects of this growth on the chloride levels in the SCR and underlying aquifers have not yet been quantified, and staff expects that the GSWI will provide critical information regarding the effects of future growth on chloride levels in the USCR and its underlying groundwater basins.

The Landmark Village project site is located in unincorporated Los Angeles County, within the SCV. The project site is located along the SCR, immediately west of the confluence of Castaic Creek and the SCR. The county line forms the western boundary. The SCR forms the southern boundary of the project site, while the northern project boundary is defined by State Route 126. The project applicant proposes to develop the 292.6-acre Landmark Village tract map site, located in the first phase of the Riverwood Village within the boundary of the approved Newhall Ranch Specific Plan. The Landmark Village tract map site proposes construction of 1,444 residential dwelling units, 1,033,000 square feet of mixed-use/commercial uses, a 9-acre elementary school, a 16-acre community park, public and private recreational facilities, trails, and road improvements. Several off-site project-related components would also be developed on an additional 679.2 acres of land. The project also includes a 6.8 MGD WRP as associated facility (Impact Sciences, Inc., 2006).

4. CURRENT STATUS OF CHLORIDE TMDL

This section describes the current status of TMDL Special Studies and other chloride management activities in the USCR watershed.

4.1. LRE

The first TMDL special study, the LRE, was completed in September 2005 and presented to the Regional Board on November 3, 2005. The LRE reviewed approximately 200 technical articles on the chloride and salinity sensitivities of avocado, strawberry and nursery plants. The LRE found a guideline concentration range for chloride sensitivity for avocado of 100 –117 mg/L. There is not sufficient technical literature to determine a guideline range for strawberry and nursery crops. The LRE concluded that a conservative guideline concentration for chloride hazard is 100-117 mg/L. The LRE was reviewed by an independent Technical Advisory Panel (TAP) and the majority TAP opinion concurred with the 100 –117 mg/L guideline concentration range. One minority

TAP opinion advocated a higher guideline concentration and another minority TAP opinion recommended a maximum guideline concentration of 100 mg/L.

4.2. GSWI

The GSWI model study is a key study to provide information for the Regional Board to consider whether a SSO for chloride is appropriate in the USCR, and if so, lend data to the discussion of the appropriate number. The GSWI will also provide information to determine the magnitude of load reductions and the compliance measures to attain the chloride WQO.

GSWI will determine the interaction between surface water and groundwater and the linkage between surface water quality and groundwater quality with respect to chloride and total dissolved solids (TDS). The model will assess the assimilative capacity of the surface water and groundwater system(s) within Reaches 5 and 6 (in Santa Clarita), and in Piru Basin (a portion of Reach 4) in relation to existing Basin Plan WQOs for groundwater and surface water. Modeling the groundwater-surface water interactions will help determine the gradient of chloride concentrations from the Saugus and Valencia WRPs outfalls to downstream receiving water stations, as well as assess the impacts that the WRPs may have on underlying groundwater in the USCR.

In accordance with the TMDL collaborative process, the Districts included stakeholders and Regional Board staff in the model and consultant selection process. The working group considered four different types of water quality models and selected the Modular Hydrogelogical Model System (MODHMS) because it is widely recognized, technically verified, United States Environmental Protection Agency (USEPA) & United States Army Corps of Engineers (USACE) endorsed, and its public domain/source code meets public access criteria. MODHMS is based on the MODFLOW code developed by the United States Geological Survey (USGS) and by extending HydroGeologic's MODFLOW-SURFACT subsurface modeling code to include overland and channel flow and transport.

Two firms, CH2M Hill and Geomatrix, were selected as consultants because each firm has extensive knowledge of the USCR. To date, the GSWI consultants have evaluated existing models, literature, and available data; drafted GSWI groundwater and surface water sampling and additional monitoring plan; and developed conceptual models and preliminary model calibration. The consultants are conducting field sampling to provide data that are needed for model calibration and validation. The task deliverables were reviewed by stakeholders. Due to delay from developing a confidentiality agreement for the data transfer from purveyors to the modeling team, the completion date of GSWI has been extended to November 2007.

In combination with the results of the other TMDL studies, the GSWI will provide information to assist the Regional Board in consideration of a site-specific chloride objective for the USCR that is protective of surface and groundwater resources.

4.3. Endangered Species Protection (ESP)

This task is a review of technical literature regarding the sensitivity of endangered species to chloride. The draft report from this task has been distributed to stakeholders for review. This task examined the chloride sensitivity of several aquatic and riparian species in the USCR. A literature review of species occurring in the USCR and cottonwood or other riparian zone trees was conducted to better understand the potential exposure and tolerance of these species to chlorides in the USCR. Special attention was given to resident species including Unarmored Three-Spine Stickleback, Steelhead Trout, Arroyo Toad, Red-Legged Frog and Cottonwood tree.

The available published data referenced in the 1988 USEPA Ambient Water Quality Criteria (AWQC) was obtained and reviewed according to the methods in Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses (USEPA, 1985). In addition, the USEPA AQUIRE and Ecotox databases were used to obtain additional data to use in an updated toxicity criteria calculation. These data were evaluated based on the USEPA's 1985 guidelines for data quality requirements. The potential thresholds were derived by one of the following methods: 1) USEPA Recalculation Procedure to estimate acute and chronic toxicity, 2) Estimation of chronic toxicity from acute toxicity data and ACR values, 3) Compilation of TDS tolerance values for T&E species inhabiting high TDS environments, 4) Confirmation with the STR model that chloride toxicity in the Saugus and Valencia effluent is not atypical of that observed in conventional toxicity test, and 5) Laboratory test of acute and chronic toxicity in accordance with USEPA toxicity methods on surrogate organisms.

Evaluation of overall toxicity data indicates that chloride concentrations of 605 mg/L and 278 mg/L for acute and chronic toxicity respectively would be fully protective of Threatened and Endangered species in the upper SCR. Thus, the existing USEPA chronic chloride criteria of 230 mg/L can be considered to be fully protective of local biota. These conclusions indicate that endangered species can tolerate higher levels of chloride than salt-sensitive agricultural crops. It appears that any further work on defining WQOs should focus on salt-sensitive agriculture. However, the results of the Endangered Species Assessment may further define the nature of SSOs in the USCR.

A TES TAP meeting was held in May 2007. The TES TAP found no "fatal flaws" with the Aquatic Life Report, however, TAP members suggested to provide additional analyses including clarification on the use of the term "resident species" and clarification of methods used for identifying resident and potentially resident species. The draft report will be revised based on the TAP members' opinion and the revised report will be further reviewed by TAP members and stakeholders. This study is scheduled to be completed by November 20, 2007.

4.4. Anti-Degradation Analysis

Anti-degradation analysis may be required for chloride objective revisions if appropriate, in accordance with the Clean Water Act section 131.12(a)(2). This regulation requires an anti-degradation analysis to implement revisions of the TMDL that may increase WQOs. The anti-degradation analysis includes: (1) identifying actions that require detailed water quality and economic impact analyses; (2) determining that lower water quality will fully protect designated uses; (3) determining that lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located; and (4) completing intergovernmental coordination and public participation.

In addition to federal anti-degradation statutes, the Basin Plan includes State Board Resolution 68-16, Statement on Policy with Respect to Maintaining High Quality Waters in California. Resolution 68-16 requires that any activity which produces or may produce a waste or increased volume or concentration of waste is consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water, and will not result in water quality less than that prescribed in the policies.

Regional Board and Districts staff discussed the anti-degradation analysis task. A two-phase schedule was proposed by the Districts. The phase I schedule includes: (1) identifying actions (potential compliance measures) that require detailed water quality and economic impact analyses; (2) development of alternative compliance concepts. The phase II schedule includes: (1) determining that lower water quality will protect designated uses; (2) determining that lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located.

4.5. Collaborative Process

Based on the Chloride Agreement and Stipulation, the Regional Board and the Districts entered into a collaborative process in June of 2004 to implement the TMDL special studies. The Board and Districts have set up a facilitated process to allow for stakeholder input and review of the special studies as they are developed. The Districts, Regional Board, facilitators, consultants and stakeholders meet on a monthly basis in the City of Fillmore to discuss the TMDL issues. About thirty people who represent a wide range of stakeholder interests, including municipalities, county government, agricultural interests, water purveyors, and environmental interests, attend these TWG meetings. Another public meeting, the GSWI sub-committee meeting was formed to discuss more detailed technical issues for the GSWI study. Stakeholder-selected TAPs meet or communicate by phone periodically to review the special studies. All meetings are open to the public, and agendas and minutes from meetings are published on the SCR Chloride TMDL website: www.santaclarariver.org.

4.6. Stakeholder Concerns

There are several stakeholder groups that regularly attend the TWG meetings and have expressed concerns about the LRE, ESP, and GSWI studies and TMDL Implementation

Plan schedule. Tthe Ventura County Agricultural Water Quality Coalition, the Districts, and UWCD, appear to represent the key views on the issue of TMDL implementation.

The key concern for agricultural stakeholders is the cumulative effects of chloride loading on downstream surface water and groundwater quality. These concerns were expressed at the May 2005 Regional Board hearing when the NPDES permits were renewed for the Saugus and Valencia WRPs and in letters to the Regional Board Chair. Agricultural stakeholders maintain that the current TMDL will increase chloride loading by approximately 14,000 tons relative to the TMDL originally adopted by the Regional Board.

The key concern for the Districts is the economic burden for implementation of the TMDL which may require advanced treatment of WRP effluent to attain chloride targets in the receiving water. The conventional approaches to achieving compliance is the addition of desalination facilities at the WRP and constructing a brine line through the SCV and an ocean outfall or to divert treated wastewater from the SCR and convey it through a land outfall to an ocean outfall. However, these approaches may have undesirable economic, environmental, and schedule consequences. To avoid these costs and potential adverse impacts, the Districts are exploring alternative approaches through discussions between upper and lower basin stakeholders.

The key concern for the UWCD is the groundwater quality objective of the eastern Piru Basin. In its comment letter submitted on June 16, 2006, UWCD stated that the chloride WQO for the eastern Piru Basin was incorrectly set at 200 mg/L. This objective reflected the high chloride concentrations caused by discharge of oil field brines in the 1950s and 1960s, but did not reflect the ambient water quality that existed at the time and for some time after the groundwater quality objective was set. When the Piru Basin WQOs were being considered in the early and middle 1970's, chloride concentrations in both the river and in groundwater were below 100mg/L. UWCD states that the WQO for chloride in the eastern Piru Basin groundwater needs to be revised downward to 100 mg/L to reflect actual conditions in the basin in the past and to help prevent degradation of the basin.

5. ALTERNATIVES AND RECOMMENDATION

5.1. Staff Findings

Staff's findings include:

- Dividing Reach 4 into two separate reaches would better reflect hydrogeologic conditions.
- Dividing Reach 4 into two separate reaches would better reflect water quality differences between east and west Piru Subbasin.

5.2. Alternatives

The alternatives for dividing Reach 4 of SCR are based on Regional Board staff analysis and assessment and are consistent with state and federal law.

- Alternative 1 Maintain Current Reach Definition – No Action

This alternative will maintain the reach definitions and boundaries as defined in the 1994 Basin Plan if the Regional Board finds that there is insufficient justification to separate Reach 4 into two separate reaches.

- Alternative 2 Divide Reach 4 into two separate reaches, 4A and 4B

This alternative would correct an error on the original map by changing the circled number "3" between "Sisar Creek" and "Santa Paula Creek" above the doted line to circled number "9", because the reach of "Santa Paula Creek above Santa Paula Water Works Diversion Dam" should be Reach 9, not Reach 3.

This alternative would revise Reach 4 of the SCR by dividing Reach 4 into two separate reaches, Reach 4A between the confluence of Piru Creek and the A Street Bridge in the City of Fillmore and Reach 4B between the Blue Cut Gauging Station and the confluence of Piru Creek.

5.3. Staff Analysis of Alternatives

Staff finds that Reach 4 of the SCR contains unique hydrogeologic conditions that support the separation of the reach into two separate reaches. First, the reach redefinition would better represent the unique hydraulic regime between Reaches 4A and 4B. Reach 4B is different in terms of channel morphology, loss in transit, and inflows from tributaries as compared to Reach 4A. All flow in Reach 4B infiltrates to groundwater in the eastern-most portion of this reach, creating the beginning of the "Dry Gap" upstream of Piru Creek. In Reach 4A, rising groundwater re-surfaces in the middle of Reach 4A due to unique geologic conditions. Second, surface water quality in Reaches 4A and 4B is significantly different due to groundwater-surface water interaction in this reach. Third, influence from small tributary inflows to the SCR east of Piru Creek are significantly smaller than influence from significantly larger flows from Piru Creek, Hopper Creek and other tributaries to the SCR west of Piru Creek. Fourth, the revised reaches would better coincide with the underlying groundwater basins.

5.4. Staff Recommendation

Staff recommends Alternative 2 - revise the existing reach boundary designations of SCR by separating Reach 4 into two separate reaches, Reach 4A between the confluence of Piru Creek and the A Street Bridge in the city of Fillmore and Reach 4B between the Blue Cut Gauging Station and the confluence of Piru Creek.

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