UPPER SANTA CLARA RIVER

CHLORIDE TMDL RECONSIDERATION

FINAL STAFF REPORT

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD - LOS ANGELES REGION

August 2006

Executive Summary

The Upper Santa Clara River (USCR) Chloride Total Maximum Daily Load (TMDL) became effective on May 5, 2005. The TMDL includes special studies to determine the chloride threshold for salt-sensitive crops and the chloride loading from surface water to underlying groundwater basins. The TMDL also includes Los Angeles Regional Water Quality Control Board (Regional Board) reconsideration of the TMDL schedule 12 months after the TMDL effective date based on results of the special studies. This Staff Report summarizes background information on chloride issues and the current status and results of TMDL-related activities in the USCR. It provides four alternatives for revising the TMDL Implementation Plan schedule for Regional Board consideration and staff's recommended alternative.

Regional Board staff finds that the work to date provides critical information on the chloride hazard concentration for salt-sensitive crops. Completion of the first Special Study, the Literature Review and Evaluation (LRE), provided a scientifically defensible baseline to support a Water Quality Objective (WQO) that is protective of agricultural supply beneficial use (AGR). The LRE established a chloride guideline concentration of 100-117 milligrams per liter. The chloride guideline concentration established by the LRE may be further refined through extended agricultural studies, which may take decades to complete. The status of additional TMDL studies, including the groundwater surface water interaction (GSWI) study, the cost study for advanced treatment to reduce chloride loadings through reverse osmosis and brine disposal, and Endangered Species Protection (ESP) study are described in this Staff Report.

The TMDL provides a thirteen-year schedule to attain compliance with the WQO for chloride. Based on the results of TMDL studies to date, staff developed four alternatives for Regional Board consideration, including: a no-action alternative in which the Regional Board takes no action to revise the schedule at this time; an alternative that adds implementation milestones in years 6-13 of the TMDL schedule but neither extends nor accelerates the 13-year TMDL implementation schedule; an alternative that extends the 13-year schedule to accommodate extended agricultural studies; and an alternative that initiates TMDL implementation tasks based on the results of the GSWI and accelerates the 13-year schedule.

Staff's recommendation is to initiate appropriate implementation activities based on the results of the GSWI study and to accelerate the TMDL schedule if the results from the GSWI indicate that advanced treatment is required to attain the chloride WQO. Staff finds that the costs of accelerating the TMDL planning and design tasks for advanced treatment, if implemented through sewerage fees in the Santa Clarita Valley, will not increase monthly sewage rates above the state average and median rates. Staff notes that the TMDL schedule originally adopted by the Regional Board was 8-1/2 years and assesses that the existing TMDL schedule can be accelerated by 3-years from 13-years to 10 years.

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List of Acronyms

AGR – Agricultural Supply Beneficial Use
AWQC – Ambient Water Quality Criteria
cfs – cubic feet per second
CLWA – Castaic Lake Water Agency
DMC – Delta Mendota Canal
DWR – California Department of Water Resources
EIR – Environmental Impact Report
ESA – Extended Study Alternatives
ESP – Endangered Species Protection
GWR – Groundwater Recharge Beneficial Use
GSWI – Groundwater and Surface Water Interaction Model
LAIRP – City of Los Angeles Integrated Resources Plan
LRE – Literature Review and Evaluation
MGD – million gallons per day
mg/L – milligrams per liter
MODHMS - Modular Hydrogelogical Model System
NPDES – National Pollutant Discharge Elimination System
OAL – Office of Administrative Law
ppd – pounds per day
RARE – Rare and Endangered Species Habitat Beneficial Use
RO – Reverse Osmosis
SARI – Santa Ana Regional Interceptor
SCV – Santa Clarita Valley
SCVJSS – Santa Clarita Valley Joint Sewerage System
SRWS – Self-Regenerating Water Softener
SSO- Site Specific Objective
SWP – State Water Project
SWRCB – State Water Resources Control Board
TAC – Technical Advisory Committee
TAP – Technical Advisory Panel
TDS – Total Dissolved Solids
TMDL – Total Maximum Daily Load
TVRI – Temescal Valley Regional Interceptor
USACE – United States Army Corps of Engineers
USBR – United States Bureau of Reclamation
USCR – Upper Santa Clara River
USEPA – United States Environmental Protection Agency
USGS – United States Geological Survey
UWCD – United Water Conservation District
VCPWA – Ventura County Public Works Agency
VWC – Valencia Water Company
WLA – Waste Load Allocation
WQO – Water Quality Objective
WRP – Water Reclamation Plant

1. Introduction

The Los Angeles Regional Water Quality Control Board (Regional Board) adopted a total maximum daily load (TMDL) to address chloride impairments of the Upper Santa Clara River (USCR) on July 10, 2003 (Resolution 03-008). On May 6, 2004, the Regional Board amended the USCR chloride TMDL to revise the interim waste load allocations (WLAs) and implementation schedule (Resolution 04-004). The amended TMDL was approved by the State Water Resources Control Board (State Board), Office of Administrative Law (OAL) and United States Environmental Protection Agency (USEPA), and became effective on May 4, 2005.

The TMDL requires the Sanitation Districts of Los Angeles County (Districts) to implement special studies and actions to reduce chloride loadings from the Saugus and Valencia Water Reclamation Plants (WRPs). The TMDL Implementation Plan includes four special studies to be considered by the Regional Board:

- Agricultural Chloride Threshold Study -- Literature Review and Evaluation (LRE) and Extended Study Alternatives (ESA) – LRE: review agronomic literature to determine a chloride threshold for salt sensitive crops; ESA: identify agricultural studies, including schedules and costs, to refine the chloride threshold.
- Groundwater and Surface Water Interaction Study (GSWI) – determine chloride transport and fate from surface waters to groundwater basins underlying the USCR.
- Endangered Species Protection (ESP) – review available literature to determine chloride sensitivities of endangered species in the USCR.
- Site Specific Objectives (SSO) and Anti-Degradation Analysis -- consider a site-specific objective for chloride based on the results of the agricultural chloride threshold study and the GSWI.

Based on these studies, the Regional Board will consider whether revisions to the chloride water quality objectives (WQOs) or TMDL schedule, or establishment of a site-specific objective (SSO) are warranted.

This Item represents the first Regional Board reconsideration of the TMDL, which is scheduled 12-months after the TMDL effective date. Specifically, Task 4 of the TMDL Implementation Schedule states "The Regional Board, at a public hearing, will re-evaluate the schedule for Task 6 and subsequent linked tasks based on input from the TAC(s), along with Regional Board staff analysis and assessment consistent with state and federal law, as to the types of studies needed and the time needed to conduct the necessary scientific studies to determine the appropriate chloride threshold for the protection of salt-sensitive agricultural uses, and will take action to amend the schedule if there is sufficient technical justification."

TMDL activities during 2005 and 2006 included completion of the LRE and ESA, progress on the GSWI Study, the ESP Report, Pollution Prevention activities, and development of a work scope for Cost Studies for advanced treatment of WRP effluent.

This Staff Report reviews the status of these activities and provides staff's analysis of the TMDL Implementation Schedule and recommendation for TMDL Implementation Schedule revisions. Staff's analysis is based on results of TMDL studies to date, as well as a review of the chloride reduction programs underway.

This Staff Report is organized under three headings: Background, Current Status, and Alternatives Analysis. Background provides a description of the Santa Clara River watershed, an overview of chloride issues in the USCR, and a brief summary of current activities by the state and other regional boards regarding salinity management within the State. Current Status describes the status of TMDL special studies, the stakeholder collaborative process, and an overview of key stakeholder concerns. Alternatives Analysis provides Staff's evaluation of the Special Study results and discusses alternatives and recommendations for the Regional Board's consideration.

Based on the information and alternatives provided within this report, the Regional Board can take formal action to revise the TMDL Implementation Plan.

2. Background

This section provides background information on chloride issues in the USCR watershed.

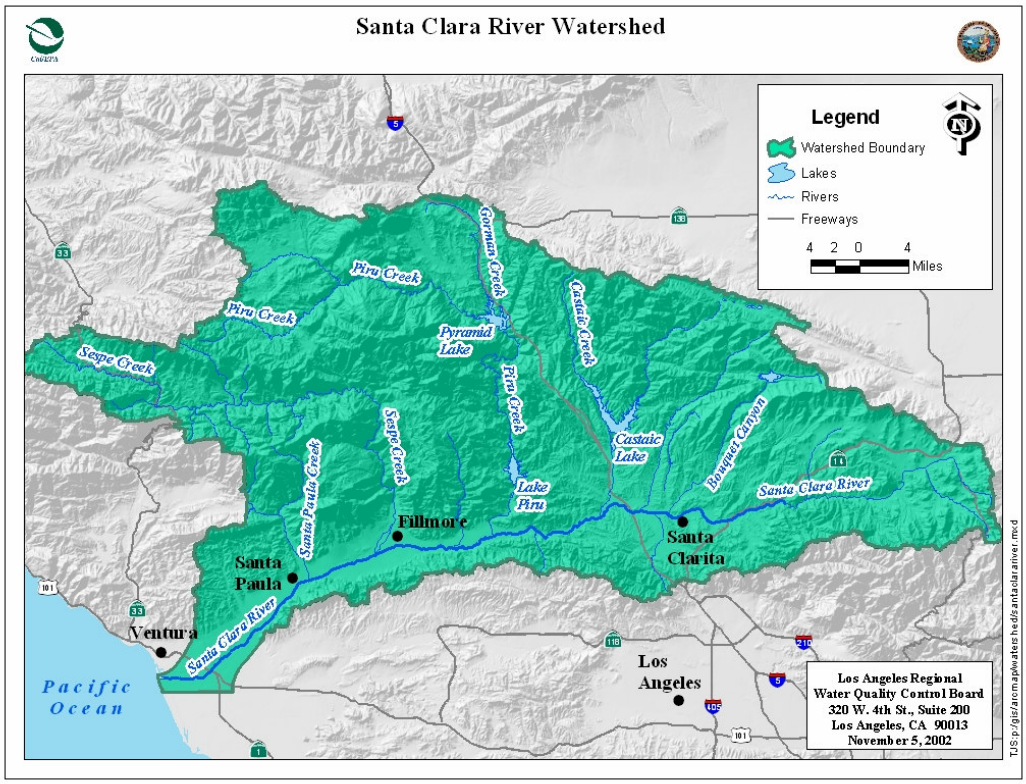
2.1. Environmental Setting

The Santa Clara River 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, Fillmore, Santa Paula, and Ventura.

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 Santa Clara River'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 Santa Clara River, also support steelhead habitat. In addition, the river serves as an important wildlife corridor. The Santa Clara River drains to the Pacific Ocean through a lagoon that supports a large variety of wildlife.

The predominant land uses in the Santa Clara River watershed include agriculture, open space, and residential uses. Revenue from the agricultural industry within the Santa Clara River watershed is estimated at over $700 million annually. Residential use is increasing rapidly both in the upper and lower watershed. The population within the

Santa Clarita Valley 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).



The upper reaches of the Santa Clara River include Reaches 5 and 6, which are located upstream of the Blue Cut gauging station that lies west of the Los Angeles - Ventura County line between the Cities of Fillmore and Santa Clarita. The upper boundary extends to Bouquet Canyon, upstream of the City of Santa Clarita. Two major point sources, the Saugus and Valencia WRPs, discharge to the USCR.

2.2. 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 Santa Clara River, including the USCR, except the headwaters. GWR is designated as an existing or potential beneficial use for the entire Santa Clara River. RARE is an existing and potential designated beneficial use for the upper reaches included in this

TMDL. Two types of endangered and rare aquatic species are known to reside in the watershed: steelhead trout and unarmored three-spine stickleback.

The WQO for chloride in Reaches 5 and 6 of the Santa Clara River 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. The existing surface water WQO is within the guideline concentration range established by the LRE.

2.3. 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 Santa Clara River 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 Santa Clara River and Calleguas Creek were not revised. Rather, the chloride policy provided surface water interim limits of 190 mg/L in the Santa Clara River that extended for three years following approval of the amendment. The Regional Board did not revise the chloride WQO in the Santa Clara River 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.

2.4. Chloride Sources and Water Quality

This section summarizes analyses of chloride sources in the USCR watershed and projections of the effects of future growth and chloride reduction measures on the final WRPs effluent quality. In addition, the section presents summaries of WRP effluent chloride concentrations by Districts and Regional Board staffs. As detailed below, Regional Board staff finds that reduction of a key chloride source, self-regenerating water softeners (SRWS), may not be sufficient to attain TMDL chloride targets. The section first summarizes key findings about chloride sources and then discusses Districts and Regional Board projections of final WRP effluent quality.

Chloride Sources

Regional Board and Districts staffs analyzed chloride sources in the USCR watershed in the 2002 Regional Board TMDL Staff Report and in the Districts 2002 and 2005 chloride reports. These analyses utilized mass balance techniques to identify and quantify chloride loads from imported water and residential, commercial, and industrial sources.

The key findings from these reports include:

- The average chloride concentration in the USCR, as measured at the Blue Cut gauging station and at the Ventura/Los Angeles county line, was 131 mg/L in 2002 and 126 mg/L in 2003. The average chloride concentration at the Blue Cut gauging station frequently exceeds the WQO of 100 mg/L.

- The total chloride load from the Saugus and Valencia WRPs ranged from 23,500 pounds per day (ppd) to 28,500 ppd in 2001 through 2005.

- The WRP effluent chloride load is comprised of two main sources: chloride present in the blended water supply and chloride added by residents, businesses, and institutions in the Saugus and Valencia WRP service area. The chloride load added by users can be further divided into two parts: brine discharge from self-regenerating water softeners (SRWSs) and all other loads added by users. Excluding the imported chloride load that exists in the water supply, non-SRWS sources of chloride include groundwater, residential, commercial, industrial, infiltration, and wastewater disinfection. The two largest sources of chloride in the WRP effluent are the blended water supply and SRWSs, which comprise from 37 to 45% and from 33 to 37% of the WRP effluent, respectively.

- The Santa Clarita Valley (SCV) water supply is a blend of State Water Project (SWP) water and local groundwater. Over the past 30 years, chloride concentrations in water from the SWP ranged from 28 mg/L to 128 mg/L. The quantity of SWP water served by SCV water purveyors has increased from 41,768 acre-feet in 2002 to 47,205 acre-feet in 2004. The use of imported water has grown steadily. As reported by the Castaic Lake Water Agency (CLWA), the use of SWP water by SCV water purveyors is projected to grow to 69,500 acre-feet by 2015.

- 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. The Districts estimate that approximately 6,500 water softeners, which were installed before the 2003 ban on new installations of SRWSs, continue to operate in the Santa Clarita Valley Joint Sewerage System (SCVJSS).

Staff notes that growth within the SCV is accompanied by increasing demand for imported water and increasing chloride loads. In 1980, imported SWP comprised 1,125 acre-feet, approximately 5% of the total water supply to the SCV. By 1998, imported SWP comprised approximately 20,000 acre-feet, approximately 50% of the total water supply to the SCV.

The relative magnitude of chloride loads from different sources is summarized below:

Relative Chloride Loadings to Saugus and Valencia WRPs Effluent by Source (Percentage)

Year	Water Supply	Ind.	Com.	Residential Non-SRWS	Residential SRWS	Inf.	Disinf.	Total Load
2001	**42%**	**3%**	**4%**	**14%**	**33%**	**0%**	**4%**	**100%**
2002	**45%**	**2%**	**3%**	**13%**	**33%**	**0%**	**4%**	**100%**
2003	**45%**	**1%**	**3%**	**13%**	**35%**	**0%**	**3%**	**100%**
2004	**41%**	**1%**	**3%**	**14%**	**37%**	**0%**	**4%**	**100%**
2005 (by June)	**37%**	**2%**	**3%**	**15%**	**34%**	**4%**	**4%**	**100%**

Note: Ind. indicates Industrial, Com. indicates Commercial, Inf. indicates Infiltration, Disinf. indicates Disinfection

Projections of WRP Effluent Quality

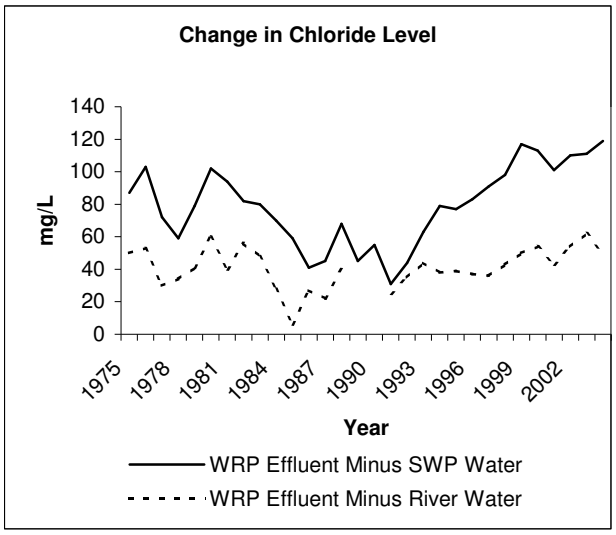
Regional Board and Districts staffs projected chloride concentrations of WRP effluent due to future growth under different scenarios of SRWS removal from the SCV. Both Regional Board and Districts staffs find that a key determinant of the final WRP effluent chloride concentration is the total quantity of water imported into the SCV and the chloride concentration in the imported water. Chloride concentrations vary according to climatic conditions in northern California. During dryer than normal conditions, the Sacramento-San Joaquin Delta is highly influenced by seawater and brackish water intrusion. Review of Castaic Lake water quality records from 1972 show a range of chloride concentrations from approximately 28 to 128 mg/L.

The Districts' projections account for variability in imported water chloride concentration by calculating a blended water supply median chloride concentration for drought and non-drought conditions. The Districts analyzed projected chloride concentrations of WRP effluent, based on several factors, including the predicted non-drought median chloride concentration (55 mg/L) of the blended water supply, the 2003 ban on SRWS installations, and the theoretical removal of all grandfathered SRWS. Using a constant non-drought chloride concentration of 55 mg/L in the blended water supply, the Districts project that chloride concentration in the WRP effluent will decrease from current levels of approximately 150 mg/L to 97 mg/L for the years 2010, 2015, and 2050. This analysis does not reflect the variability of the chloride concentration in the SWP supply water. Additionally, the assumption that all granfathered SRWS will be removed by 2010 or 2015 is an unreasonable expectation that is not grounded in existing data or lawmaking.

Regional Board staff's projection of WRP effluent chloride concentrations is based on analysis of the difference in chloride concentrations in water supplied to the SCV from the state water project and chloride concentrations in wastewater discharged to the Santa Clara River in the Valencia WRP effluent. Staff's projection assumes that the chloride concentration in the WRP effluent is correlated to the sum of chloride concentrations from imported water, chloride concentrations from SRWS loads, and chloride concentrations from other sources in the SCV including groundwater, commercial, residential, industrial, wastewater disinfection, and groundwater infiltration into the SCVJSS. The variability of WRP effluent is based primarily on the chloride concentration variability in imported SWP waters. Regional Board staff's projection categorizes the remaining chloride loads as SRWS and non-SRWS loads. Staff developed frequency exceedance curves to estimate the probability that WRP effluent concentrations will exceed different WQOs for estimated rates of SRWS removals.

Staff's projections include an analysis of chloride loads from SRWS and other sources within the SCVJSS. The Districts 2002 report states that technical literature indicates that typical chloride concentrations in municipal wastewater range from 20 to 50 mg/L above the chloride concentration in supply water, excluding chloride loads from SRWSs. Staff's analysis assumes that non-SRWS chloride loads contribute 40 mg/L above supply water to the combined WRP effluent chloride concentration, and that the chloride load from SRWSs contributes 40 mg/L above supply water to the combined WRP effluent. These assumptions are confirmed by conditions in early 2005 in which the WRP effluent chloride concentration was about 90 mg/L greater than the SWP imported water.

Staff also reviewed historical records of chloride concentration differences between SWP and WRP effluent. The difference in chloride concentration from WRP effluent to SWP, and the difference in chloride concentration from WRP effluent to USCR water at Blue Cut from 1975 to 2004 are plotted on the figure below. The figure below shows the historical record of chloride concentration differences based on annual average chloride concentrations.



The chloride concentration difference between WRP effluent and SWP water increased sharply after 1991, suggesting increased contribution of chloride to the WRP effluent from SCV sources. Further, staff notes that difference between WRP effluent and SWP water continues to increase despite the reduction in SRWS loads implemented in 2003. The concentration difference between WRP effluent and USCR water at Blue Cut varied around the level of approximately 40 mg/L in the last 30 years, which implies that the USCR chloride level is well related to chloride level from WRP effluents. Based on this analysis, staff finds that it will be difficult to reduce the contribution of SCV sources to a level less than 40 mg/L above the supply water. The NPDES permit for the Valencia plant includes an interim effluent limit of 134 mg/L above the level in SWP supply water.

Staff employed standard statistical methods to calculate the percent probability of exceedance occurrence as shown on the table below. The percent exceedance is obtained by subtracting the percent probability in the probability plots from 100 percent. The exceedance frequencies for different chloride WQOs assuming 0%, 50% and 100 % reduction in SRWS loads were obtained based on the above analysis and shown on the table.

Exceedance frequencies for different chloride WQOs assuming 0%, 50%, and 100% reduction in SRWS loads

	Exceedance frequencies for different chloride WQOs At different reduction rates of SRWS loads		
Percent reduction in SRWS loads	**0%**	**50%**	**100%**
WQO 100 mg/L	100%(1.0)	93%(0.93)	27%(0.27)
WQO 120 mg/L	91%(0.91)	27%(0.27)	13%(0.13)
WQO 140 mg/L	27%(0.27)	12%(0.12)	10%(0.10)
WQO 160 mg/L	12%(0.12)	9%(0.09)	3%(0.03)

The statistical analysis indicates that the WQO would need to be raised to more than 160 mg/L to achieve a compliance rate of greater than 97%, even when 100% of the SRWS load is eliminated. A WQO of 160 mg/L is appreciably greater than the chloride guideline concentration range of 100 – 117 mg/L, and staff concludes, based on available information, that advanced treatment is likely to be required, even with a highly effective SRWS elimination program, to attain a reasonably protective chloride WQO. Although Staff finds that advanced treatment is a likely means of compliance with the existing Chloride TMDL, Staff notes that the TMDL does not mandate a specific means of compliance. The Districts are encouraged to employ the most cost-effective means to comply with the Final WQO.

2.5. 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 million gallons per day (MGD) presently to about 36 MGD in 2035. The effects of this growth on the chloride levels in the Santa Clara River 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.

Projections of future chloride loading to the USCR are dependent on several factors. Most importantly, the chloride contribution from the blended water supply varies greatly according to hydrologic conditions in Northern California because the salinity of SWP is dependent on the mix of fresh and brackish water in the San Francisco Bay – Delta, which is the source of the water imported into the SCV. The timing and duration of future droughts are uncertain, but based on review of more than thirty years of water quality data it is not unreasonable to conclude that California will experience several droughts within the next few decades. Therefore, even though future chloride loadings from the blended water supply cannot be predicted with certainty, it is likely that chloride concentrations may rise to 130 mg/L.

The Districts reported a sharp decline in residential SRWS chloride contribution from 66 mg/L in 2004 to 50 mg/L during the first half of 2005. This large change in chloride loading represents the removal or inactivation of roughly 1,200 SRWSs, from a high in 2004 of 7,694 to 6,502 by July of 2005. Staff finds the future trend of SRWS removal is difficult to predict. It is possible that the current public information campaign and the current SRWS removal incentive program will lead to a similar SRWS removal rate for the coming years. However, it is also possible that the reduction in SRWS from 2004 to 2005 represents action by the SCV residents who are most willing to remove their SRWS. If this is true, then SRWS removal will not continue at the same rate.

Further, staff is concerned that it is unlikely that all residents will remove their SRWS under the current District program. According to the Districts' SCVJSS chloride report, results from several focus groups conducted by the Districts show that "some SRWS users would not respond to any reasonable incentive program." Additionally, an area-wide survey conducted by the Districts found that 48% of SRWS users would participate in a removal incentive program with a $1,000 buyback. Because the current SRWS removal incentive program offers only $100 to remove a SRWS, and $150 to remove a SRWS and replace it with an acceptable alternative, Staff finds that it is unlikely that the current program will result in more than 50% removal of SRWS. Under the above assumptions, Staff estimates the future SRWS chloride concentration load at approximately 4,500 ppd or 25 mg/L in the SCVJSS effluent.

Additionally, staff notes that the Districts chloride report indicates that that chloride loading from non-SRWS residential sources in terms of ppd has been increasing. This increase is likely correlated with residential growth and increased residential wastewater flow and increased demand on water resources. The chloride load from non-SRWS residential sources increased from 3,500 ppd in 2002 to 3,900 ppd during the first half of 2005.

2.6. Salinity Management – Recent State and Regional Boards Actions

Water quality impairments by salts and chloride are a statewide issue. This section provides a brief overview of several current issues addressed by the State Board and the Central Valley and Santa Ana Regional Boards. It also reviews the status of salinity implementation activities in Northern California.

In the Central Valley region, salts in surface and ground water are largely derived from supply water from the State Water Project (SWP) and the Delta Mendota Canal (DMC) and from surface soil. Salinity impairments are exacerbated locally by other sources, such as discharges to land associated with municipal wastewater disposal. The Central Valley Regional Board has adopted several approaches for basin management within their jurisdiction. The Central Valley Regional Board established a policy to control groundwater degradation for the Tulare Basin, a policy to promote the maximum export of salt from the San Joaquin River Basin, and a policy to control point source discharges to the Sacramento River Basin. At this time, a salinity TMDL for the San Joaquin River has been developed to meet the objectives at Vernalis and a second phase of this TMDL is being developed for upstream stretches of the river. Further, the State Board may consider whether to adopt Cease and Desist Orders against the United States Bureau of Reclamation (USBR) and the Department of Water Resources with regard to their potential violation of conditions in their water right permits that require the USBR and the California Department of Water Resources (DWR) to meet salinity standards in the Southern Delta.

In southern California, the USBR led a comprehensive regional salinity management study in support of the Southern California Water Recycling Projects Initiative. The study was conducted by CH2M Hill and identified a range of projected brine discharge volumes for Southern California. Some of the factors influencing this projected range are the salinity of imported water, the stringency of wastewater effluent regulation, and the level of seawater desalting. The study predicted a regional brine discharge volume ranging from 43.7 MGD to 2,011 MGD. In addition to predicting future brine discharge volumes, the study identified the location of existing and potential future brine/concentrate management facilities in southern California. These facilities include 86 pipelines, 113 wastewater treatment plants, 32 groundwater desalters, 9 seawater desalination facilities, and 9 major groundwater basins (with 91 sub-basins).

An established Southern California salinity management facility is the Arlington Desalter Facility and the Santa Ana Regional Interceptor (SARI). The Desalter, using Reverse Osmosis (RO) technology, produces up to 6 MGD of blended desalinized water, with another estimated 1 MGD of concentrated brine generated by the plant discharged to the SARI line. The SARI line, a regional brine line, is designed to convey 30 MGD of non-reclaimable wastewater from the upper Santa Ana River basin to the ocean for disposal, after treatment. The non-reclaimable wastewater consists of Desalter concentrate and industrial wastewater. Domestic wastewater is also received on a temporary basis. To date over 73 miles of the SARI line have been completed. The most recent extension (23 miles in length), the Temescal Valley Regional Interceptor (TVRI) line was completed in 2002. The upstream extension was completed in 1995 to the City

of San Bernardino Wastewater Treatment Plant. The SARI also serves the Chino Basin area and the City of Riverside.

Desalinization treatment facilities have been planned in several regions of the state. The Northern California Salinity Coalition is planning RO treatment facilities to draw and treat water with a high salinity concentration from shallow aquifers in order to reduce net salt loading in groundwater basins of the Bay Area. The USBR proposed using RO to treat reused drainage water from an agricultural subsurface drainage system in the San Luis and Northerly Area of the Central Valley. Drainage will be collected from the fields and sent to one of 16 reuse areas to irrigate salt tolerant crops. The drainage from the reuse areas will then be collected and sent to Point Estero for ocean disposal or to a treatment facility.

Staff also notes that within the Region, the City of Los Angeles has implemented a RO facility at the Terminal Island Treatment Plant in order to meet local water quality targets. The facility processes 4.5 MGD and produces potable water for injection to the seawater barrier in the Dominguez Gap. The reverse osmosis effluent meets standards established by the Department of Health Services and is suitable not only for injecting into groundwater basins but also as boiler feed water for local industries.

2.7. Advanced Treatment

As described earlier, the key issue for the USCR Chloride TMDL is determining the need for advanced treatment of WRP effluent discharged into the USCR. That determination is highly dependent on the wasteload allocation for the WRPs. At the present time, the existing WQO of 100 mg/L is consistent with and supported by the chloride guideline concentration reported in the LRE.

Additional TMDL special studies may provide information on which the Regional Board may base a revision of the chloride WQO. Specifically, these studies include the GSWI and the ESA. The timing and schedule implications of these studies are discussed in Section 4 of this report. This section presents staff's rationale that, based on available information, the TMDL most likely will require advanced treatment.

Based on analysis of historic chloride levels in imported water, staff finds that a reasonable WQO within the range of 100 – 117 mg/L established by the LRE cannot be attained without advanced treatment of WRP effluent. Staff's analysis shows that if the SRWS removal incentive program were to lead to the removal or inactivation of most of the SRWS in the Santa Clarita Valley, then compliance with the WQO would be subject to the large variability of the chloride concentration in SWP water. Staff finds that advanced treatment most likely is needed to improve the effluent chloride concentration to meet a WQO of 120 mg/L for drought and non-drought conditions. Because RO treatment achieves very low chloride concentrations, staff notes that treatment of the entire effluent from the WRPs would not be necessary to attain WQOs. Treatment of a

partial portion of effluent could be blended with the untreated effluent stream to attain chloride WQOs.

With RO treatment of 7.7 MGD, removal of at least an additional 75% of the remaining SRWSs most likely would be required to meet a 120 mg/L WQO for drought and removal of an additional 25% of the remaining SRWSs would be required for non-drought. Without RO treatment of at least 7.7 MGD, a potential chloride WQO of 120 mg/L most likely could not be met for drought and at least an additional 50% of the remaining SRWSs would need to be removed for non-drought.

A key concern regarding RO implementation is the cost of constructing a brine line and ocean outfall. Recently, Regional Board staff became aware of an existing pipeline and outfall that may obviate the need to construct a new pipeline and outfall. Crimson Pipeline, a common carrier pipeline company regulated by the California Utilities Commission, owns a high pressure steel pipeline system which begins within 1-1/2 miles of the Saugus water reclamation plant and ends at an ocean outfall extending nearly one mile into the Pacific Ocean off of the Ventura harbor. Originally constructed and operated in crude oil service, over half of the system is currently idle. Initial estimates indicate that the pipeline has sufficient capacity to transport projected brine volumes and can be converted to brine service at a fraction of the cost estimated for a similar newly-constructed pipeline system.

3. Current Status

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

3.1. 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.

Staff finds that, based on the results of the Special Study, the existing WQO for chloride of 100 mg/L is within a scientifically defensible range for protection of AGR.

Based on the guideline concentration range set by the LRE, staff concludes that, absent additional information from extended scientific studies, any revision of the WQO for chloride would be limited to a maximum of 117 mg/L.

3.2. 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 need for advanced treatment 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, 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. Staff notes that the selection of a GSWI consultant through a collaborative process took more time than originally allotted in the TMDL schedule.

To date, the GSWI consultants have collected data provided by the Districts, United Water Conservation District (UWCD), Valencia Water Company (VWC), CLWA, Ventura County Public Works Agency (VCPWA), and the Regional Board. Data from purveyors and groundwater management agencies that was provided to the GSWI consultants are subject to a confidentiality agreement between the Districts, purveyors, and consultants. Additionally, the consultant will conduct field sampling to provide data that are needed for model calibration and validation. This process of developing a confidentiality agreement for the data transfer from purveyors to the

modeling team took more time than anticipated and the GSWI is currently seven months behind its scheduled completion date of May, 2007. Staff has considered the status of the GSWI schedule in developing alternatives for the Board's consideration.

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.

UWCD has provided a report to stakeholders on chloride concentrations in groundwater in the Piru basin. The Report provided an overview of recharge to and discharge from the Piru basin, and the change of chloride concentrations in groundwater in the basin. The following is a brief summary of the UWCD report.

The Santa Clara River is the largest source of recharge to the Piru basin and the sole significant recharge source of the eastern part of the basin. Recharge by the Santa Clara River mainly occurs in Reach 4 between the present location of the USGS gauging station at the Newhall bridge and the area upstream of the confluence of Piru Creek and the Santa Clara River. Based on studies by UWCD, typical dry weather flows of approximately 25-30 cubic feet per second (cfs) percolate entirely in this reach, approximately 85 percent of flows as high as 100 cfs percolate here, and percolation as high as 1000 cfs has been estimated during flood flows. These high percolation rates in the upstream end of the Piru basin cause the entire flow of the Santa Clara River to infiltrate during much of the year, creating a "dry gap" which typically extends some five miles downstream. Surface flow in the river is then re-established by discharge of groundwater from the Piru basin where the groundwater gradient intersects the bottom of the river channel.

At the eastern third of the Piru basin, strong correlation of chloride concentrations was found between groundwater samples taken at wells and surface water samples taken at Blue Cut near the county line in the past 40 years. Since 1999, the chloride concentrations in groundwater have been steadily increasing in the eastern portion of the Piru groundwater basin from approximately 80-100 mg/L to levels as high as 176 mg/L. These increases match with the increase in chloride concentrations in surface water. UWCD concluded that the chloride in the Santa Clara River is causing the increase in chloride in the eastern basin. The high salt loading in the eastern basin may further cause degradation of the remainder of the Piru basin by migrating downgradient.

3.3. ESA

This task provided an overview of the types of agricultural studies that are available to further define an appropriate threshold for protection of AGR in the Santa Clara River Watershed. The ESA evaluated study options ranging from surveys to field experiments and estimated a period of 2 to 10 years to develop adequate local data to define a site-specific threshold different from the guideline concentration determined by the LRE. The ESA also documented the complexities of determining the effects of

chloride on crop productivity under field conditions. Stakeholders are currently reviewing the ESA, and at this time, no extended studies have been initiated.

As part of the LRE, a TAP of agricultural experts noted, "The TAP majority believe it would be possible to do controlled greenhouse or laboratory studies that would give a correct range of chloride values that caused damage to avocados with a particular scion/root combination. Nevertheless, TAP majority members indicated that it would be difficult to extrapolate those lab results to the field."

Staff notes that the time required for field experiments in agricultural sciences varies from years to decades. Staff notes that the Center for Integrated Farming Systems at the University of California, Davis is conducting long-term research focused on improving the sustainability and environmental impact of agriculture. The Center notes that short-term trends can be poor predictors of long-term sustainability in agriculture, citing studies in England where yields increased and decreased over a period of 80 years. Staff further note the level of chloride injury on plants, including productivity effects, may be affected by factors such as soil texture, soil fertility, soil pH, soil cation exchange capacity, soil salinity level, annual rainfall, and irrigation and crop practice. Staff finds that the duration of time and the treatments proposed by the ESA might not be sufficient to address all the factors that may affect the chloride threshold level, and, absent a lengthy TMDL schedule extension, might not provide conclusive data to meet the TMDL schedule.

3.4. 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 report will also subject to review by the TAP that will be formed in the future. 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 US EPA 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.

3.5. 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: a finding that it is necessary to accommodate important economical or social development in the area in which the waters are located; full satisfaction of all intergovernmental coordination and public participation provisions; and assurance that the highest statutory and regulatory requirements for point sources (including new source performance standards) and best management practices for nonpoint source pollutant controls are achieved.

In addition to federal anti-degradation statutes, the Basin Plan includes State Water Resources Control 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.

The due date for the Anti-degradation Analysis is four years from the TMDL Effective Date and Regional Board staff understands that the Districts estimate a one-year study duration for the Anti-degradation Analysis. Regional Board and Districts staff have discussed the Anti-degradation analysis task, but this task has not yet been initiated. Staff has considered the status of the Anti-degradation Analysis schedule in developing alternatives for the Board's consideration.

3.6. Pollution Prevention

Pollution prevention activities have focused on a ban on new installations of SRWSs in residences served by the Saugus and Valencia WRPs, a public awareness and education program, a voluntary sales ban of SRWSs and salt by home furnishing and plumbing stores, a rebate program for residents to remove existing SRWSs, and a ban on the connection of salt water swimming pool drains to the sanitary sewer system.

This ban on installation of new SRWSs has been in place since 2003 and initial results indicate the trend in chloride load increases from SRWSs has been halted. However, staff finds it difficult to assess the effectiveness of pollution prevention activities because the program is relatively recent and the chloride levels in imported water are currently very low. Staff is concerned that recent pollution prevention efforts may not effect further substantial reductions of chloride loadings. For example, the rebate program offers residents $150 for removing an existing SRWS and replacing it with an acceptable alternative. However, the Districts' 2005 Chloride Source report estimated approximately 6,500 operating residential SRWSs in the SCVJSS. The report includes results of a resident survey that predict a 48% SRWS removal rate if the removal incentive program were funded at $1,000 per household. Staff is concerned that the existing rebate may not be sufficient for a significant number of residents to remove their SRWSs. Although the rebate program has been recently implemented, at this time staff understands that there have been less thirty rebates issued.

Similarly, the Districts recently implemented a ban on connection of salt-water swimming pool drains to the SCVJSS collection systems. However, because most swimming pools are drained to streets, wastewater from pool draining operations is conveyed to the Santa Clara River by stormwater sewers rather than through WRP effluent. Absent additional actions by stormwater permittees, staff finds this ban will have little effect on chloride loading to the Santa Clara River.

The Districts' industrial source chloride control program dates back to 1961 with the adoption of resolutions prohibiting the discharge of salt brines produced by the regeneration of water softening units to the SCVJSS. Recent industrial source control efforts focused on Keysor Century Corporation, which was at the time the largest industrial contributor of chloride in the SCVJSS. Keysor Century manufactured polyvinyl chloride (PVC) beads and discharged over 100,000 gallons per day of wastewater containing chloride. By 1999 Keysor Century was only required to haul its water softening brine off-site for disposal, but chloride level in wastewater discharged to the SCVJSS remained elevated. Keysor effected further chloride reduction measures by process changes and the average chloride concentration in Keysor's wastewater dropped from 897 mg/L in 1999 to 400 mg/L in 2000. Assuming chloride mass discharge of 748 ppd in 1999, the decrease of chloride loading from Keysor Century contributed greatly to chloride control from industrial sources. Staff finds that further reduction of industrial chloride loads may be limited.

3.7. Cost Study

The Districts, with cooperation from Regional Board staff, has initiated cost studies for advanced treatment of WRP effluent to attain chloride targets in the receiving water. A Scope of Work to provide preliminary designs and a parametric estimate for capital and operation and management costs was issued in February 2004. The Scope also included an analysis of available existing pipelines to the coast in Ventura County. Staff expects the cost study to be completed by December 2006. The cost study will not include analysis of potential revenue from reuse of the treated effluent to offset advanced treatment costs.

Regional Board staff has reviewed cost estimate summaries for microfiltration/reverse osmosis alternatives from the City of Los Angeles Integrated Resources Plan (LAIRP) Environmental Impact Report (EIR). Staff notes that capital costs range from $33.5 million to $233.4 million for facilities ranging from 15 MGD to 64 MGD. Operation and maintenance costs range from $1.3 million per year to $4.2 million per year. Because the combined flow from the Saugus and Valencia WRPs is approximately 20 MGD, and because treatment of 20-50% of the effluent will be necessary to attain the existing WQO, staff estimates that the lower range of the operation costs defined by the LAIRP EIR are most applicable for the USCR TMDL.

Regional Board also reviewed the State Water Resources Control Board (SWRCB) report, Wastewater User Charge Survey Report F.Y. 2004-2005. This report is prepared annually by the SWRCB and summarizes and analyzes cost data from a survey of California wastewater agencies. The report shows that the monthly user charge for the City of Santa Clarita was $12.46 per month. The report also shows the statewide monthly service charge average is $26.08 per month and the median is $22.04 per month, with a high of $248.58. For Los Angeles County, the monthly service charge average is $22.71 per month and the median is $10.17 per month. Staff recommends that consideration of advanced treatment planning and implementation include an evaluation of TMDL costs as allocated to monthly sewerage rates in the Santa Clarita Valley.

3.8. Collaborative Process

Based on the Chloride Agreement and Stipulation discussed in Section 2.3, 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 special studies as well as other planning issues regarding chloride impairments within the Santa Clara River. About thirty people who represent a wide range of stakeholder interests, including Municipalities, County government, agricultural interests, water purveyors, and environmental interests, attend the meetings. There is a website, www.santaclarariver.org, which updates activities and progress on the USCR Chloride TMDL.

Additionally, two other public outreach evening meetings have been held and an independent TAP of recognized agricultural experts was engaged to review the results of the LRE. The TAP issued a separate report, which provides technical guidance on the use of the LRE for policy development. The TAP report largely confirmed the results of the LRE. Both the TAP Report and LRE are available to the public on the website listed above.

Finally, as noted below, Regional Board staff has been meeting with Districts' staff and representatives of the Ventura County Agricultural Water Quality Coalition to explore the potential for restructuring the TMDL. To date there has been some success in reaching agreement about the need for implementation milestones in the TMDL schedule. However, there has been no further agreement regarding development of an integrated solution that both stakeholders and the Regional Board staff can endorse.

3.9. Regional Board Information Item – November 3, 2005

On November 3, 2005, Regional Board staff presented an Information Item on the status of the TMDL, specifically focusing on the LRE and Implementation Schedule. Staff reported that the most significant issue regarding the TMDL is determining the need for advanced treatment of WRP effluent to attain the chloride WQO and that the numerical value of the WQO objective is a key determinant of the need for advanced treatment. In this respect, the TMDL special studies address two important issues: 1) the chloride threshold that can be tolerated by salt-sensitive crops, and 2) the cumulative effect of the chloride level on groundwater and surface water quality. Staff also noted that the TMDL schedule contained no milestones for implementation tasks during years 6 through 13 and recommended that the Regional Board consider revising the schedule to include implementation milestones and increase the certainty that the chloride target can be attained within the 13-year schedule.

At the November 2005 hearing, staff also informed the Board that the first TMDL special study, the LRE, had recently been completed. The LRE reviewed approximately 200 studies in agronomic literature regarding the salt-sensitivity of avocado, strawberry, and nursery crops. The LRE recommended a chloride hazard range for avocado of 100-117 mg/L based on plant injury.

At the hearing, the Districts supported the existing TMDL Implementation Plan and agricultural stakeholders supported the existing WQO and urged the Board to consider accelerating the implementation schedule in recognition that the existing WQO was scientifically defensible and reasonable.

At the hearing, UWCD, the agency responsible for groundwater management of the Piru and downstream basins, presented a series of maps showing the average chloride concentration plume in groundwater wells exceeding 100 mg/L appears to be migrating downstream in the Piru Basin. UWCD stated that the chloride levels in Piru basin were increasing as the total load from the WRPs increased.

At the hearing, the Districts presented the results of their analysis of projected WRP effluent chloride levels. The Districts stated that pollution prevention activities, specifically the ban on installation of new SRWSs and the removal of all 'grandfathered' SRWSs, would attain a WRP effluent chloride concentration of 97 mg/L for 2010, 2015, and 2050. Staff also notes that the Districts' analysis is based on an assumed constant chloride concentration in the blended water supply of 55 mg/L. Staff notes that the historical record shows SWP chloride levels to range from 28 to 128 mg/L, and that the analysis may not account for a reasonable range of future conditions.

Staff discussed schedule risk associated with the lack of defined tasks for implementation of advanced treatment. Staff described how the Implementation Plan, as presently structured, may not ensure attainment of the final WLAs within 13 years. Staff noted schedule gaps in which there are few tasks or deliverables in years 6 through 13 when advanced treatment, if required, would be constructed. The Regional Board directed staff to meet with the Districts and Agriculture Stakeholders to explore options for mutual agreement on TMDL Implementation. The group has met three times to discuss specific language regarding implementation actions, identification of regional solutions, and options for funding. The group has not yet reached consensus on issues of WQO revisions and restructuring the TMDL Implementation Schedule.

3.10. Stakeholder Concerns

There are several stakeholder groups that regularly attend the Technical Working Group meetings and have expressed concerns about the LRE, ESA and GSWI studies and TMDL Implementation Plan schedule. Two stakeholders, including agricultural interests as represented by the Ventura County Agricultural Water Quality Coalition and the Districts, appear to represent the key views on the issue of amending the TMDL implementation schedule. Their concerns, as understood by Regional Board staff, are summarized below.

The key concern for agricultural stakeholders is the length of the implementation period and the cumulative effects of chloride loading. 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 a letter 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.

Regional Board staff understands that the key concern for the Districts is that the current TMDL Implementation Plan should not be amended and the planning and implementation tasks should proceed according to the implementation schedule of the TMDL. The Districts maintain that significant scientific uncertainty persists and that all of the TMDL special studies should be completed before planning for chloride treatment commences.

4. Alternatives and Recommendation

The Regional Board, at a public hearing, may re-evaluate the schedule and amend the schedule if there is sufficient technical justification. This section first provides a brief overview of the current TMDL schedule and staff's findings regarding the schedule status and results from the Special Studies and other TMDL tasks. Then, alternatives for revising the TMDL schedule and staff's recommendation are presented.

4.1. Overview of TMDL Implementation Schedule

The existing TMDL Implementation Plan, attached to this Staff Report, consists of twelve tasks in three categories: special studies, administrative actions, and implementation planning and actions. The special studies address areas of scientific uncertainty; administrative actions include potential Regional Board actions to develop SSOs and revise the TMDL schedule; implementation planning and actions pertain to implementation of advanced treatment to reduce chloride loadings, if necessary.

The existing TMDL Implementation Plan provides 13-years to attain the chloride WQO and is structured in a sequential manner in which implementation tasks, including planning and design for advanced treatment, are not scheduled to be initiated until the special studies and a SSO are considered by the Regional Board. In the existing implementation plan, the period of special studies and administrative actions is 5-years when the Regional Board is scheduled to consider a SSO, in absence of any extended studies. The implementation period for construction of advanced treatment, if required, is 8-years.

Under the existing TMDL Implementation Plan, the Regional Board will reconsider the Chloride TMDL five times. These reconsiderations include:

- Reconsideration of schedule - 12 months after the effective date;
- Consideration of GSWI recommendations – 2 years after the effective date;
- Consideration of a SSO – 5 years after the effective date;
- Consideration of schedule extension – 9 years after the effective date;
- Consideration of schedule extension – 13 years after the effective date.

4.2. Staff Findings

The alternatives for revising the TMDL are based on Regional Board staff analysis and assessment and are consistent with state and federal law. Staff's findings include:

- Staff finds that the LRE presents critical information for determining the appropriate chloride concentration for the protection of salt-sensitive agricultural uses. Based on a review and evaluation of best available science, the LRE establishes a guideline concentration range of 100-117 mg/L of chloride for salt-sensitive agricultural uses. Staff notes that the LRE represents the best available information on the chloride sensitivity of key crops in the Santa Clara River watershed and any potential revision of the WQO will likely be based on the findings of the LRE. Therefore, the final WQO is not likely to be increased beyond 117 mg/L without extended studies that could take decades to complete.

- Staff finds that the ESA estimates a period of 2 – 10 years for studies to develop additional science for the Regional Board to consider in potentially revising the chloride guideline concentration of 100-117 mg/L established by the LRE. The ESA discusses the complexities of determining a site-specific threshold based on chloride effects on productivity. Staff estimates that at least 10 years of study will be required to obtain sufficient data to support a revision of the WQO beyond the range established by the LRE.

- Staff finds that the GSWI will provide critical information for determining assimilative capacity of the upper reaches of the USCR and the effects of cumulative chloride loadings. Staff assesses that results from the GSWI will provide critical information for the Regional Board to consider a SSO and assess the effectiveness of pollution prevention to attain the requisite load reductions.

- Staff finds that information provided in the ESP study indicates that aquatic species can tolerate higher levels of chloride than avocado. Staff assesses that salt-sensitive agricultural use is the most sensitive beneficial use for chloride load analyses.

- Staff finds that an Anti-degradation Analysis will be required if a revised WQO or a SSO is considered and is above the existing WQO of 100 mg/L.

- As presented at the November 3, 2005 public information hearing, staff finds that the existing schedule contains few milestones during the implementation period. Staff assesses that the lack of concrete implementation tasks increases the risk of not attaining the waste load reductions required by the TMDL during the 13-year implementation period. This concern regarding the possible failure to attain the final WQO is reflected in the language of Task 12.

- Staff finds that the TMDL Implementation Plan is structured in a sequential manner. The initiation of implementation tasks is dependent on the results of the preceeding Special Studies and administrative tasks.

- Staff notes that the current implementation plan contains no discharger milestones for advanced treatment implementation tasks in years 6 through 13 of the

schedule. Staff finds that there is a high risk that chloride WLA will not be met on time due to the lack of interim milestones for advanced treatment.

- Staff finds that the key technical issues of cumulative chloride impacts to groundwater will be addressed by GSWI. GSWI is currently behind schedule by about seven months.

- Staff finds that the current monthly service charges in Santa Clarita are approximately 50% less than statewide average and lower than other cities in the Santa Clara River watershed.

- Staff finds that advanced treatment most likely will be needed to improve the effluent chloride concentration and consistently meet chloride targets ranging from 100 - 117 mg/L established by the LRE. Additionally, with advanced treatment of 7.7 MGD of the SCVJSS combined effluent, removal of at least an additional 75% of the remaining SRWSs is required to meet a 120 mg/L WQO for drought conditions and removal of 25% of the remaining SRWSs is required for non-drought conditions. Without advanced treatment of approximately 7.7 MGD of the combined effluent, a 120 mg/L WQO most likely cannot be attained for drought conditions.

4.3. Implementation Schedule Alternatives

The alternatives described below can be characterized as alternatives that neither extend nor accelerate the 13-year TMDL schedule, an alternative that extends the 13-year TMDL schedule, and an alternative that accelerates the 13-year TMDL schedule.

4.3.1. Alternative 1 - Maintain Current TMDL Schedule – No Action

Under this alternative, the Regional Board takes no action at this time to amend the TMDL Implementation Schedule. The TMDL will proceed according to the existing Implementation Plan and staff will participate in Special Studies and other Implementation tasks. Staff notes several concerns with Alternative 1. As noted above, staff finds a risk of non-attainment of the chloride WQO within 13 years because the existing TMDL lacks milestones for advanced treatment implementation, if required. Therefore, greater definition of the Implementation Schedule may conserve staff resources as the TMDL progresses. Further, it is likely that the GSWI study will not be completed by the TMDL deadline and that the Board may receive an incomplete report by the deadline specified in the existing implementation schedule. Staff notes that the Board can revise the Implementation Plan to extend the due date for GSWI without revising the overall TMDL schedule.

4.3.2. Alternative 2 Maintain Current Schedule – Revise Implementation Plan to include Implementation Milestones

This alternative is based on staff's finding that the Implementation Schedule contains no milestones for implementation activities as described above. Staff has worked with Districts' staff and the Agricultural Water Quality Coalition to draft language that defines milestones in the Implementation Plan. Although the parties agree that such language can benefit the TMDL Implementation Plan by clarifying deliverables in years 5 through 13, the parties have not formally agreed to specific language. Board staff developed language and proposed to address the need for implementation milestones as specified in the accompanying Implementation Schedule – Alternative 2. This alternative neither extends nor accelerates the 13 year schedule for attainment of the chloride WQO.

4.3.3. Alternative 3 Extend TMDL Schedule – Extended Studies

Under this alternative, the Regional Board will extend the Implementation schedule by a minimum of eight years in order to consider the results of the extended agricultural studies. Implementation tasks will be extended so that planning and design activities will commence when the results of the extended studies are available. Based on the range of study duration defined in the ESA, staff assesses that the ESA will include a minimum completion schedule of ten years. This alternative includes staff's recommendations for milestone definition as in Alternative 2. The overall period for this alternative is 21 years from the effective date of the TMDL.

4.4. Alternative 4 Accelerate TMDL Schedule – Integrated Planning

Under this alternative, the Regional Board will revise the schedule for TMDL planning and implementation tasks so that they are triggered based on the results of the LRE and GSWI studies. This alternative extends the due date of the GSWI from the present scheduled completion date of May 2007 until November 2007 to allow a complete GSWI study to be submitted to the Regional Board. The GSWI study will allow the Regional Board to consider a chloride SSO in the USCR and revisions of wasteload allocations for the Saugus and Valencia WRPs within six months after completion of GSWI. By accelerating the date of Regional Board consideration of an SSO, implementation of advanced treatment planning activities can be accelerated and the attainment of the chloride WQO can be accelerated by 3 years. Regional Board staff assesses that integrated planning and design can reduce chloride loading to surface and groundwaters relative to the current TMDL schedule and also reduce the risk of schedule delay during construction of advanced treatment remedies. This alternative includes the implementation milestones included in Alternatives 2 and 3 and will require an Anti-degradation Analysis to be completed for establishing a SSO, if appropriate, for chloride in the USCR.

To implement this alternative, the TMDL schedule will be revised to include implementation milestones regarding the planning and design of advanced treatment within six months of the Regional Board action. These documents will accelerate the planning and installation of advanced treatment. Construction of the remedy, not including planning and design, is estimated at 5 years for an overall TMDL completion within 10 years.

4.5. Staff Analysis of Alternatives

Staff finds that a revision of the Implementation Schedule by the Regional Board will likely affect the Districts and agricultural stakeholders. The Districts opine that the WQO has not been verified through extended studies. The Districts are concerned that the results of the extended studies may indicate a significantly different WQO, which could then reduce the need for advanced treatment. The Agricultural Water Quality Coalition is concerned that cumulative effects of chloride loadings in this watershed are not well studied and continue to accumulate as long as the discharge chloride concentration exceeds the WQO. If the schedule is extended and the extended studies confirm the existing WQO, the groundwater basin would have been unnecessarily further degraded by extending the schedule. Regional Board staff is concerned that advanced treatment, if required, cannot be implemented within the 13-year TMDL schedule unless planning and design milestones for advanced treatment are included in the schedule.

A key concern of the Districts is the cost of implementing planning and design tasks prior to Regional Board consideration of extended studies and potential adoption of a SSO. The Districts contend that planning is costly and may possibly prove unnecessary if extended studies find a significantly increased chloride threshold based on productivity effects rather than plant injury, and the Regional Board adopts a SSO for chloride that is significantly higher than the existing WQO.

Staff finds opportunities for more timely attainment of WQOs by triggering planning and design tasks based on current information from the TMDL special studies and completion of the GSWI. Staff's analysis of chloride loading is based on thirty years of DWR records of chloride imported into the Region and the Districts analysis of SRWS loading from SRWSs. As detailed above, staff finds that pollution prevention alone cannot consistently attain the LRE guideline concentration and that advanced treatment likely will be necessary unless the Regional Board adopts a SSO that is significantly higher than the guideline concentration established by the LRE.

Based on the cost study above, staff notes that current monthly sewerage fees are below the state and regional averages. Because planning and design costs are a small percentage of overall project costs, staff finds that if the Districts were to allocate preplanning and design costs to rate payers in the Santa Clarita Valley, monthly service charges will remain well below the state average and regional averages.

The costs to the agricultural community of continuing chloride loadings at the interim limit level are largely unknown. Stakeholders stated at the November 3, 2005 hearing that recent information shows the potential for groundwater degradation at the current level of chloride loading. Staff notes that it is generally accepted that prevention of groundwater pollution is far less expensive than remediation of groundwater pollution. Thus, staff concludes that the costs of accelerating and initiating preplanning may be offset by the benefits of reducing the potential for groundwater remediation.

4.6. Staff Recommendation

Staff recommends Alternative 4. Staff finds that the remaining technical issues regarding the need for advanced treatment and brine conveyance systems will be addressed by the GSWI and Staff assesses that completion of GSWI will provide sufficient basis for the Regional Board to consider establishing a SSO, if there is sufficient technical justification. Further, many of the extended studies described by the ESA can be scheduled so that their results are available before construction of advanced treatment would commence. This alternative will result in timely attainment of WQOs and reduce the chloride load to the USCR and underlying groundwater basins during the TMDL implementation period. Given the complexity of planning treatment facilities for chloride removal, staff recommends that the TMDL should be amended to reduce the risk of not attaining the WQO within 13 years. Given the potential risk to water resources posed by delays in advanced treatment, staff recommends that the Implementation Schedule be revised so that advanced treatment planning is triggered based on the GSWI studies. This alternative will reduce chloride loadings to the USCR, accelerate the overall TMDL schedule to 10 years and provide sufficient milestone targets to ensure compliance.

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