UPPER SANTA CLARA RIVER

CHLORIDE TMDL RECONSIDERATION, ~~AND~~ CONDITIONAL SITE SPECIFIC OBJECTIVES FOR CHLORIDE, AND INTERIM WASTELOAD ALLOCATIONS FOR SULFATE AND TOTAL DISSOLVED SOLIDS

STAFF REPORT

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD - LOS ANGELES REGION

~~September, 30~~November 24 2008

Executive Summary

Chloride levels in the upper Santa Clara River (USCR) and in nearby groundwater basins have increased over the past three decades due to increased salt loadings from water imported into the Santa Clarita Valley and the increased number of self regenerating water softeners in the Santa Clarita Valley. Since the 1970s, growth in the Santa Clarita Valley has le~~a~~d to chloride levels that exceed the water quality objective and impair beneficial uses for agricultural supply. Agriculture is the largest industry in the Santa Clara River Valley and the Regional Board has adopted a TMDL to restore the Santa Clara River to attain its beneficial uses.

This Staff Report discusses efforts under the Upper Santa Clara River Chloride TMDL to address these impairments with particular emphasis on the recent studies which have le~~a~~d to a stakeholder developed plan for complying with the TMDL. The stakeholder plan, termed "Alternative Water Resources Management Plan" (AWRM) considers the results of key TMDL studies on the chloride sensitivity of crops and aquatic life and the interaction of groundwater and surface water in the USCR to fashion a plan that provides reduction of chloride loads from current levels, enhancement of water supplies for recycling and downstream uses, restoration of groundwater basins underlying the Upper Santa Clara River, and consideration of critical conditions such as a sustained drought. The AWRM requires a revision to existing water quality objectives for chloride, but it provides a significant reduction in chloride loading from current levels such that the most stringent beneficial uses are attained. During the critical condition of sustained drought, growers are provided alternative water to meet requirements and the chloride exported from the watershed still exceeds chloride into the watershed so that groundwater conditions will continue to improve.

The Regional Board first adopted a Total Maximum Daily Load (TMDL) for chloride in the USCR in 2000. The TMDL showed that chloride is loaded primarily into the Santa Clara River from Water Reclamation Plants serving residential, commercial and industrial users in the Santa Clarita Valley. The sources of the chloride which are loaded into the SCR are primarily chloride contained in the imported source water and chloride added by domestic uses, including self regenerating water softeners. As the Santa Clarita Valley has grown over the past decades, these TMDL source analyses also showed that the water quality objectives could not be met with source control alone, and that some type of advanced treatment would be necessary.

The identification of remedies for chloride impairments is challenging due to stakeholders with widely different interests in Los Angeles and Ventura Counties and potentially costly implementation measures. These factors lead to a remand of the TMDL from State Water Resources Control Board and after reconsideration by the Regional Board, the TMDL became effective on May 5, 2005. Key provisions of this TMDL include special studies to address scientific uncertainties and a consideration of site specific objectives by the Regional Board. This Staff Report summarizes the results of the special studies and discussions with stakeholders, which lead to an AWRM program to comply with the TMDL. This report considers the antidegradation and Water

Code Section 13241 requirements and recommends conditional site specific objectives to implement the AWRM.

Prior to completion of the special studies, the presumed implementation plan included two options: advanced treatment of effluent from the Saugus and Valencia water reclamation plants and disposal of brine in a new ocean outfall or disposal of effluent from the Saugus and Valencia water reclamation plants in a new ocean outfall. Both options entail construction of a pipeline from the Santa Clarita Valley WRPs and an ocean outfall. Concerns regarding the cost and feasibility of constructing this line lead caused controversy amongst stakeholders.

The TMDL Special Studies, all conducted in a facilitated stakeholder process in which stakeholders in scoping and reviewing the studies addressed three scientific uncertainties: 1) the levels of chloride required to support irrigation of salt sensitive crops; 2) the interaction of surface water and groundwater and the fate and transport of chloride in the USCR; 3) the effects of chloride on threatened and endangered fish in the USCR.

Regional Board staff finds that the work to date provides sufficient information on the chloride hazard threshold for salt-sensitive crops, the chloride threshold for endangered species, and the hydraulic and contaminant interactions between surface waters and groundwater basins in the USCR watershed to demonstrate that conditional site specific objectives can be combined with reverse osmosis technology to effectively reduce chloride loadings to the USCR and protect beneficial uses. Completion of the Literature Review and Evaluation (LRE) provided a scientifically defensible baseline to support a Water Quality Objective (WQO) of 117 milligrams per liter (mg/L) that is protective of agricultural supply beneficial use (AGR). The endangered species study shows that the chloride threshold for protection of salt sensitive agriculture is also protective of threatened and endangered species. The groundwater surface water interaction model shows that surface flows in the river recharge the Piru Basin with attendant chloride accumulation in that groundwater Basin. The AWRM consists of chloride source reduction actions and chloride load reduction through advanced treatment of the Valencia WRP effluent in conjunction with conditional site specific objectives. These source and load reductions mitigate the effect of any chloride accumulation in the groundwater basin.

The TMDL provides a ten-year schedule to attain compliance with the conditional SSOs. Key uncertainties at this point relate to identification of the optimum method for brine disposal. Several options, including deep-well injection in the vicinity of old oil fields in the Santa Clarita Valley, and drying and landfill disposal will be considered by the Santa Clarita Sanitation District of Los Angeles County in the first two years of the TMDL Implementation Plan. The recommended water quality objective changes before the Board are conditioned on implementation of the AWRM program; if the AWRM system is not built, the water quality objectives revert back to the current levels in the Basin Plan.

Staff's recommendation is to adopt the conditional site specific objectives for chloride. Staff finds that the costs of implementing the AWRM program will not increase monthly sewage rates substantially above the state average and median rates. Staff notes that the existing TMDL schedule can be accelerated by one year from 11 years to 10 years.

List of Acronyms

AGR – Agricultural Supply Beneficial Use
AWRM – Alternative Water Resources Management
BPA – Basin Plan Amendment
cfs – cubic feet per second
CLWA – Castaic Lake Water Agency
EIR – Environmental Impact Report
ESA – Extended Study Alternatives
ESP – Endangered Species Protection
GWR – Groundwater Recharge Beneficial Use
GSWI – Groundwater and Surface Water Interaction Model
LA – load allocation
LRE – Literature Review and Evaluation
LWA – Larry Walker Associates
MCL – Maximum Contaminant Level
MF/RO – microfiltration-reverse osmosis
MGD – million gallons per day
mg/L – milligrams per liter
NPDES – National Pollutant Discharge Elimination System
O&M – operation and maintenance
ppd – pounds per day
RARE – Rare and Endangered Species Habitat Beneficial Use
RO – Reverse Osmosis
SARI – Santa Ana Regional Interceptor
SB475 – Senate Bill 475
SCV – Santa Clarita Valley
SCVJSS – Santa Clarita Valley Joint Sewerage System
SCVSD – Santa Clarita Valley Sanitation District of Los Angeles County
SRWS – Self-Regenerating Water Softener
SSO- Site Specific Objective
SWP – State Water Project
SWRCB – State Water Resources Control Board
TAP – Technical Advisory Panel
TDS – Total Dissolved Solids
TMDL – Total Maximum Daily Load
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
WLA – Wasteload Allocation
WQO – Water Quality Objective
WRP – Water Reclamation Plant

TABLE OF CONTENTS

1. Introduction 8
2. Background 10
2.1. Regulatory History 10
2.2. Stakeholder Collaborative Process 12
2.3. Environmental Setting 12
2.4. Beneficial Uses and WQOs 14
2.5. Chloride Sources and Water Quality 15
2.6. Future Growth 16
2.7. Salinity Management – Recent State and Regional Boards Actions 17
3. Results of TMDL Special Studies 20
3.1. Literature Review and Evaluation 20
3.2. Extended Study Alternatives 20
3.3. Endangered Species Protection 21
3.4. Groundwater and Surface Water Interaction Model 21
3.5. Conceptual Compliance Measures (AWRM) 23
3.6. Site Specific Objectives and Antidegradation Analysis 23
4. Alternative Water Resources Management Program 24
4.1. Conditional Site Specific Objectives to Support AWRM 27
4.2. Conditional Wasteload Allocations to Support AWRM 30
4.3. Conditional Load Allocations to Support AWRM 33
5. Water Code Section 13241 Analysis 35
5.1. Past, present, and probable future beneficial uses of water 35
5.2. Environmental characteristics 36
5.3. Water quality conditions that could reasonably be achieved 37
5.4. Economic Considerations 37
5.5. The Need to Develop Housing 40
5.6. The Need to Develop and Use Recycled Water 40
6. Antidegradation Analysis 41
7. Alternatives Analysis and Staff Recommendation 44
7.1. Alternative 1 - Maintain Current Basin Plan Objectives – No Action 44
7.2. Alternative 2 - Adopt Conditional SSOs and Revised TMDL Conditional WLAs 45
7.3. Staff Recommendation 45
8. Implementation 49
8.1. Implementation of Reach 4B Conditional WLAs 49
8.2. Implementation of Reach 5 and 6 Conditional WLAs 50
8.3. Blended RO and Groundwater Discharge to Reach 4A 51
8.4. Supplemental Water 51
8.5. Downstream Effects of TMDL Implementation 52
8.6. Implementation Schedule 54
8.7. Monitoring for the AWRM Program 54
9. References 57
~~391. Introduction ..... 7~~
~~2. Background ..... 9~~

~~2.1. Regulatory History ... 9~~
~~2.2. Stakeholder Collaborative Process ... 11~~
~~2.3. Environmental Setting ... 11~~
~~2.4. Beneficial Uses and WQOs ... 12~~
~~2.5. Chloride Sources and Water Quality ... 13~~
~~2.6. Future Growth ... 15~~
~~2.7. Salinity Management – Recent State and Regional Boards Actions ... 15~~
~~3. Results of TMDL Special Studies ... 18~~
~~3.1. Literature Review and Evaluation ... 18~~
~~3.2. Extended Study Alternatives ... 18~~
~~3.3. Endangered Species Protection ... 19~~
~~3.4. Groundwater and Surface Water Interaction Model ... 19~~
~~3.5. Conceptual Compliance Measures (AWRM) ... 21~~
~~3.6. Site Specific Objectives and Antidegradation Analysis ... 21~~
~~4. Alternative Water Resources Management Program ... 22~~
~~4.1. Conditional Site Specific Objectives to Support AWRM ... 25~~
~~4.2. Conditional Wasteload Allocations to Support AWRM ... 27~~
~~4.3. Conditional Load Allocations to Support AWRM ... 30~~
~~5. Water Code Section 13241 Analysis ... 31~~
~~5.1. Past, present, and probable future beneficial uses of water ... 31~~
~~5.2. Environmental characteristics ... 32~~
~~5.3. Water quality conditions that could reasonably be achieved ... 33~~
~~5.4. Economic Considerations ... 33~~
~~5.5. The Need to Develop Housing ... 35~~
~~5.6. The Need to Develop and Use Recycled Water ... 36~~
~~6. Antidegradation Analysis ... 37~~
~~7. Alternatives Analysis and Staff Recommendation ... 40~~
~~7.1. Alternative 1 - Maintain Current Basin Plan Objectives – No Action ... 40~~
~~7.2. Alternative 2 - Adopt Conditional SSOs and Revised TMDL Conditional WLAs ... 41~~
~~7.3. Staff Recommendation ... 41~~
~~8. Implementation ... 45~~
~~8.1. Implementation of Reach 4B Conditional WLAs ... 45~~
~~8.2. Implementation of Reach 5 and 6 Conditional WLAs ... 46~~
~~8.3. Blended RO and Groundwater Discharge to Reach 4A ... 47~~
~~8.4. Supplemental Water ... 47~~
~~8.5. Downstream Effects of TMDL Implementation ... 48~~
~~8.6. Implementation Schedule ... 50~~
~~8.7. Monitoring for the AWRM Program ... 50~~
~~9. References ... 52~~

1. Introduction

This staff report discusses the scientific and regulatory basis for proposed Basin Plan amendments to revise the Upper Santa Clara River Chloride Total Maximum Daily Load (TMDL) and establish conditional site-specific water quality objectives (SSOs) for chloride in reaches and groundwater basins in the Upper Santa Clara River watershed.

The Los Angeles Regional Water Quality Control Board (Regional Board) adopted a TMDL to address chloride impairments of the USCR on July 10, 2003 (Resolution 03-008). On May 6, 2004, the Regional Board amended the USCR chloride TMDL to revise the interim wasteload 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 and United States Environmental Protection Agency (USEPA), and became effective on May 4, 2005.

At the time the TMDL was adopted and approved, there were key scientific uncertainties regarding the sensitivity of crops to chloride and the complex interactions between surface water and groundwater in the Upper Santa Clara River watershed. However, the TMDL found that the chloride sources are primarily imported source water from the State Water Project and chloride added by domestic uses, including self regenerating water softeners. These chloride sources are loaded into the USCR in effluent from the Saugus and Valencia Water Reclamation Plants (WRPs) that serve residents and industries in the Santa Clarita Valley. The TMDL recognized the possibility of revised chloride water quality objectives (WQOs) and included mandatory reconsiderations by the Regional Board to consider SSOs. The TMDL required the Santa Clarita Valley Sanitation District of Los Angeles County (SCVSD[1]) to implement special studies and actions to reduce chloride loadings from the Saugus and Valencia WRPs. The TMDL included the following special studies to be considered by the Regional Board:

- Literature Review and Evaluation (LRE) – review agronomic literature to determine a chloride threshold for salt sensitive crops.
- Extended Study Alternatives (ESA) – identify agricultural studies, including schedules and costs, to refine the chloride threshold.
- Endangered Species Protection (ESP) – review available literature to determine chloride sensitivities of endangered species in the USCR.
- Groundwater and Surface Water Interaction Study (GSWI) – determine chloride transport and fate from surface waters to groundwater basins underlying the USCR.

[1]Prior to 2005, the Santa Clarita Valley was historically served by the County Sanitation District Number 26 of Los Angeles County (Saugus WRP) and County Sanitation District Number 32 of Los Angeles County (Valencia WRP). Both of these Districts were collectively referred to as the County Sanitation Districts of Los Angeles County or CSDLAC in previous documents related to the Upper Santa Clara River Chloride TMDL. These two districts were merged into a single district, the Santa Clarita Valley Sanitation District of Los Angeles County or SCVSD as of July 1, 2005.

- Conceptual Compliance Measures – identify potential chloride control measures and costs based on different hypothetical WQO and final WLA scenarios.
- Site Specific Objectives and Antidegradation Analysis - consider a site-specific objective for chloride based on the results of the agricultural chloride threshold study and the GSWI.

The TMDL special studies were conducted in a facilitated stakeholder process in which stakeholders participated in scoping and reviewing the studies. This process has lead stakeholders to develop an alternative TMDL implementation plan that addresses chloride impairment of surface waters and degradation of groundwater. The alternative, termed Alternative Water Resources Management (AWRM) was first set forth by Upper Basin water purveyors and United Water Conservation District (UWCD), the management agency for groundwater resources in the Ventura County portions of Upper Santa Clara River watershed.

This Staff Report first presents a background on the TMDL, including regulatory history, the stakeholder collaborative process, a description of the watershed and the sources of chloride, and other salinity management programs in the state. The report then discusses the results and conclusions of the special studies which led to the development of the AWRM Program and proposed conditional SSOs. The AWRM Program and the proposed conditional SSOs needed to support the AWRM are then discussed. The report then discusses one of the special studies in detail, the Site Specific Objectives/ Antidegradation Analysis, which provides the regulatory basis for the conditional SSOs. Finally, the staff report reviews the alternatives for TMDL implementation based on the results of the special studies, provides staff's recommendation for conditional SSOs and TMDL revisions, and discusses how the recommended conditional SSOs and TMDL revisions would be implemented.

2. Background

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

2.1. Regulatory History

The Regional Board has adopted several 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 WQOs in the Santa Clara River and Calleguas Creek because of the potential to affect present and anticipated agricultural beneficial uses.

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 WQOs 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 in October 2002 (Resolution No. 2002-018). The TMDL showed that the chloride sources are primarily chloride contained in the imported source water from the State Water Project and chloride added by domestic uses, including self regenerating water softeners. These chloride sources are loaded into the USCR in effluent from the Saugus and Valencia WRPs that serve residents and industries in the Santa Clarita Valley. The TMDL source analysis also showed that the water quality objectives could not be met with source control alone, and that some type of advanced treatment would be necessary. The TMDL contained an 8-1/2 year implementation plan to attain chloride WQOs.

Because of differing stakeholder interests and potentially costly implementation measures, the State Board remanded the Chloride TMDL (State Board Resolution No. 2003-0014) to the Regional Board in February 2003 due to concerns about the duration of the interim effluent limits and concerns that the original implementation plan could have required the SCVSD to embark on planning and construction of an advanced treatment even though such studies might have demonstrated a need that could have been proved unnecessary in the end. The remand resolution also directs the Regional Board to consider an integrated solution for all water quality pollutants in the SCR basin on the Clean Water Act 303(d) list. 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. 04-004) 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 SCVSD signed a Settlement Agreement and Stipulation Concerning Chlorides in the UCSR. The Regional Board and SCVSD 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.

In 2006, the Regional Board reconsidered the TMDL and amended the TMDL schedule. The Board considered the results of the special studies to date and found it appropriate to accelerate the study period of the Implementation Plan based on the Literature Review and Evaluation, which showed that the range of chloride values protective of AGR and GWR beneficial uses was significantly smaller than originally anticipated.

In 2007, the Regional Board amended the Basin Plan to divide Reach 4 into two separate reaches. This action was based on historical and current water quality, flow, and land use data showing significant water quality differences between the western and eastern portions of Reach 4. Staff found that Reach 4 of the SCR contains unique hydrogeologic conditions due to the significant alterations to land uses and waste discharges within the USCR watershed that supported the separation of the reach into two separate reaches, 4A and 4B, divided at the confluence of Piru Creek.

This proposed action represents the second Regional Board reconsideration of the TMDL, which is scheduled 3-years after the TMDL effective date. Specifically, Tasks 10.a and 10.d of the TMDL Implementation Schedule state, “Preparation and Consideration of a Basin Plan Amendment (BPA) to revise the chloride objective by the Regional Board” and “Reconsideration of and action taken on the Chloride TMDL and Final Wasteload Allocations for the Upper Santa Clara River by the Regional Board.”

2.2. Stakeholder Collaborative Process

Based on the Chloride Agreement and Stipulation discussed in Section 2.1, the Regional Board and the SCVSD entered into a collaborative process in June of 2004 to implement the TMDL special studies. The Regional Board and SCVSD have set up a facilitated process to allow for stakeholder input and review of the special studies as they are developed. The SCVSD, Regional Board, facilitators, consultants and stakeholders attended Technical Working Group meetings on a monthly basis in the Cities of Santa Clarita, Fillmore, and Santa Paula 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, an independent technical advisory panel (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, Regional Board staff has been meeting with SCVSD' staff and representatives of the Upper Basin Water Purveyers, UWCD, and Ventura County Agricultural Water Quality Coalition, to explore the potential implementation actions and site specific objectives for the TMDL. This process has lead to development of the AWRM and the development of proposed conditional SSOs to support the AWRM and protect beneficial uses.

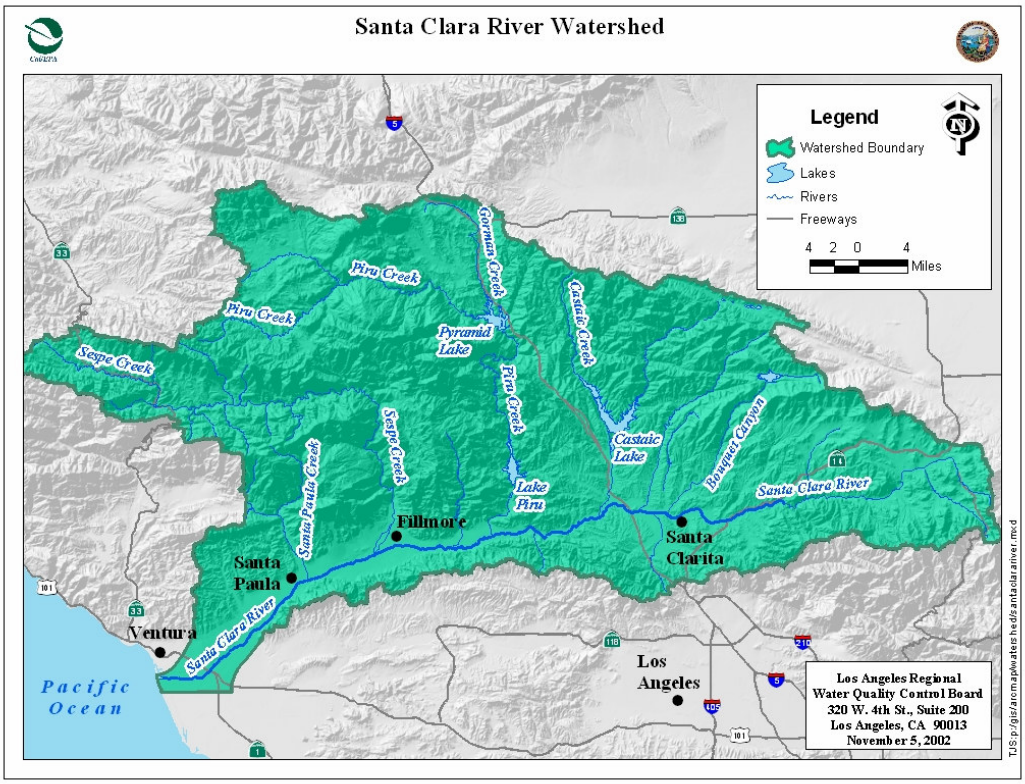
2.3. Environmental Setting

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 (Figure 1).

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.

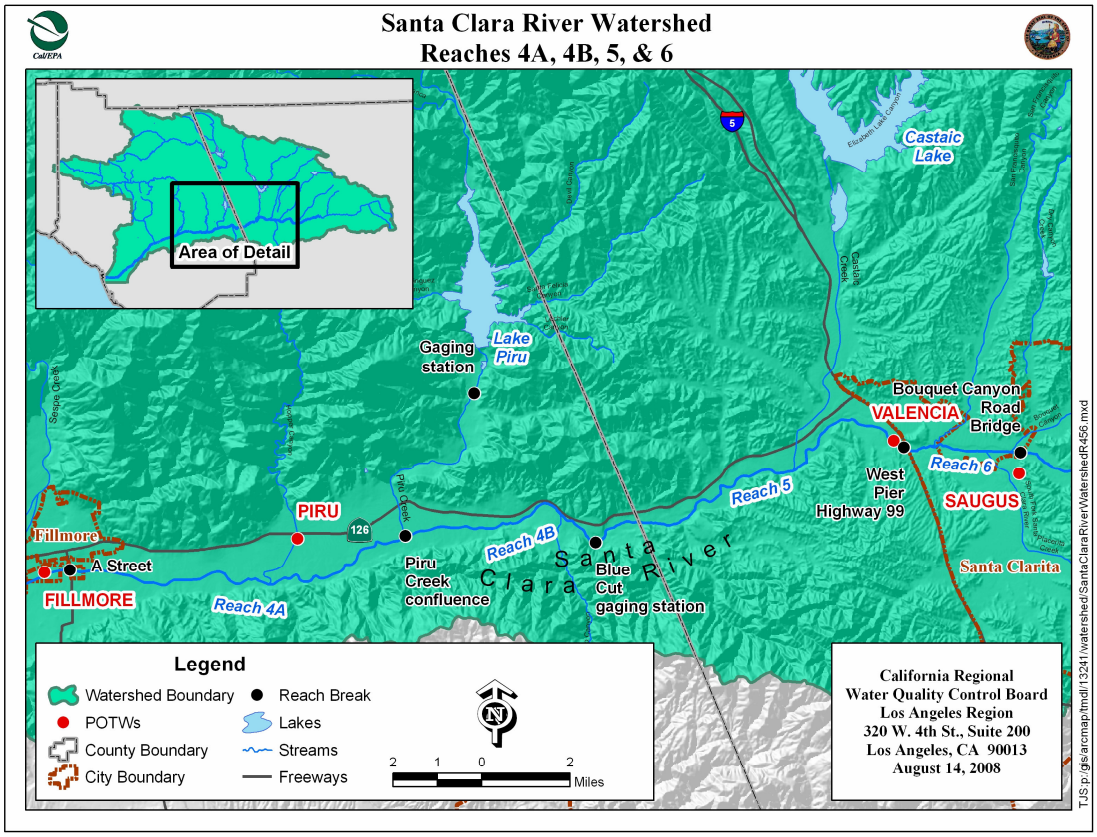
The predominant land uses in the Santa Clara River watershed include agriculture, open space, and residential uses. Revenue from the agricultural industry within the Santa Clara River watershed is estimated at over $700 million annually. Residential use is increasing rapidly both in the upper and lower watershed. The number of housing units in the watershed is estimated to increase by 187 percent from 1997 to 2025.

Figure 1. Santa Clara River Watershed



The upper reaches of the Santa Clara River include Reaches 5 and 6, which are located upstream of the Blue Cut gauging station, 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. The portion of the river within Los Angeles County is generally described as the Upper Santa Clara River, and the portion within Ventura County is generally referred to as the Lower Santa Clara River. Two major point sources, the Saugus and Valencia WRPs, discharge to the USCR. Below Reach 5 are reaches 4A and 4B, divided at the confluence of Piru Creek (Figure 2).

Figure 2. Santa Clara River Watershed Reaches 4A, 4B, 5, and 6



2.4. 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 USCR. 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 current WQO for chloride in Reaches 4A, 4B, 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.

2.5. Chloride Sources and Water Quality

This section summarizes chloride sources in the USCR watershed and projections of the effects of future growth and chloride reduction measures on the final WRPs effluent quality. Regional Board and SCVSD staff analyzed chloride sources in the USCR watershed in the 2002 Regional Board TMDL Staff Report and in the SCVSD's 2002, 2005, 2006 and 2007 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 2007.

- The WRP effluent chloride load is comprised of two main sources: chloride present in the imported 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: residential, commercial, industrial, infiltration, and wastewater disinfection. The two largest sources of chloride in the WRP effluent are the imported water supply and SRWSs, which have historically comprised from 37% to 45% and from 26% to 33% of the chloride in the WRP effluent, respectively.

- Municipal supply in 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 SCVSD reported a sharp decline in residential SRWS chloride contribution from 66 mg/L in 2004 to 35 mg/L during the first half of 2007. This large change in chloride loading represents the removal or inactivation of roughly 2,200 SRWSs, from a high in 2004 of 6,800 to 4,600 by July of 2007.

- In 2006, The SCVSD and the City of Santa Clarita co-sponsored Senate Bill 475 (SB475), which is authored by Senator George Runner of the 17th Senate District. SB 475 provides the SCVSD with the authority to require removal all SRWS remaining in the Santa Clara Valley that were installed prior to SCVSD's 2003 ordinance. SB 475 also includes establishments of a phased voluntary and mandatory program to compensate residents for the reasonable value and cost of removal and disposal of SRWS. SB 475 was passed by the Legislature on August 31, 2006, and signed into law on September 22, 2006. The SCVSD has enacted a new ordinance on June 11, 2008 banning the use of existing SRWS, which will become effective on January 1, 2009, contingent upon voter approval by the qualified voters in the SCVSD's service area. This ordinance will be considered for voter approval by qualified voters in the district's service area in the November 2008 general election.

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

Table 1. Relative Chloride Loadings to Saugus and Valencia WRPs Effluent by Source

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%	29%	0%	8%	100%
2003	45%	1%	3%	13%	31%	0%	7%	100%
2004	41%	1%	3%	14%	33%	0%	8%	100%
2005	37%	2%	3%	16%	30%	3%	9%	100%
2006	42%	2%	3%	18%	26%	0%	9%	100%
2007 (through June)	43%	2%	4%	17%	26%	0%	8%	100%

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

2.6. 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 SCVSD estimates effluent flow from wastewater treatment plants will grow from approximately 20 million gallons per day (MGD) presently to about ~~32~~ 34 MGD ~~in~~ by 2027~~30~~. The effects of this growth on the chloride levels in the Santa Clara River and underlying aquifers were investigated through GSWI Study (see Section 3.4).

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 (Newhall Ranch WRP) as associated facility (Impact Sciences, Inc., 2006).

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.

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.

Additionally, staff notes that the SCVSD's 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 3,562 ppd in 2002 to 4,272 ppd in 2006.

2.7. 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, Santa Ana, and Los Angeles 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 SWP and the Delta Mendota Canal 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, 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 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 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 planed 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.

In 2006, the Los Angeles Regional Board adopted the Calleguas Creek Watershed Salts TMDL based on a salts balance for that watershed. The Regional Board found that the water quality impairments and groundwater degradation in the Calleguas Creek watershed are due to a greater mass of salts imported to the watershed than exported from the watershed. The TMDL requires salt export throughout the watershed to achieve a salt balance, reduce salt load to surface and groundwater, and achieve and maintain water quality objectives for salts in the watershed. The Calleguas Creek watershed TMDL Implementation Plan is based on construction of a regional brine line and ocean outfall through which brines from the advanced treatment of degraded groundwater in the Calleguas Creek watershed are discharged directly to the ocean in compliance with the state Ocean Plan. The TMDL implementation plan also includes increased use of POTW effluent and advanced treated (reverse osmosis) groundwater for recycled water use. This plan has collateral benefits of increasing local sources of water supply in the watershed.

3. Results of TMDL Special Studies

This section describes the results of TMDL Special Studies and other chloride management activities in the USCR watershed, which were considered by staff in proposing TMDL revisions and conditional SSOs for the USCR watershed.

3.1. Literature Review and Evaluation

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 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. As a supplement to the LRE, a memorandum on averaging period analysis was prepared by Newfields Agricultural and Environmental Resources (Newfields), in consultation with the TAP co-chairs, to determine what the applicable compliance averaging periods are for the LRE guideline concentration. The memorandum found that the minimum time between the beginning of exposure to chloride stress and signs of visible leaf chloride injury is between 2 and 9 weeks when high chloride concentrations are applied (at least 170 mg/L), and usually between 4 and 8 weeks. Based on an analysis of the literature and the receiving water variability, a three-month averaging period was recommended. (Newfields, 2008)

3.2. Extended Study Alternatives

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 threshold determined by the LRE. The ESA also documented the complexities of determining the effects of chloride on crop productivity under field conditions. 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 requirements.

3.3. Endangered Species Protection

This task provided a review of technical literature regarding the chloride sensitivity of several endangered aquatic and riparian species 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. Evaluation of overall toxicity data indicates that chloride concentrations for acute and chronic toxicity would be fully protective of Threatened and Endangered species in the USCR. 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. The study results were reviewed by an independent TAP with the TAP finding the report supports the conclusion that the existing US EPA criteria are protective of threatened and endangered species in the Santa Clara River.

3.4. Groundwater and Surface Water Interaction Model

The GSWI model study was developed to determine the linkage between surface water and groundwater quality with respect to chloride and total dissolved solids (TDS) in the USCR. The model simulated historical water levels, flows, and concentrations and movement of chloride in surface water and groundwater in the USCR watershed from 1975 through 2005. The calibrated model was reviewed and approved as an appropriate and adequate modeling tool by the stakeholders and an independent GSWI TAP. The model was then used to assess the assimilative capacity of the surface water in Reaches 4, 5 and 6 and the groundwater basins underlying those reaches. The model was also used to determine the gradient of chloride concentrations from the Saugus and Valencia WRP outfalls to downstream receiving water stations and to assess the impacts of WRP effluent on underlying groundwater in the USCR. The model was then used to simulate future potential chloride impacts from 2007 to 2030 based on various combinations of high, intermediate and low reuse of recycled water from the with various levels of advanced treatment or SRWS removal rates. The results of the initial GSWI study are presented in a report entitled “Task 2B-1 Numerical Model Development and Scenario Results” (CH2M Hill, 2008; Geomatrix, 2008a).

Based on the model, none of the alternatives were predicted to comply with the existing chloride WQO of 100 mg/L at all times and at all locations (Table 2).

Table 2. Attainment Frequencies of Compliance Options-Existing Water Quality Objective

Compliance Options	Surface Water at Blue Cut Reach 4B Surface Water WQO 100 mg/L	East Piru Basin Groundwater Reach 4B Surface Water WQO 100 mg/L	East Piru Basin Groundwater Reach 4B Ground-water WQO 200 mg/L	West Piru Basin Groundwater Reach 4A Surface Water WQO 100 mg/L	West Piru Basin Groundwater Reach 4A Ground-water WQO 100 mg/L
Advanced Treatment	66.8	55.0	100.0	100.0	100.0
Minimal Discharge	65.5	62.1	100.0	100.0	100.0
Zero Discharge	63.8	68.3	100.0	100.0	100.0
Alternate WRP Discharge Location	48.9	46.1	100.0	100.0	100.0
AWRM	43.5	56.3	100.0	100.0	100.0

Note: Values represents percentage of days during simulation period that chloride is predicted to be equal to or less than the WQO concentration

Only the advanced treatment scenarios would produce surface water chloride concentrations less than the upper bound of the LRE chloride threshold of 120 mg/L (Table 3).

Table 3. Attainment Frequencies of the Compliance Options-LRE Water Quality Objective

Compliance Options	Surface Water at Blue Cut Reach 4B Surface Water WQO 120 mg/L	East Piru Basin Groundwater Reach 4B Surface Water WQO 120 mg/L	East Piru Basin Groundwater Reach 4B Ground-water WQO 200 mg/L	West Piru Basin Groundwater Reach 4A Surface Water WQO 120 mg/L	West Piru Basin Groundwater Reach 4A Ground-water WQO 100 mg/L
Advanced Treatment	99.0	99.6	100.0	100.0	100.0
Minimal Discharge	87.8	98.8	100.0	100.0	100.0
Zero Discharge	80.7	97.5	100.0	100.0	100.0
Alternate WRP Discharge Location	76.0	80.5	100.0	100.0	100.0
AWRM	88.0	93.0	100.0	100.0	100.0

Note: Values represents percentage of days during simulation period that chloride is predicted to be equal to or less than the WQO concentration

As a result, stakeholders in the USCR developed the AWRM Program, which increases chloride WQOs in certain groundwater basins and reaches of the USCR watershed, decreases the chloride objectives in the eastern Piru Basin, and results in an overall reduction in chloride loading as well as water supply benefits.

3.5. Conceptual Compliance Measures (AWRM)

The GSWI model was used to assess the ability of the AWRM to achieve compliance with proposed conditional SSOs under future water use scenarios within the USCR watershed. The model was based on design capacities at Valencia WRP and Saugus WRP of 27.6 MGD and 6.5 MGD, for a total system design capacity of 34.1 MGD by year 2027. The results of this effort are presented in a report entitled "Task 2B-2 Assessment of Alternatives for Compliance Options Using the Groundwater/Surface Water Interaction Model" (Geomatrix, 2008b). The model predicted that the AWRM could achieve proposed conditional SSOs for chloride under both drought and non-drought conditions (Table 4).

Table 4. Attainment Frequencies of the AWRM Compliance Option for Revised WQO

Compliance Options	Reach 4B (at Blue Cut) Surface Water WQO 117 mg/L	Surface Water WQO 130 mg/L	Ground-water WQO 150 mg/L	Reach 5 Surface Water WQO 150 mg/L	Ground-water WQO 150 mg/L	Reach 6 Surface Water WQO 150 mg/L	Ground-water WQO 150 mg/L
AWRM Alternative	99.9	99.2	100.0	98.3-99.7	100.0	98.6-99.7	100.0

Note: Values represents percentage of days during simulation period that chloride is predicted to be equal to or less than the WQO concentration

3.6. Site Specific Objectives and Antidegradation Analysis

The Site Specific Objectives and Antidegradation analysis has been completed and is included in a report entitled "Task 7 and 8 Report Site Specific Objective and Antidegradation Analysis" prepared by Larry Walker Associates (LWA). This report also presents the costs associated with the AWRM compliance alternatives identified in the GSWI reports. The report found that adoption of proposed conditional SSOs, when implemented with the AWRM Program, would be consistent with the state and federal antidegradation policies. The results of the SSO/Antidegradation analysis are discussed further in Sections 6 and 7.

4. Alternative Water Resources Management Program

The AWRM Program is a result of joint efforts of the Upper Basin Water Purveyors[2], Ventura County agricultural and water interests[3], and the SCVSD to find a regional watershed solution for compliance with the TMDL that benefits parties in both Los Angeles and Ventura Counties. The AWRM Program, which is described in detail in the GSWI Task 2B-2 Report (Geomatrix, 2008b), consists of advanced treatment for a portion of the recycled water from the SCVSD's Valencia WRP, constructing a well field in the eastern Piru basin to pump out higher chloride groundwater, discharging the blended pumped groundwater and advanced treated recycled water to Reach 4A at the western end of the Piru basin at a chloride concentration not to exceed 95 mg/L (Reach 4A WQO is 100 mg/L), and providing supplemental water and advanced treated recycled water to the river.

The objectives of the AWRM program are to lower chloride concentrations crossing the County Line, comply with conditional SSOs, protect agricultural water users in the eastern Piru basin, mitigate high-chloride groundwater in the eastern Piru basin, and maximize water resources in Ventura County. The key elements of the AWRM Program focus on reducing chloride in the water reclamation plant effluent through:

- SRWS removal
- Conversion of treated wastewater disinfection from chlorine injection to ultra-violet light disinfection
- Construction of 3 MGD microfiltration-reverse osmosis (MF/RO) facility at the Valencia WRP
- Brine disposal via deep well injection
- Groundwater extraction from the Piru Basin
- Discharges of blended MF/RO water and extracted groundwater in Reaches 4A and 4B

These facilities would typically be operated in two modes depending on the SCVSD's ability to comply with applicable water quality objectives, which is correlated to ~~the~~ chloride concentrations in the State Water Project (SWP) supply water (Figure 3~~2~~). During typical hydrologic cycles, when the supply water concentration is below 80 mg/l, the SCVSD WRPs would be able to comply with applicable water quality objectives a majority of the time without having to discharge ~~the~~ RO permeate produced at the Valencia WRP to the Santa Clara River. Under these conditions, the RO permeate

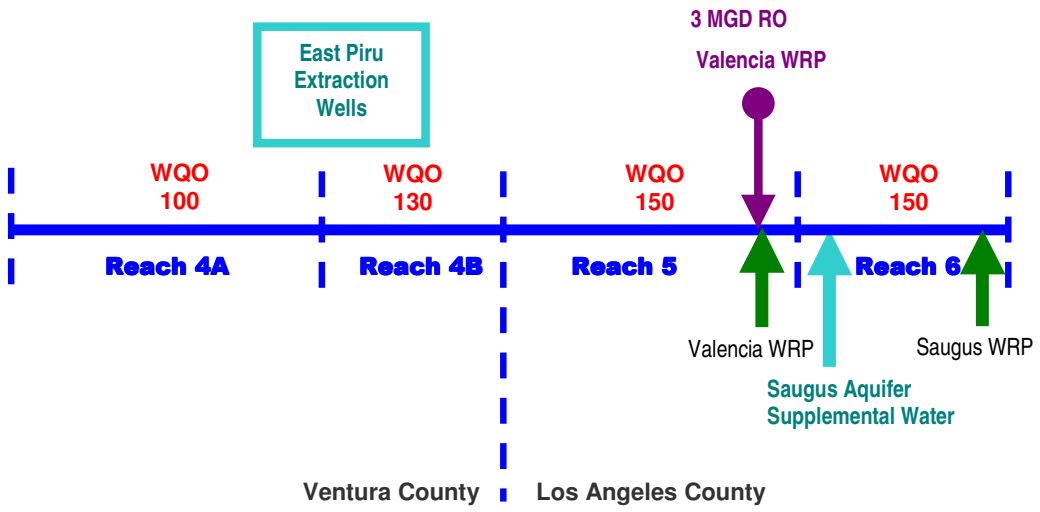
[2] The Upper Basin Water Purveyors are the Castaic Lake Water Agency, Valencia Water Company, Newhall County Water District, Los Angeles County Water Works District No. 36, and the Santa Clarita Water Division of the Castaic Lake Water Agency

[3] Represented by Ventura County Agricultural Water Quality Coalition (VCAWQC) and UWCD

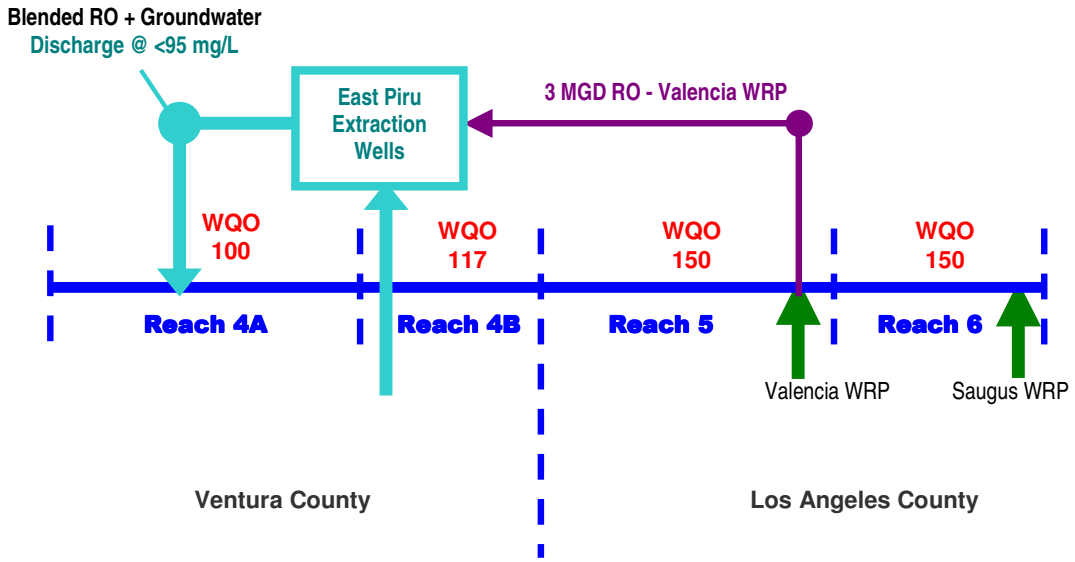
c~~w~~ould be delivered to the extraction wells, blended with pumped groundwater, and discharged to Reach 4A for Ventura County water supply benefit. This option provides further water quality benefits for Ventura County because increased flows can mitigate sea water intrusion to the Oxnard Plain. During periods when the supply water concentration is above 80 mg/l~~,~~ is typically when most, if not all of the RO permeate will ~~be~~ need to be discharged directly to ~~4B~~ the Santa Clara River to comply with applicable water quality objectives. In addition some supplemental water would also be discharged as necessary to the Santa Clara River to reduce chloride concentrations in Reach 4B and comply with applicable water quality objectives.

Figure 3~~2~~. Schematic of AWRM Facilities

Typical AWRM facility operation to comply with WQOs, when SWP > 80 mg/L



Typical AWRM facility operation to comply with WQOs, when SWP < 80 mg/L



Stakeholders have agreed upon the primary objectives for the uses of RO permeate from the MF/RO facility at the Valencia WRP. The primary objectives are prioritized as follows:

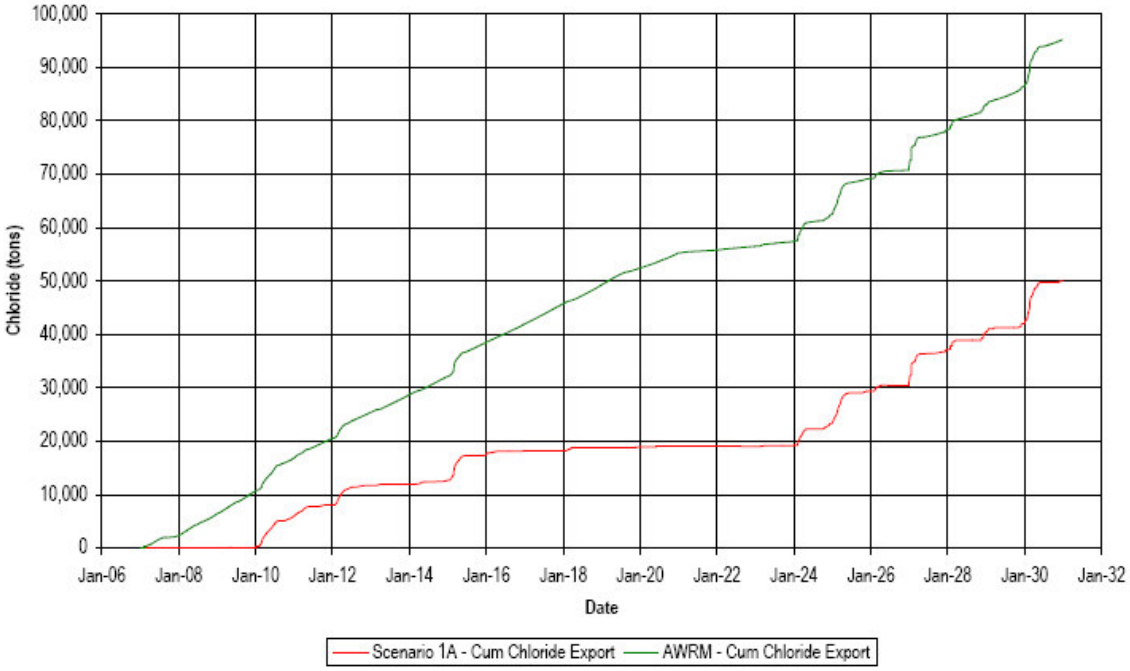
1) Compliance with conditional SSOs in the Santa Clara River at the County Line.
2) Provide alternative water supply to Camulos Ranch.
3) Achieve salt-balance in East Piru groundwater basin for past loading from surface water greater than 117 mg/L.
4) Achieve salt-balance in East Piru groundwater basin for any future loading from surface water greater than 117 mg/L.

The effects of the AWRM on surface water and groundwater have been evaluated using several tools. For Reaches 4B, 5, and 6 and the Piru basin, the primary tool was the GSWI model. Using the GSWI model, the AWRM has been shown to provide multiple water resource benefits, including:

- Increased flows in reaches 4A and downstream reaches of the USCR
- Improvement of groundwater quality in the Eastern Piru Basin
- Increased availability of irrigation and barrier water

The results of the GSWI model were used to calculate a mass balance to compare the predicted amount of salt exported under the AWRM compliance option with the predicted amount of salt exported under other compliance options to demonstrate the benefits to the East Piru Basin under the AWRM. Figure 4~~3~~ illustrates the cumulative salt export capabilities of the AWRM compliance option compared with the salt export capabilities of a maximum advanced treatment compliance option to meet the 100 mg/L chloride WQO (Scenario 1A).

Figure 4~~3~~. Cumulative Chloride Mass Export from East Piru Groundwater Basin: AWRM Option vs. Advanced Treatment Option (Scenario 1A)



Additionally, a study was prepared analyzing the effects of the AWRM Program in Ventura County (Bachman, 2008). The report found that the lowering of chloride concentrations in Reach 4B results in improved quality of water recharged to the East Piru Basin. Additionally, high chloride water that is pumped from the basin is recharged by lower chloride water during wet years. Using output from the GSWI model, UWCD's routing and percolation model was used to predict increased yield at the Freeman Diversion from implementation of the AWRM Program. The difference in yield at the Freeman Diversion between the Minimum Discharge option and the AWRM option is 11,500 AFY, which is approximately double the increased yield of 6,000 AFY when the permanent Freeman Diversion was constructed. This could result in a significant decrease in saline intrusion in the Oxnard Plain.

4.1. Conditional Site Specific Objectives to Support AWRM

The AWRM compliance option provides greater benefits than other potential scenarios and compliance options that have been identified. However, it will not result in compliance with the 100 mg/L water quality objectives at all times and in all locations for Reaches 4B, 5 and 6 of the USCR. Given the benefits of chloride reduction and protectiveness of the AWRM compliance option and in the context of achieving a salt balance for the watershed and protecting beneficial uses, staff proposes conditional SSOs that support the AWRM, while still being protective of beneficial uses (see Sections 5 and 6). Conditional SSOs for surface water and groundwater are presented in Tables 5 and 6. These conditional SSOs shall apply and supersede the existing regional water quality objectives of 100 mg/L only when chloride load reductions and/or chloride export

projects are in operation by the SCVSD according to the implementation provisions in Section 8 of the staff report.

Table 5. Conditional SSOs for Surface Water to Support AWRM Program

Reach	Current Instantaneous Chloride Objective (mg/L)	Conditional Chloride SSO (mg/L)[a]	Averaging Period
6	100	150	12-month~~Annual~~
5	100	150	12-month~~Annual~~
4B	100	117	3-month
4B Critical Conditions	100	130[b]	3-month[c]

a. The conditional SSOs for chloride in the surface water of Reaches 4B, 5, and 6 shall apply and supersede the existing regional water quality objectives of 100 mg/L only when chloride load reductions and/or chloride export projects are in operation by SCVSD according to the implementation provisions in Section 8.

b. The conditional SSO for Reach 4B under critical condition applies, only if the following conditions and implementation requirements are met:

1. Water supply concentrations measured in Castaic Lake are ≥ 80 mg/L.
2. Salt-sensitive agricultural uses that are irrigated with surface water are provided supplemental water during periods when Reach 4B surface water exceeds 117 mg/L.
3. ~~Beginning~~ By May 4, 2020~~16~~, the 10-year cumulative net chloride loading above 117 mg/L ($CNCl_{117}$)[i] to Reach 4B of the SCR, calculated annually, from the SCVSD Water Reclamation Plants (WRPs) ~~is~~ shall be zero or less~~, where:~~.

[i] $CNCl_{117} = Cl_{(Above\ 117)} - Cl_{(Below\ 117)} - Cl_{(Export\ Ews)}$

Where:

$Cl_{(Above\ 117)}$ = [WRP Cl Load[1]/Reach 4B Cl Load[2]] * [Reach 4B Cl $Load_{>117}$[3]]

$Cl_{(Below\ 117)}$ = [WRP Cl Load[1]/Reach 4B Cl Load[2]] * [Reach 4B Cl $Load_{\leq 117}$[4]]

$Cl_{(Export\ EWs)}$ = Cl Load Removed by Extraction Wells

[1] WRP Cl Load is determined as the monthly average Cl concentration multiplied by the monthly average flow measured at the Valencia WRP.

[2] Reach 4B Cl Load is determined as the monthly average Cl concentration at SCVSD Receiving Water Station RF multiplied by the monthly average flow measured at USGS Gauging Station 11109000 (Las Brisas Bridge).

[3] Reach 4B Cl $Load_{>117}$ means the calculated Cl load to Reach 4B when monthly average Cl concentration is above 117 mg/L.

[4] Reach 4B Cl $Load_{<=117}$ means the calculated Cl load to Reach 4B when monthly average Cl concentration is below or equal to 117 mg/L.

4. The chief engineer of the SCVSD signs under penalty of perjury and submits to the Los Angeles Regional Water Quality Control Board (Regional Board) a letter documenting the fulfillment of conditions 1, 2, and 3.

c. The averaging period for the critical condition SSO may be reconsidered based on results of chloride trend monitoring after the alternative water resources management (AWRM) system is applied.

The conditional SSOs for chloride in Reach 4B are applied as 3 month rolling averages because there is salt-sensitive agriculture in the area of Reach 4B and the LRE supplemental study recommended a three-month averaging period for salt-sensitive crops (Newfields, 2008). The conditional SSOs for chloride in Reaches 5 and 6 are applied as 12-month~~annual~~ rolling averages since agriculture in these reaches is identified as non-salt sensitive. ~~Annual~~ Twelve-month averaging periods have been used historically in the Los Angeles Region and throughout California for salts objectives, and an 12-month~~annual~~ average would protect the groundwater recharge and non-salt sensitive agricultural beneficial uses in Reaches 5 and 6 (LWA, 2008).

Table 6. Conditional SSOs for Groundwater to Support AWRM Program

Constituent	Santa Clara--Bouquet & San Francisquito Canyons		Castaic Valley		Lower area east of Piru Creek[1]	
	Conditional SSO (mg/L)	Current Objective (mg/L)	Conditional SSO (mg/L)	Current Objective (mg/L)	Conditional SSO (mg/L)	Current Objective (mg/L)
Chloride	150	100	150	150	150	200
Averaging period	~~Annual~~12-month	None	12-month	None	~~Annual~~ 12-month	None

[1] Applies only to San Pedro formation. Existing objective of 200 mg/L applies to shallow alluvium layer above San Pedro formation.

The conditional SSOs for chloride in groundwater in Santa Clara-Bouquet & San Francisquito Canyons, Castaic Valley, and the lower area east of Piru Creek (San Pedro formation) shall apply and supersede the existing regional water quality objectives ~~of 100 mg/L~~ only when chloride load reductions and/or chloride export projects are in operation by the SCVSD according to the implementation provisions in Section 8 of the staff report.

4.2. Conditional Wasteload Allocations to Support AWRM

The conditional WLAs for chloride for all point sources shall apply only when chloride load reductions and/or chloride export projects are in operation by the SCVSD according to the implementation provisions in Section 8 of the staff report. If these conditions are not met, WLAs are based on existing water quality objectives for chloride of 100mg/L.

Discharges to Reach 4B by the Saugus and Valencia WRPs will receive the concentration-based conditional wasteload allocations for chloride presented in Table 7.

Table 7. Conditional Reach 4B Wasteload Allocations for chloride for Saugus and Valencia WRPs

Reach	Conditional Chloride SSO (mg/L)[a]	~~Averaging Period~~
4B	117 (3-month Average), 230 (Daily Maximum)	~~3-month~~
4B Critical Conditions	130[a] (3-month Average[b]), 230 (Daily Maximum)	~~3-month~~[b]

a. The Conditional WLA under critical conditions shall apply~~ies~~ only if the following conditions and implementation requirements are met:
   1. Water supply concentrations measured in Castaic Lake are ≥ 80 mg/L.
   2. Salt-sensitive agricultural uses that are irrigated with surface water are provided supplemental water during periods when Reach 4B surface water exceeds 117 mg/L.
   3. ~~Beginning~~ By May 4, ~~2016~~2020, the 10-year cumulative net chloride loading above 117 mg/L ($CNCl_{117}$)[i] to Reach 4B of the SCR, calculated annually, from the Saugus and Valencia WRPs ~~is~~ shall be zero or less~~, where:~~.

[i] $CNCl_{117} = Cl_{(Above\ 117)} - Cl_{(Below\ 117)} - Cl_{(Export\ Ews)}$

Where:

$Cl_{(Above\ 117)}$ = ([WRP Cl Load[1]/Reach 4B Cl Load[2]] * [Reach 4B Cl $Load_{>117}$[3]])
$Cl_{(Below\ 117)}$ = ([WRP Cl Load[1]/Reach 4B Cl Load[2]] * [Reach 4B Cl $Load_{\leq 117}$[4]])
$Cl_{(Export\ EWs)}$ = [Cl Load Removed by Extraction Wells]

[1] WRP Cl Load is determined as the as the monthly average Cl concentration multiplied by the monthly average flow measured at the Valencia WRP.
[2] Reach 4B Cl Load is determined as the monthly average Cl concentration at SCVSD Receiving Water Station RF multiplied by the monthly average flow measured at USGS Gauging Station 11109000 (Las Brisas Bridge).
[3] Reach 4B Cl $Load_{>117}$ means the calculated Cl load to Reach 4B when monthly average Cl concentration is above 117 mg/L.

[4] Reach 4B Cl Load$_{\leq 117}$ means the calculated Cl load to Reach 4B when monthly average Cl concentration is below or equal to 117 mg/L.

4. The chief engineer of the SCVSD signs under penalty of perjury and submits to the Regional Board a letter documenting the fulfillment of conditions 1, 2, and 3.

b. The averaging period for the critical condition WLA may be reconsidered based on results of chloride trend monitoring after the AWRM system is applied.

Beginning May 4, 2015, discharges to Reaches 5 and 6 by the Saugus and Valencia WRPs, will have conditional concentration-based and mass-based WLAs for chloride based on conditional SSOs (Table 8).

Table 8. Conditional WLAs for Saugus and Valencia WRPs

WRP	Concentration-based Conditional WLA for Chloride ~~(12-month Average)~~	Mass-based Conditional WLA for Chloride (12-month Average)
Saugus	150 mg/L (12-month Average), 230 (Daily Maximum)	Q_{Design}*150 mg/L*8.34
Valencia	150 mg/L (12-month Average), 230 (Daily Maximum)	Q_{Design}*150 mg/L*8.34 – AF_{RO}

AF_{RO} is the chloride mass loading adjustment factor for operation of RO facilities, where:

If RO facilities are operated at ≥ 50% ~~rated capacity~~Capacity Factor[a] in preceding 12 months

$$AF_{RO} = 0$$

If RO facilities are operated at < 50% Capacity Factor~~rated capacity~~[b] in preceding 12 months

$$AF_{RO} = (50\% \text{ Capacity Factor } \cancel{\text{rated capacity}} - \%\text{RO Capacity}) * ChlorideLoadRO^{c}$$

[a] ~~Rated capacity~~Capacity Factor is based on 3 MGD of recycled water treated with RO, 90% of the time.

[b] If operation of RO facilities at <50% ~~rated~~ capacity factor is the result of conditions that are outside the control of SCVSD, then under the discretion of the Executive Officer of the Regional Board, the AF_{RO} may be set to 0.

[c] Chloride load reduction is based on operation of a ~~3 MGD~~ RO treatment plant treating 3 MGD of recycled water with chloride concentration of 50 mg/L + Water Supply Chloride. Assumes operational capacity factor of 90% and RO

membrane chloride rejection rate of 95%. Determination of chloride load based on the following:

$$ChlorideLoadRO = 90\% \times [(Q_{RO} \times C_{WRP} \times 8.34) \times r] \times \left({}^{30Days}\!/_{Month} \right)$$

where:

Q_{RO} = ~~RO Treatment Flow in MGD (~~3 MGD of recycled water treated with RO~~)~~
C_{WRP} = Chloride Concentration in State Water Project + 50 mg/L
r = % RO chloride rejection (95% or 0.95)
8.34 = Conversion factor (ppd/(mg/L*MGD))

The GSWI model accounted for existing major and minor NPDES dischargers located within the model boundaries. The future modeling scenarios were based on:

- Projected flow for the Saugus and Valencia WRPs and chloride concentrations equal to conditional WLAs,
- projected flow for the Newhall WRP and a chloride concentration of 100 mg/L, and
- existing flow and chloride concentrations for the other major and minor NPDES dischargers.

The affect of assigning conditional WLAs to the Newhall WRP and the other major and minor NPDES discharges on net chloride loading was not modeled. Therefore, other major NPDES dischargers (as defined in Table 4-1 of the Basin Plan), including Newhall WRP, receive WLAs equal to 100 mg/L. The Newhall Ranch WRP already has a permit limit of 100 mg/L for chloride in Order No. R4-2007-0046 based on the current WQO. The Regional Board may consider assigning conditional WLAs for other major NPDES dischargers, including Newhall WRP, based on an analysis of the downstream increase in net chloride loading to surface water and groundwater as a result of implementation of conditional WLAs. The Regional Board may require chloride mass removal quantity that is proportional to mass based chloride removal required for the Valencia WRP in order to receive conditional WLAs.

Other minor NPDES dischargers (as defined in Table 4-1 of the Basin Plan) receive conditional WLAs. Minor discharges receive conditional WLAs without the additional analysis because, based on their flows, the impact of minor discharges is negligible compared to the WRPs.

~~Other NPDES discharges contribute a minor chloride load.~~ The conditional WLAs for minor~~these~~ point sources are presented in Table 9.

Table 9. Conditional WLAs for Minor~~Other~~ NPDES Discharges

Reach	Concentration-based Conditional WLA for Chloride (mg/L)	~~Averaging Period~~
6	150 (12-month Average), 230 (Daily Maximum)	~~Annual~~
5	150 (12-month Average), 230 (Daily Maximum)	~~Annual~~
4B	117 (3-month Average), 230 (Daily Maximum)	~~3-month~~

The WLA of 230 mg/L for daily maximum for chloride is to protect threatened and endangered species. The Endangered Species Protection study indicates that the existing US EPA chronic chloride criteria of 230 mg/L can be considered to be fully protective of local biota.

The final WLAs for TDS and sulfate are equal to existing surface water and groundwater quality objectives for TDS and sulfate in Tables 3-8 and 3-10 of the Basin Plan. The Regional Board may revise the final WLAs based on review of trend monitoring data as detailed in the monitoring section (Section 8.7) of this staff report.

4.3. Conditional Load Allocations to Support AWRM

The source analysis indicates nonpoint sources are not a major source of chloride. The conditional load allocations (LAs) for nonpoint sources are presented in Table 10.

Table 10. Conditional LAs for Nonpoint Sources

Reach	Concentration-based Conditional LA for Chloride (mg/L)	~~Averaging Period~~
6	150 (12-month Average), 230 (Daily Maximum)	~~Annual~~
5	150 (12-month Average), 230 (Daily Maximum)	~~Annual~~
4B	117 (3-month Average), 230 (Daily Maximum)	~~3-month~~

The conditional LAs shall apply only when chloride load reductions and/or chloride export projects are in operation by the SCVSD according to the implementation

provisions in Section 8 of the Staff Report. If these conditions are not met, LAs are based on existing water quality objectives of 100 mg/L.

The LA of 230 mg/L for daily maximum for chloride is to protect threatened and endangered species. The Endangered Species Protection study indicates that the existing US EPA chronic chloride criteria of 230 mg/L can be considered to be fully protective of local biota.

5. Water Code Section 13241 Analysis

In setting site specific objectives, Porter-Cologne section 13241 requires consideration of six factors relating to beneficial uses, economics, the environmental setting, water quality that can be reasonably attained, housing and the need for recycled water. Further, because some of these site specific objectives are greater than the existing water quality objectives, state and federal antidegradation provisions must be considered. These considerations were provided in the Task 7 and 8 Report (LWA, 2008) and are summarized below. Because the agricultural beneficial use of water has been determined to be the most sensitive use under the chloride TMDL, the 13241 analysis focused on salt sensitive agricultural uses. Based on an analysis of the Task 7 and 8 Report, staff concludes that the conditional SSOs, when implemented with the AWRM Program, will support beneficial uses and is in the best interests of the people of California.

5.1. Past, present, and probable future beneficial uses of water

Probable future beneficial uses of the surface waters in Reaches 4, 5, and 6 are likely to remain consistent with past and present uses with the exception of agriculture supply. Agricultural uses in Reaches 5 and 6 will likely decline over time due to increasing urbanization. Agricultural uses in Reaches 4A and 4B will likely remain constant.

The proposed conditional SSOs of 150 mg/L for surface and groundwater within Reaches 5 and 6 are protective of the AGR beneficial use because these waters are not currently and have not historically been used as an irrigation supply for salt-sensitive crops. Newhall Land and Farm is the only landowner with existing agricultural operations that could potentially be impacted by groundwater-surface water interactions within Reach 5 of the Santa Clara River. Newhall has not historically and does not plan in the future to cultivate salt-sensitive crops in Reaches 5 or 6 because of adverse climatic conditions. A number of commercial and wholesale nurseries are located in the Santa Clarita Valley along the Castaic Creek and South Fork tributaries and east of Reach 6, but these nurseries are not likely impacted by surface flows from the Santa Clara River. This situation is unlikely to change due to climatic conditions that impact the ability to grow salt sensitive crops and because the use of irrigation water for crops is anticipated to decline in Reaches 5 and 6 due to planned urban development.

When implemented with the AWRM compliance option, the proposed conditional SSOs of 117 mg/L during normal conditions and 130 mg/L during drought conditions in Reach 4B and the underlying groundwater will protect agricultural uses in the area. Local growers in this area irrigate crops primarily with groundwater from local aquifers fed by releases from Lake Piru and the Santa Clara River, as well as surface diversions from the Santa Clara River. Agricultural supply water originating from Lake Piru are unaffected by chloride levels in the Santa Clara River because Lake Piru is fed with State Water Project water and local runoff. Camulos Ranch is the only known avocado grower that irrigates crops using water originating from Reach 4B waters. The proposed

conditional SSOs in Reach 4B and the underlying groundwater are fully protective of agricultural uses in this area based on the result of the LRE for salt-sensitive crops (a 117 mg/L chloride threshold value) and supplemental water supply to Camulos during drought conditions.

5.2. Environmental characteristics

The environmental setting of the proposed conditional SSOs and TMDL conditional WLA revisions is presented in Section 2.3. The proposed conditional SSOs and TMDL revisions will impact reaches 4B, 5, and 6 of the Santa Clara River and the groundwater basins underlying those reaches. The proposed conditional SSOs, when implemented with the AWRM Program, will ensure protection of beneficial uses considering the environmental characteristics of and the water quality available to the USCR.

Surface flows in the USCR correspond to seasonal precipitation within the region. Portions of the river are perennial, but various reaches are ephemeral and intermittent and flow only during significant storm events. Base flow in the USCR is comprised of surfacing groundwater, discharges from the Saugus and Valencia WRPs, conservation releases of imported and local waters from reservoirs, and agricultural and urban runoff. Base flow in Reach 6 is largely dependent on discharges from the Saugus WRP. Base flows in Reaches 5 and 4B are dependent on Saugus and Valencia WRP discharges as well as rising ground water. Further downstream, in Reach 4A between the confluence at Piru Creek and Las Brisas, surface flow is typically present only during parts of the wet season, which varies by water year. This “dry gap” seasonally separates the upper Santa Clara River hydrologically from the lower river, which, during normal or below normal water years, impedes inter-reach migration and movement of aquatic life. The Vern Freeman Diversion, at the bottom of Reach 3, diverts up to 375 cubic feet per second (cfs) from the Santa Clara River to the El Rio and Saticoy spreading grounds, where the water recharges the underground aquifers and is distributed for agricultural irrigation.

The largest source of chloride to the Upper Santa Clara River is the water supply (see Section 2.5). Dry and critically dry periods affecting the Sacramento and San Joaquin River Valleys reduce fresh-water flow into the Sacramento-San Joaquin Delta and result in higher than normal chloride concentrations in the SWP supply within the California aqueduct system. Typically, water pumped through the Sacramento-San Joaquin Delta takes approximately 1 to 2 years to show up as deliverable SWP water sold by the Santa Clarita Valley wholesaler, CLWA, to local retail water purveyors, due to reservoir storage and turnover time. Salinity fluctuations in the SWP are reflected in both the imported water treated and delivered by the CLWA and the WRP effluent quality. The quality of the SWP water can be high enough to cause or contribute to exceedances of the current water quality objective.

The proposed conditional SSOs are more stringent than historical effluent limitations for the Saugus and Valencia WRPs and would result in improved water quality over existing conditions. In addition, the proposed conditional SSOs are below

the USEPA aquatic life chloride criteria, which according to the TES Study are protective of the most chloride-sensitive organisms for which data are available. Therefore, it is not expected that the proposed conditional SSOs will harm in-stream or riparian species or habitat.

5.3. Water quality conditions that could reasonably be achieved

A detailed discussion of the compliance options and water quality that can be achieved through different approaches to compliance is presented in the Task 2B-1 and Task 2B-2 Reports (Geomatrix, 2008a, CH2MHill 2008, and Geomatrix 2008b). As discussed in Section 5, the AWRM compliance strategy will result in compliance with the proposed conditional SSOs. Other compliance measures, such as large scale advanced treatment facilities, could achieve 100 mg/L in Reaches 5 and 6, but would not meet 100 mg/L during all times in Reach 4B. Given the technical constraints on large scale advanced treatment facilities and the environmental and water resource benefits of the AWRM, staff recommends the adoption of conditional SSOs. Implementation of the AWRM will protect beneficial uses, improve the water quality in the Eastern Piru groundwater basin through export of salts, and result in an overall salt balance in the watershed.

5.4. Economic Considerations

Costs of complying with the existing WQOs were compared with costs of complying with conditional SSOs, including with facility upgrades to the Saugus and Valencia WRPs and other AWRM actions and summarized below.

5.4.1 Compliance with existing WQOs

The costs of two advanced treatment alternatives were analyzed for compliance with existing WQOs. One alternative involves constructing a 3.6 MGD MF/RO facility at the Saugus and WRP and a 15.4 MF/RO facility at the Valencia WRP, so that the entire discharge at each plant meets 100 mg/L in all conditions. This alternative would require brine waste disposal through a pipeline and ocean outfall. A second alternative involves reducing the amount of discharge from each WRP, so that only the minimum amount of discharge necessary to maintain habitat complies with 100 mg/L under all conditions. In this alternative, approximately 6 MGD would be treated with MF/RO at both plants and the remaining balance of effluent would be disposed to a pipeline to the ocean. The estimated capital and operation and maintenance (O&M) costs for these treatment alternatives are in Table 11.

Table 11: Costs for Advanced Treatment to Comply with Existing Objectives

Facility	Capital Cost	Annual O&M
Maximum Advanced Treatment	$118,000,000	$~~8,79~~,00,000
Brine Disposal	$230,000,000	$7~~5~~00,000
Total Maximum Advanced Treatment and Brine Disposal	**348,000,000**	**$9, 7~~2~~00,000**
Minimum Advanced Treatment	$~~49~~52,000,000	$4, 4~~2~~00,000
Ocean Discharge	$419,000,000	500,000
Total Minimum Advanced Treatment and Ocean Discharge	**$~~468~~471,000,000**	**$4, 9~~7~~00,000**

Assuming an interest rate of 5.5% and a period of 20 years, the combined present worth of the estimated Capital and O&M Costs for compliance by providing maximum advanced treatment and brine disposal is approximately $~~460~~ 470 Million and by providing minimum advanced treatment and ocean discharge is $~~524~~ 530 Million. Therefore, the range of costs for facilities required to comply with the existing water quality objectives is between $47~~6~~0 Million and $~~524~~ 530 Million.

5.4.2 Compliance with Conditional SSOs

Cost estimates were prepared for the various elements of the AWRM Program (Table 12). The costs of source control measures are based on SRWS removal and conversion of bleach-based disinfection processes at the WRPs to UV disinfection facilities. The AWRM program also includes construction and operation of a 3-MGD MF/RO facility at the Valencia WRP and brine waste disposal through deep well injection technology. During periods of extreme drought and prior to construction and operation of the MF/RO facility, the AWRM Program includes supplemental water from local water purveyors to reduce chloride levels in the surface water in Reach 4B. Costs for this element were estimated based on a need for approximately 30,000 acre-feet of supplemental water at an assumed cost of approximately $1,000 per acre-feet (based on discussions with local water purveyors) as well as infrastructure for conveyance of the supplemental water at a cost of approximately $7.5 Million. Finally, the costs of water supply facilities needed to achieve salt export from the Piru groundwater basin and blend groundwater with RO permeate include the costs of 10 groundwater extraction wells, a 12-mile RO permeate conveyance pipeline, and a 6-mile blended water supply pipeline.

Table 12. Costs for AWRM Program

AWRM Element	Capital Cost	Present Worth O&M	TOTAL
Source Control Measures	$185,5900,000	$6,000,000	$241,9500,000
Advanced Treatment and Brine Disposal	$78,4000,000	$44,2000,000	$122,6000,000
Supplemental Water	$37,500,000	N/A	$37,500,000
Ventura Water Supply Facilities	$70,100,000	$3,600,000	$73,700,000
TOTAL AWRM Program	**$2041,1900,000**	**$53,8600,000**	**$2584,700,000**

Note: All costs are as of September 2007

Assuming an interest rate of 5.5% and a period of 20 years, the combined present worth of the Capital and O&M cost for the AWRM facilities required to comply with the proposed site-specific objectives is estimated at approximately $2595 Million.

Amortizing the total costs at 5.5% per year for 20 years yields an annual cost estimate of $36.4005 per month per connection for maximum advanced treatment and brine disposal, $41.5507 for minimum advanced treatment and ocean discharge, and $20.3019.96 for the AWRM. Amortizing the total costs at 5.5% per year for 30 years yields an annual cost estimate of $29.6331.54 per month per connection for maximum advanced treatment and brine disposal, $34.9733.76 for minimum advanced treatment and ocean discharge, and $176.431 for AWRM. This rate analysis does not include additional costs related to procurement of bonds, provision for rate ramp-up periods, nor actual increased costs of project implementation that can occur in the field (e.g., construction change orders, increased cost of materials, and increased cost of construction).

Regional Board staff also reviewed the State Board report, Wastewater User Charge Survey Report F.Y. 2007-2008. This report is prepared annually by the State Board 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 $16.29 per month. The report also shows the statewide monthly service charge average is $33.82 per month and the median is $26.83 per month, with a high of $231.92. For Los Angeles County, the monthly service charge average is $23.90 per month and the median is $12.28 per month. For Ventura County, the monthly service charge average is $38.47 per month and the median is $35.35 per month. The rate will likely increase to a level similar to thenot substantially above the statewide average if applying the AWRM program, and to a level substantially higher than the statewide average if applying the other two options. Potential cost savings to community residents which could be acquired through funding programs to assist in the construction costs, and avoidance of additional treatment costs for other pollutants (i.e. future TMDL requirements) are not included.

5.5. The Need to Develop Housing

The proposed water quality objectives would not restrict the development of housing near the reaches of the Santa Clara River affected by the proposed conditional SSOs because they do not result in discharge requirements that affect housing or housing development. The proposed conditional SSOs and AWRM Program were developed based on projected population and housing growth in the Santa Clarita Valley. The GSWI model considered increased effluent flow from the WRPs and the effects of this growth on the chloride levels in the Santa Clara River and underlying aquifers. The proposed conditional SSOs will support water recycling and the use of the AWRM compliance option in the USCR. Both of these factors will provide water resources to support housing that may be lost with other compliance options.

5.6. The Need to Develop and Use Recycled Water

The proposed water quality objectives will support the expansion of recycled water uses in the Santa Clarita Valley consistent with the California's stated goal of increasing the use of recycled water to help meet the state's growing demand for potable water. The CLWA 2005 Urban Water Management Plan projects that water demand in the area will continue to increase, and that additional sources of water including recycled water will be necessary to meet projected demand. Recycled water use in CLWA's service area is projected to increase from 448 acre-feet per year (actual use in 2004) to 17,400 acre-feet per year by 2030. This 2030 figure represents 70% of the imported water portion of the ultimate wastewater flow projected for the Saugus and Valencia WRPs of approximately 34 MGD. The increased flow from the WRPs from current flows of 21 MGD to future flows of 34 MGD is expected to accommodate most of the increased recycled water demand in the watershed.

The proposed conditional SSOs will support the expansion of recycled water uses by protecting municipal supply. For groundwater recharge reuse projects, Maximum Contaminant Level (MCL) codified in California Administrative Code, Title 22 provide reasonable protection of groundwater quality for the beneficial use of municipal supply. The proposed groundwater objectives for chloride are below the Recommended Secondary Maximum Contaminant Levels for drinking water sources codified in Title 22. Given the demonstrated need to expand recycling in the USCR to meet the region's future water requirements, the proposed conditional SSOs are needed to ensure the required compliance mechanisms allow for the recycling to take place. Additionally, the proposed conditional SSOs are consistent with the secondary MCLs in Title 22 and will not result in water quality for chloride that exceeds these levels.

6. Antidegradation Analysis

State Board Resolution 68-16, “Statement of Policy with Respect to Maintaining High Quality Water” in California, known as the "Antidegradation Policy," protects surface and ground waters from degradation. It states that waters having quality that is better than that established in effective policies shall be maintained unless any change will be consistent with the maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial uses, and will not result in water quality less than that prescribed in the policies.

The federal antidegradation policy (40 CFR 131.12) requires states to maintain and protect existing instream water uses and the water quality necessary to protect the existing uses (Tier I), maintain high quality waters unless the State finds after satisfaction of intergovernmental and public participation provisions of the states continuous planning process that allowing lowering water quality is necessary to accommodate important economic and social development (Tier II), and maintain and protect water quality in waters the state has designated as outstanding National resource waters (Tier III).

Adoption of proposed conditional SSOs, when implemented the AWRM Program, would be consistent with the state and federal antidegradation policies. Staff worked with stakeholders to develop a complete antidegradation analysis that is contained in the Task 7 and 8 report (LWA, 2008). The following contains a summary of the antidegradation analysis.

The proposed conditional site specific surface and groundwater objectives are protective of present and anticipated beneficial uses. The proposed conditional SSOs in Reaches 5 and 6 of 150 mg/L are protective of present and anticipated uses for irrigation of non-salt sensitive crops in the area, municipal supply, and aquatic life. The proposed conditional SSOs for Reach 4B, when implemented with the AWRM compliance option, are protective of the present and anticipated beneficial uses of these waters, including the most sensitive beneficial use, salt sensitive agriculture. The proposed SSO of 117 mg/L is within the LRE guidelines for protection of salt sensitive agricultural uses. The proposed SSO of 130 mg/L, which applies during critical conditions when source water is greater than 80 mg/L chloride, is protective when alternative water supplies are provided to salt sensitive agriculture uses (conditional SSO = 130 mg/L) and salt export projects as described in Section 8 are operated such that the net chloride loading above 117 mg/L is zero or less.

The proposed implementation activities, which will increase chloride export from the East Piru groundwater basin, will offset any increases in chloride discharges. If higher water quality objectives (130 mg/L) are in place in Reach 4B due to elevated concentrations in source water, the groundwater basin will be protected from degradation through the required salt export. The AWRM proposal will improve water quality in the basin over time and offset any increase in chloride concentrations that result from the

higher objective during some periods. The AWRM proposal was evaluated based on design capacities at Valencia WRP and Saugus WRP of 27.6 MGD and 6.5 MGD, for a total system design capacity of 34.1 MGD. If the capacity of the WRPs ever exceeds the current total system design capacity of 34.1 MGD, then the amount of water required for salt reduction and/or export should increase proportionally to the increase in the total system design capacity, and an additional antidegradation analysis should be conducted.

Under the AWRM Program, the blended extraction well and RO permeate discharge into Reach 4A will not exceed a chloride concentration of 95 mg/L. The current chloride WQO of 100 mg/L in Reaches 3 and 4A is within the LRE guidelines and will protect salt-sensitive agricultural uses. Therefore, the blended extraction well and RO permeate discharge into Reach 4A will not exceed the WQO of the receiving water at the point of discharge (Reach 4A) or in the reach downstream of the discharge point (Reach 3) and the designated beneficial uses for the reaches are still protected. This satisfies EPA's Tier 1 requirements in 40 CFR 131.12(a). Ongoing trend monitoring and additional modeling will determine whether the blended extraction well and RO permeate discharge would increase chloride concentrations in high quality waters downstream in Reaches 4A and 3 and in the Fillmore and Santa Paula groundwater basins. The GSWI model will be extended to the Freeman Diversion to assess the interaction of groundwater and surface water through the Piru, Fillmore, and Santa Paula groundwater basins and the overlying surface waters.

The proposed conditional SSOs and implementation of the AWRM are consistent with the maximum benefit to the people of the state and will result in social and economic benefits. It has been shown that AWRM Program will support water recycling and provide for additional water resources for agriculture and aquatic habitat. The GSWI model demonstrates that the AWRM compliance option results in benefits from the County Line to the area of seawater intrusion on the Oxnard Plain. The model shows that the ARWM option allows for more water diverted at the Freeman Diversion than conventional advanced treatment options, which then has a significant effect on saline intrusion in the Oxnard Plain. At the downstream end of the Piru basin, modeled surface water chloride concentrations are higher in the river about 40% of the time with the AWRM operating, but still in compliance with the existing water quality objective of 100 mg/L. Groundwater chloride concentrations in Piru Basin are improved by pumping and replacing groundwater with stormwater recharge during wet years when chloride concentrations are lower. As a result, surfacing groundwater from the Piru basin in Reach 4A may decrease over time as a result of the AWRM. The AWRM will also result in increased surface water flows in Reaches 3 and 4A as compared to other compliance options. Additionally, the proposed groundwater and surface water objectives for Reaches 5 and 6 will support the expansion of recycled water uses in the Santa Clarita Valley, which is consistent with the maximum public benefit and not unreasonably adverse to present and anticipated beneficial uses. Finally, in general, the AWRM compliance option has more water quality benefits to Ventura County than do the conventional advanced treatment based compliance options.

The proposed conditional SSOs will not result in water quality less than that prescribed in the policies. The proposed conditional SSOs comport with the Chloride Policy in Regional Board resolution 97-002 and its requirements for a watershed chloride reduction plan.

Finally, the proposed conditional SSOs will be implemented through NPDES permits, including effluent limits and required minimum salt export requirements. The effluent limits will ensure that the current performance of the WRPs continues at a minimum and will most likely require additional actions to achieve the water quality objectives. Additionally, receiving water limits will ensure that downstream water quality is not degraded as a result of wastes discharged. Finally, minimum salt export requirements will be included to ensure that excess salt loadings to the groundwater basin due to periods of elevated water supply concentrations are removed from the groundwater basin through pumping and export.

7. Alternatives Analysis and Staff Recommendation

Based on the results of the TMDL special studies, Regional Board staff analyzed two alternatives for Regional Board consideration. The first entails a TMDL based on the existing surface water Basin Plan objectives; the second alternative entails a TMDL based on a suite of site specific objectives for both surface water and groundwater underlying the Upper Santa Clara River to support the AWRM approach. Both alternatives rely on implementation of RO technology; however, the first alternative requires larger capacity RO facilities and ocean brine disposal while the second alternative requires smaller capacity RO facilities and no ocean disposal.

7.1. Alternative 1 - Maintain Current Basin Plan Objectives – No Action

Under this alternative, the Regional Board takes no action at this time to adopt SSOs or amend the TMDL Wasteload Allocations and Implementation Schedule. Staff notes several concerns with Alternative 1.

First, a key factor in implementation of RO is safe disposal of the resultant brine waste. Several options for brine disposal include ocean discharge, deep well injection, and drying and subsequent landfill disposal. Cost-effective brine disposal is based on several factors including the brine quantity generated and proximity to available disposal facilities. Because it requires larger capacity RO to meet more stringent objectives, the first alternative would require brine disposal via an ocean discharge. The second alternative, which requires smaller capacity RO, would enable disposal via deep well injection. Ocean disposal options generally provide greater capacity than disposal wells, but for the Santa Clarita Valley, would require construction of a large pipeline through two counties over 43-miles. Deep well injection involves retrofitting abandoned oil production wells or constructing new injection wells in areas near the Santa Clarita Valley and injecting the brine into stable geological formations. Local disposal of the smaller volumes brine associated with second alternative through deep well injection or landfilling is likely more cost effective and would likely have less environmental impacts than ocean disposal for this site. In particular, facilities for deep well injection are closer to the RO facilities than ocean disposal sites and therefore require a shorter pipeline. Further, the capacity limits the size of the RO plant so that electrical resources are lower than the first option.

Another concern with the first alternative is under an ocean disposal scenario, a pipeline and outfall could potentially be used for discharge of treated wastewater rather than the discharge of brine. If the SCVSD were to discharge wastewater directly to the Ocean, this option would reduce flows in the Upper Santa Clara River.

7.2. Alternative 2 - Adopt Conditional SSOs and Revised TMDL Conditional WLAs

Under this alternative, the Regional Board adopts a suite of site specific objectives that are conditioned on implementing a chloride balance that is based on advanced treatment of the Valencia WRP effluent to reduce chloride loading to the USCR by a level greater than any loading contributed by the Valencia WRP in excess of loading corresponding to 117 mg/L (see section 8.2). TMDL conditional WLAs for chloride are revised to reflect the conditional SSOs. In addition, interim WLAs for sulfate and TDS are included to facilitate the use of supplemental water to Reach 4B when chloride objectives exceed 117 mg/L.

The AWRM Program uses smaller-scale reverse osmosis to provide greater flexibility for disposal of brine generated by the reverse osmosis system. The AWRM Program also provides capability for aquifer restoration and resource conservation through blending the advanced treated wastewater with extracted groundwater from degraded underlying basin in the upper Santa Clara River. In order to implement an alternative implementation plan, conditional SSOs that are in excess of the existing WQOs for surface water are required. However, because the AWRM facilitates the feasibility of aquifer restoration, the groundwater WQOs can be more stringent. This alternative is analyzed in accordance with a salt balance in the Upper Santa Clara River Watershed.

7.3. Staff Recommendation

Staff recommends the adoption of Alternative 2- adopt conditional site specific objectives and revised TMDL conditional WLAs. The conditional site specific objectives will maintain beneficial uses and the implementation of the AWRM program will result in decreased salt loading to the USCR with fewer environmental and economic impacts than Alternative 1. Additional benefits in both water supply and water quality accrue in areas downstream of the USCR.

- Staff finds that the key technical issues of cumulative chloride impacts to groundwater have been addressed by GSWI. Details of staff's findings on the GSWI model are presented in Appendix I, "GSWI Study for the USCR Chloride TMDL – Staff Report."

- Staff find that the GSWI model has been adequately calibrated by 88 groundwater level, 50 groundwater chloride, 6 streamflow, and 12 surface-water quality target locations that are spatially distributed throughout the GSWI domain and it has been considered as an appropriate model for groundwater and surface water interaction modeling purposes.

- Staff finds that, based on the GWSI model, none of the simulated chloride concentrations derived from the proposed compliance options result in chloride concentrations less than the existing WQO of 100 mg/L in surface water at all

times over 24-year simulation periods (2007-2030) and at all locations in Reaches 4B, 5 and 6. All of the predicted chloride concentrations in groundwater for all compliance options consistently met the existing WQO of 200 mg/L in groundwater of the Piru Basin except the area between Blue Cut and SCR-RF monitoring locations.

- Staff finds that the model predicted high chloride concentrations of 350 mg/L or greater in the alluvial groundwater (thickness of 50-100 ft) in the areas between Blue Cut and receiving water station SCR-RF during drought periods for all proposed compliance options. The high chloride concentration in this area will migrate downstream through the pumping activity in the proposed extraction well locations for the AWRM compliance option and will affect the chloride concentration of the mixed water with RO and then will affect the chloride concentration in SCR in Reach 4A. Geomatrix has prepared a technical memo stating that there is no current or expected future use of the shallow groundwater for beneficial uses in this area (Geomatrix, 2008c). The memo states that groundwater production in Reach 4B for existing beneficial uses occurs downstream of Blue Cut area, where the aquifer has a greater saturated thickness, yields more water, and has lower chloride concentrations. The memo also states that the alluvial groundwater concentrations are predicted to quickly recover once the drought period has ended. Staff therefore recommends that the proposed SSOs of 150 mg/L be set for the deeper San Pedro Formation and that the existing WQOs of 200 mg/L be retained for the shallow alluvium layer.

- Staff finds that the predicted chloride concentrations in both groundwater and surface water at Blue Cut were generally related to concentrations of chloride in the discharges to the SCR from the Saugus and Valencia WRPs.

- Staff finds that the Advanced Treatment and Brine Disposal Compliance Option can not result in full attainment of the 100 mg/L WQO for the USCR at Blue Cut at all times and in all locations of the receiving water. In addition, other compliance options like conveying all recycled water discharges from the Valencia and Saugus WRPs to the ocean outfall (Zero Discharge Compliance Option), limiting discharges from the WRPs and conveying the balance of WRPs recycled water discharges to ocean outfall (Minimal Discharge Compliance Option), and moving the discharge location of WRPs to the beginning of Reach 7 near Lang gauge (Alternative WRP Discharge Location Compliance Option) are also not likely to achieve attainment of the existing 100 mg/L WQO at all times and all locations.

- Staff notes that an alternative compliance option is required to achieve the site specific objectives (SSOs) when the original proposed compliance options were not able to achieve the existing WQO of 100 mg/L. Staff also notes that the SSOs shall be carefully evaluated based on the GSWI model results of different averaging periods to ensure they are fully protective of the agricultural beneficial uses in the study area.

- Staff finds that the AWRM compliance option can produce better chloride concentrations than other proposed compliance options during drought periods and the salt export capability of the AWRM compliance option will help to substantially reduce the amount of chloride loading from salt-water intrusion in the Oxnard Plain.

- Staff finds that the AWRM compliance alternative will result in timely attainment of conditional SSOs and reduce the chloride load to the USCR and underlying groundwater basins during the TMDL implementation period. Staff further finds that the AWRM will help provide enough mass loading to protect the SCR downstream from sea water intrusion.

- Staff finds that the proposed conditional SSOs would be consistent with state and federal antidegradation policies. The antidegradation analysis shows that the Alternative Water Resources Management Plan, involving conditional SSOs that are less stringent than existing WQOs used in conjunction with advanced treatment and salt export, are protective of beneficial uses in the USCR.

- Staff finds that the proposed conditional SSOs considered section 13241 requirements including: (a) past, present, and probable future beneficial uses of water, (b) environmental characteristics of the hydrographic unit under consideration, (c) water quality conditions that could reasonably be achieved, (d) economic considerations, (e) the need for developing housing within the Region, and (f) the need to develop and use recycled water.

- Staff finds that the AWRM Program is consistent with the draft State Board Water Recycling Policy. A stakeholder draft of the policy was presented to the State Board on September 3, 2008. This draft policy states that salts from all sources should be managed on a basin-wide or sub basin-wide basis to attain water quality objectives and support beneficial uses through the development of regional salt management plans. The draft policy provides some specific requirements to be met in the salt management plans, including:

  1. Basin or sub basin-wide monitoring;

  2. Determination of all sources and loading of salts, the basin's assimilative capacity of salts, and fate and transport of salts;

  3. Implementation measures to manage salt loading on a sustainable basis;

  4. An antidegradation analysis demonstrating that projects included with the plan will satisfy State Board Resolution 68-16; and

  5. Water recycling and stormwater recharge/reuse goals and objectives.

Although no salt management plan has yet been developed for the Santa Clara River watershed, the AWRM program can serve as a basis for a future salt management plan. The AWRM Program elements have many similarities to the required salinity management plan elements. The AWRM Program was developed using the G~~W~~SWI model. Based on the total system design capacity of 34.1 MGD for the Saugus and Valencia WRPs and accommodated future growth, the GSWI model ~~, which~~ assessed the fate and transport of chloride from all sources in the surface waters and groundwater in the Santa Clara River watershed. The GSWI model also assessed water quality impacts associated with the planned recycled water uses in the future. Given that the AWRM program will eventually be implemented through various NPDES permits issued in the future, it also will involve a number of monitoring requirements to assess actual fate and transport of chloride during and after project implementation. While the GSWIM was developed specifically to assess the fate and transport of chloride, the evaluations and assessments will largely apply to other salts in the region, which behave similarly to chloride. The facilities that will be implemented through the AWRM (i.e., advanced treatment of wastewater, salt export facilities) will also remove and manage other salts. Hence, with some minor modifications and assessments, the AWRM program could be deemed a salinity management plan for the watershed, since it would provide for (1) watershed-wide monitoring, (2) determination of all sources, loading, fate and transport of salts, (3) salt management measures and implementation, (4) an antidegradation analysis; and (5) water recycling goals and objectives.

8. Implementation

The conditional SSOs proposed in Section 4.1 are conditioned on implementation of the AWRM program; if the AWRM system is not built, the water quality objectives revert back to the current levels in the Basin Plan (100 mg/L). These conditions comport with the Chloride Policy in Regional Board resolution 97-002 and its requirements for a watershed chloride reduction plan. The watershed chloride reduction plan will be implemented through NPDES permits for the Valencia WRP and a new NPDES permit for discharge into Reach 4A. The conditional site specific objectives for chloride in the USCR watershed shall apply and supersede the regional water quality objectives only when chloride load reductions and/or chloride export projects are in operation and reduce chloride loading in accordance with Table 13.

Table 13. Watershed Chloride Reduction Plan

Water Supply Chloride[1]	Chloride Load Reductions[2]
40 mg/L	58,000 lbs per month
50 mg/L	64,000 lbs per month
60 mg/L	71,000 lbs per month
70 mg/L	77,000 lbs per month
80 mg/L	83,000 lbs per month
90 mg/L	90,000 lbs per month
100 mg/L	96,000 lbs per month

[1] Based on measured chloride of the SWP water stored in Castaic Lake

[2] Chloride load reduction is based on operation of a ~~3 MGD~~ RO treatment plant treating 3 MGD of recycled water with chloride concentration of 50 mg/L + Water Supply Chloride. Assumes operational capacity factor of 90% and RO membrane chloride rejection rate of 95%. Determination of chloride load based on the following:

$$ChlorideLoad = 90\% \times [(Q_{RO} \times C_{WRP} \times 8.34) \times r] \times \left({}^{30Days}\!/_{Month} \right)$$

where r = % chloride rejection (95%)
Q_{RO} = 3 MGD of recycled water treated with RO~~RO treatment flow (3 MGD)~~
C_{WRP} = SWP Cl + 50 mg/L

8.1. Implementation of Reach 4B Conditional WLAs

The Saugus and Valencia WRP NPDES permits will have receiving water limits for the District's receiving water station, RF, located in Reach 4B of the Santa Clara River. The receiving water limits will be based on the Reach 4B conditional WLAs for chloride as presented in section 4.2.

8.2. Implementation of Reach 5 and 6 Conditional WLAs

Beginning May 4, 2015, Reach 5 and 6 conditional WLAs for the Saugus and Valencia WRPs (Table 5) will become effective. Prior to May 4, 2015, Saugus and Valencia WRPs will have interim WLAs for chloride equal to ~~the interim limits for chloride specified in order Nos. R4-2003-0143 and R4-2003-0145 as amended by order Nos. R4-2005-0031 and R4-2005-0032 (Table 14).~~ the interim limit for chloride specified in order No. R4-04-004.

Table 14. Interim WLAs for Valencia and Saugus WRPs

Reach	Interim Chloride WLA (mg/L)	Interim Sulfate WLA (mg/L)	Interim TDS WLA (mg/L)	Averaging Period
5	[SWP] + 114 not to exceed 230	450	1000	12-month~~Annual~~
6	[SWP] + 134 not to exceed 230	450	1000	12-month~~Annual~~

In addition, in order to support water recycling in the USCR, which is critical to the success of and stakeholder support for the AWRM Program, the Saugus and Valencia WRPs will receive interim WLAs for sulfate and TDS (Table 14). When the water reclamation requirements for these WRPs are renewed, they will likely contain limits based on groundwater WQOs. Current levels of sulfate and TDS in the WRP effluent will not meet limits based on existing WQOs. Instead the Saugus and Valencia WRPs must meet interim WLAs equal to 450 mg/L sulfate and 1000 mg/L TDS, which will apply for discharges to the Santa Clara River and recycled water uses from the Saugus Valencia WRPs. This will allow the SCVSD time to conduct special studies on the impacts of sulfate and TDS concentrations at these levels on groundwater quality and the potential for sulfate and TDS SSOs. These interim WLAs will expire on May 4, 2015 and will be replaced either with final WLAs based on the results of SSOs, if developed, or existing WQOs.

The interim WLAs are protective of beneficial uses and consistent with historical surface and groundwater objectives for basins underlying Reaches 5 and 6. A recent report prepared for the SCVSD used a weight of evidence approach to demonstrate that the interim WLAs for sulfate are protective of USCR aquatic life uses, including threatened and endangered fish and amphibians, and their prey organisms (Environ, 2008). The report states that the species mean acute value of the most acutely sulfate-sensitive invertebrate species was more than four times greater than the interim WLA of 450 mg/L. The report also states that the available toxicity data for sulfate confirm the relatively low sensitivity of fish, including threatened and endangered species in the USCR, to sulfate. Thus, protective values based on highly sensitive invertebrates will be additionally protective of TES fish and amphibians given their low sensitivity to ions.

Additionally, the interim WLAs are protective of groundwater recharge uses. These levels are consistent with the upper range of the secondary MCLs in Title 22.

8.3. Blended RO and Groundwater Discharge to Reach 4A

An NPDES permit and associated Monitoring and Reporting Program (MRP) will be required for any new discharge of the blend of RO-treated recycled water and extracted groundwater from the east Piru Basin, as contemplated in the AWRM Program. The Permittee shall submit a report of waste discharge and initiate an application to receive an NPDES permit for these facilities prior to their discharge to the SCR. Permit writers will consider ambient water quality when establishing permit limits to meet WQOs for Reach 4A.

8.4. Supplemental Water

Supplemental water released to Reach 6 of the Santa Clara River will require an NPDES permit. The AWRM contemplates the use of existing Saugus aquifer wells to deliver low chloride supplemental water directly to the USCR because infrastructure already exists and would not need to be constructed. These supplemental waters would be delivered through contractual arrangements between the SCVSD and the Upper Basin Water Purveyors and would be discharged directly to the USCR. However, although chloride concentrations in these alternative supplemental water wells are very low (20 to 42 mg/L), sulfate concentrations consistently exceed the existing surface water quality objective of 300 mg/L for Reach 6 and the TDS groundwater objectives of 700 mg/L for the groundwater basin underlying Reach 6.

Interim wasteload allocations (Table 12) are developed for sulfate and TDS for the dilution water discharges. These wasteload allocations would apply until then end of the TMDL Implementation period in order to allow (1) time for construction of infrastructure to connect the supplemental water to the Valencia WRP and be diluted with the RO permeate, or (2) time for the SCVSD to conduct additional special studies to provide adequate justification for SSOs for sulfate and TDS. If infrastructure to remove the direct discharge of supplemental water to the USCR is not constructed or if the Regional Board does not approve SSOs for sulfate and TDS, the interim WLAs would expire.

Table 12. Interim WLAs for Reach 6 Supplemental Water Discharges

Reach	Interim Sulfate WLA (mg/L)	Interim TDS WLA (mg/L)	Averaging Period
6	450	1000	12-

	month~~Annual~~

The interim WLAs are protective of beneficial uses and consistent with historical surface and groundwater objectives for Reach 6 (see discussion in section 8.2).

The final WLAs for TDS and sulfate are equal to existing surface water and groundwater quality objectives for TDS and sulfate in Tables 3-8 and 3-10 of the Basin Plan. The Regional Board may revise the final WLAs based on review of trend monitoring data as detailed in the monitoring section (Section 8.7) of this staff report.

8.5. Downstream Effects of TMDL Implementation

Implementation of the USCR Chloride TMDL, including implementation of AWRM and the discharge to Reach 4A of the blended RO permeate and pumped groundwater will not cause exceedances of surface water quality objectives for downstream reaches. The water discharged to Reach 4A will meet the WQO of 100 mg/L for Reaches 4A and 3. Furthermore, US EPA has established a TMDL for chloride in Reach 3 of the Santa Clara River (US EPA, 2003). The TMDL for Reach 3 sets a numeric target of 80 mg/L of chloride. The linkage analysis for the Reach 3 TMDL demonstrates that the numeric target of 80 mg/L will be attained if upstream discharges from Reach 4 have a chloride concentration of 100 mg/L.

Although the discharge to Reach 4A will have a concentration below the surface WQO of 100 mg/L, it will have a concentration greater than the existing chloride concentrations in Reach 4A and the Fillmore groundwater basin downstream. The average chloride concentration in Reach 4A is 59 mg/L, based on data collected from 1992 to 2006 downstream of the Fillmore Fish Hatchery. The GWSI model was used to calculate the average mass loading, average chloride concentration, and average flow from the discharge to 4A of blended RO permeate and extracted groundwater. This was compared with historic chloride concentration and flow data to determine the incremental increase in Reach 4A surface water chloride concentrations caused by the blended discharge. Depending on the flows and existing surface chloride concentrations, the discharge could increase chloride concentrations by up to 20 mg/L in Reach 4A

The increased concentrations in surface water could impact groundwater quality in the Fillmore Basin, depending on how much surface water recharges the groundwater. The average chloride concentration in the Fillmore Basin is 49 mg/L, 62 mg/L, and 46 mg/L based on data collected at wells V-0309, V-0340, and V-0342, respectively, located in the eastern portion of the Fillmore Basin from 1987 to 2006. Therefore, there is a potential to degrade water quality below existing ambient conditions in groundwater by implementation of the AWRM compliance option. The extent of this potential degradation needs to be further assessed through an evaluation of hydrology and the amount of surface water recharge that occurs in Reach 4A and downstream.

In addition, the potential increases in chloride concentrations in the Fillmore Basin, which is the water supply for the City of Fillmore, could impact the levels of chloride in Fillmore treatment plant effluent discharged to Reach 3.

Therefore, it is likely that an antidegradation analysis will be required during the permitting stage for the discharge to Reach 4A. The permit will require further evaluation of this discharge and any impacts on downstream uses, groundwater and surface water monitoring, and enforceable effluent limits. An initial antidegradation analysis is presented here. State and federal antidegradation requirements include the following conditions:

- The reduction in water quality will not unreasonably affect actual or potential beneficial uses.
- The proposed action is necessary to accommodate important economic or social development in the area.
- The reduction in water quality is consistent with maximum public benefit.
- Water quality will not increase above water quality objectives prescribed in the Basin Plan.

The current chloride WQO of 100 mg/L in Reaches 3 and 4A will protect the most sensitive beneficial use of the river's water, which is salt-sensitive agricultural use and has threshold value of 117 mg/L. Under the AWRM Program, the blended extraction well and RO permeate discharge into Reach 4A will not exceed a chloride concentration of 95 mg/L, and may be further adjusted downward as needed to protect water quality. Therefore, the blended extraction well and RO permeate discharge into Reach 4A will not exceed the water quality objective of the receiving water at the point of discharge or in the reach downstream of the discharge point.

Further water quality assessments will be used to determine whether the discharge to 4A would increase chloride concentrations in groundwater in the Fillmore and Santa Paula Basins. Responsible parties, including SCVSD and the ultimate permit holder for the 4A discharge, will be required to conduct chloride trend monitoring in the Fillmore Basin and in Reaches 3, 4A to evaluate impacts of compliance measures to downstream groundwater and surface water quality, including areas downstream of the Fillmore treatment plant. This TMDL shall be reconsidered if chloride trend monitoring indicates degradation of groundwater or surface water due to implementation of compliance measures.

The water quality analyses discussed above will be utilized in conjunction with an extension of the GSWI model to assess the interaction of groundwater and surface water and any potential impacts to downstream water quality by the AWRM option. Specifically, key stakeholders have agreed through a memorandum of understanding to extend the GSWI model through the Piru, Fillmore, and Santa Paula groundwater basins and the overlying surface waters to the Freeman Diversion. If the extended GSWI model results indicate the blended extraction well and RO permeate discharge as currently proposed by the AWRM option would cause an exceedance of water quality objectives,

the GSWIM will be utilized to determine the level of chloride in the blended extraction well and RO permeate discharge necessary to preclude such an exceedance.

The important social and economic benefits of the AWRM Program could warrant some degradation of the downstream reaches. It has been shown that AWRM Program will support water recycling and provide for additional water resources for agriculture and aquatic habitat. Additionally, chloride concentrations in the Santa Clara River will be lower at the Ventura-Los Angeles County Line, and will result in better-quality recharge to the east Piru basin. As a result, surfacing groundwater from the Piru basin in Reach 4A may decrease over time as a result of the AWRM. The AWRM will also result in increased surface water flows in Reaches 3 and 4A as compared to other compliance options. Finally, in general, the AWRM compliance option has more water quality benefits to Ventura County than do the conventional advanced treatment based compliance options.

It is important to note that any degradation in water quality can be averted by operating the extraction wells in the Piru basin in a manner that will not cause increases in the baseline water quality for the Fillmore and Santa Paula groundwater basins and surface water reaches (4A and 3). For example, the maximum concentration of the extraction well and RO permeate blend could be adjusted downward from 95 mg/L, as warranted based on GSWIM modeling.

The Reach 3 Chloride TMDL may be re-evaluated in the context of the findings of the Upper Santa Clara River Chloride TMDL studies, chloride trend monitoring, and the extended GSWI model results.

8.6. Implementation Schedule

The TMDL provides a ten-year schedule to attain compliance with the conditional SSOs and conditional wasteload allocations. Key uncertainties at this point relate to identification of the optimum method for brine disposal. Several options, including deep-well injection in the vicinity of old oil fields in the Santa Clarita Valley, and drying and landfill disposal will be considered by the SCVSD in the first two years of the TMDL Implementation Plan.

The Implementation schedule includes 6 years for implementation of compliance measures including planning, completing Environmental Impact Report, engineering design, and construction. The Regional Board will re-valuate the schedule to implement control measures needed to meet final conditional WLAs at year 6 (2011) and year 9.5 (2014) after the effective date of the TMDL.

8.7. Monitoring for the AWRM Program

NPDES Permittee will conduct TDS, chloride, and sulfate monitoring to ensure that water quality objectives are being met. This monitoring will be consistent with and at least equivalent to monitoring specified in existing permits.

The SCVSD will submit a monitoring plan to conduct chloride, TDS, and sulfate trend monitoring to ensure that the goal of chloride export in the watershed is being achieved, water quality objectives are being met, and downstream groundwater and surface water quality is not degraded due to implementation of compliance measures. The SCVSD monitoring plan shall include plans to monitor chloride, TDS, and sulfate in groundwater and identify representative wells to be approved by the Regional Board Executive Officer, in the following locations: (a) Shallow alluvium layer in east Piru Basin, (b) San Pedro Formation in east Piru Basin, and (c) groundwater basins under Reaches 5 and 6, which shall be equivalent or greater than existing groundwater monitoring required by NPDES permits for Saugus and Valencia WRPs. The monitoring plan shall also include a plan for chloride, TDS, and sulfate trend monitoring for surface water for Reaches 4B, 5 and 6. The monitoring plan shall include plans to monitor chloride, TDS, and sulfate at a minimum of once per quarter for groundwater and at a minimum of once per month for surface water. The plan should propose a monitoring schedule that extends beyond the completion date of this TMDL to evaluate impacts of compliance measures to downstream groundwater and surface water quality. This TMDL shall be reconsidered if chloride, TDS, and sulfate trend monitoring indicates degradation of groundwater or surface water due to implementation of compliance measures.

The Reach 4A permittee will submit a monitoring plan to conduct chloride, TDS, and sulfate trend monitoring to ensure that the goal of chloride export in the watershed is being achieved, water quality objectives are being met, and downstream groundwater and surface water quality is not degraded due to implementation of compliance measures. The Reach 4A permittee monitoring plan shall include plans to monitor chloride, TDS, and sulfate in groundwater and identify representative wells to be approved by the Regional Board Executive Officer in the following locations (a) Fillmore Basin, and (b) Santa Paula Basin. The monitoring plan shall also include a plan for chloride, TDS, and sulfate trend monitoring for surface water for Reaches 3 and 4A. The monitoring plan should include plans to monitor chloride, TDS, and sulfate at a minimum of once per quarter for groundwater and at a minimum of once per month for surface water. The plan should propose a monitoring schedule that shall extend beyond the completion date of this TMDL to evaluate impacts of compliance measures to downstream groundwater and surface water quality. This TMDL shall be reconsidered if chloride, TDS, and sulfate trend monitoring indicates degradation of groundwater or surface water due to implementation of compliance measures. ~~The SCVSD and Reach 4A Permittee will conduct chloride, sulfate, and TDS trend monitoring to ensure that the goal of chloride export in the watershed is being achieved, water quality objectives are being met, and downstream groundwater and surface water quality is not degraded due to implementation of compliance measures. Trend monitoring for groundwater shall be conducted by the SCVSD at the following locations measured at representative wells as determined by the Regional Board Executive Officer: (a) Shallow alluvium layer in east Piru Basin, (b) San Pedro Formation in east Piru Basin, and (c) groundwater basins under~~

~~Reaches 5 and 6, which shall be equivalent or greater than existing groundwater monitoring required by NPDES permits for Saugus and Valencia WRPs. Trend monitoring for groundwater shall be conducted by the Reach 4A Permittee at the following locations measured at representative wells as determined by the Regional Board Executive Officer: (a) Fillmore Basin, and (b) Santa Paula Basin. Chloride trend monitoring for surface water shall be conducted by the SCVSD for Reaches 4B, 5 and 6, while trend monitoring for surface water shall be conducted by the Reach 4A Permittee for Reaches 3 and 4A. Trend monitoring shall be conducted at a minimum of once per quarter for groundwater and at a minimum of once per month for surface water. Trend monitoring shall extend beyond the completion date of this TMDL to evaluate impacts of compliance measures to downstream groundwater and surface water quality. A monitoring plan shall be submitted by the SCVSD and Reach 4A Permittee to the Regional Board for Executive Officer approval within six months after the completion date of Task 10. Monitoring will begin one year after Executive Officer approval of the monitoring plan to allow time for the installation of any monitoring wells and/or surface water monitoring stations. Trend monitoring in Fillmore and Santa Paula Basins and in Reaches 3 and 4A will begin one year after Executive Officer approval of the monitoring plan and upon issuance of NPDES permit for the Reach 4A Permitee. This TMDL shall be reconsidered if chloride trend monitoring indicates degradation of groundwater or surface water due to implementation of compliance measures.~~

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