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VENTURA COUNTY WATERSHED PROTECTION DISTRICT

Lower Santa Clara River
Salt and Nutrient Management Plan

prepared by

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CITY OF FILLMORE

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VENTURA COUNTY PUBLIC WORKS AGENCY/WATERSHED PROTECTION DISTRICT

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Acknowledgements

The Lower Santa Clara River Salt (LSCR) and Nutrient Management Plan (SNMP) is the result of the collaborative effort of the Watersheds Coalition of Ventura County (WCVC) under the WCVC Integrated Regional Watershed Management Plan (IRWMP). The regional planning efforts included this special study to enhance the IRWMP and overall water resource management in Ventura County. The WCVC sought and obtained Proposition 84 Grant funding to support the SNMP development.

The grant and project was directed by the Ventura County Public Works Agency's Watershed Protection District. The development of the SNMP was overseen by a Technical Advisory Group (TAG) of agencies and entities that will be directly affected by the SNMP.

Funding for this project has been provided in full or in part by the Department of Water Resources (DWR) under a Proposition 84 Grant. The contents of this document do not necessarily reflect the views and policies of the DWR, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

The grant management agency and members of the WCVC serving on the TAG provided in-kind services and supplemental funding for the project.

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The LSCR SNMP was prepared by a team led by Larry Walker Associates in association with Hydrometrics WRI, Carollo, Rincon Consultants, and Dr. Norm Brown.

Executive Summary

In February 2009 the State Water Resources Control Board (State Water Board) adopted the Recycled Water Policy[1], which requires the development of regional or sub-regional salt and nutrient management plans (SNMPs) for groundwater basins in California. The purpose of the Recycled Water Policy is to increase the use of recycled water from municipal wastewater sources consistent with state and federal water quality laws. Since recycled water contains salts and nutrients that may cause or contribute to exceedances of water quality objectives, management of these constituents in recycled water projects is important. This document provides the SNMP for the Lower Santa Clara River (LSCR) Watershed, located in Ventura County. The LSCR SNMP covers the Piru, Fillmore, Santa Paula, Mound and Oxnard Forebay sub-basins within the Lower Santa Clara River Groundwater Basin.

The SNMP area includes the cities of Fillmore, Santa Paula, and San Buenaventura (Ventura) and small unincorporated communities in Ventura County, and includes seven wastewater treatment plants (WWTPs). Five of the WWTPs have actively participated in the SNMP development and provided input into potential future plans for recycled water projects.

The LSCR SNMP has been developed as a comprehensive planning document that provides all of the key technical information necessary to meet the requirements of the Recycled Water Policy. The SNMP has also been developed as a flexible planning document that can guide the management and regulation of discharges of salts and nutrients in the context of the unique characteristics of the watershed and the current status of recycled water project planning. While all of the participating wastewater agencies have plans to recycle water, only a few specific recycled water project locations have been identified. Most of the plans are more general, including goals for volumes of recycled water to be used, but the specific project locations for the recycled water applications are still being identified.

To accommodate the range of stages of recycled water planning in the SNMP area, the SNMP includes required background information and an assessment of the groundwater basins, providing a description of water recycling and stormwater recharge goals and objectives, quantification of sources, identification of loading estimates, estimates of assimilative capacity, and description of fate and transport of salts and nutrients. Based on this technical information, a list of project scenarios encompassing the potential projects found in the recycled water planning documents and management measures was identified. The SNMP provides an evaluation of the future scenarios, develops a structure for evaluating specific projects as they are implemented in the future, and identifies management measures where appropriate. The SNMP builds on a range of water quality management policies and mechanisms already in place or being implemented, and is accordingly focused on management of increased recycled water utilization to benefit the study area.

WATER QUALITY ANALYSIS AND ASSIMILATIVE CAPACITY

All available groundwater quality data were compiled and reviewed. A data period of 1996 to 2012 was selected for analysis. Groundwater data were evaluated for trends, summary statistics were prepared, and wells were grouped by sub-basin for comparison to objectives. For wells with

[1] State Water Resources Control Board Resolution No. 2009-0011

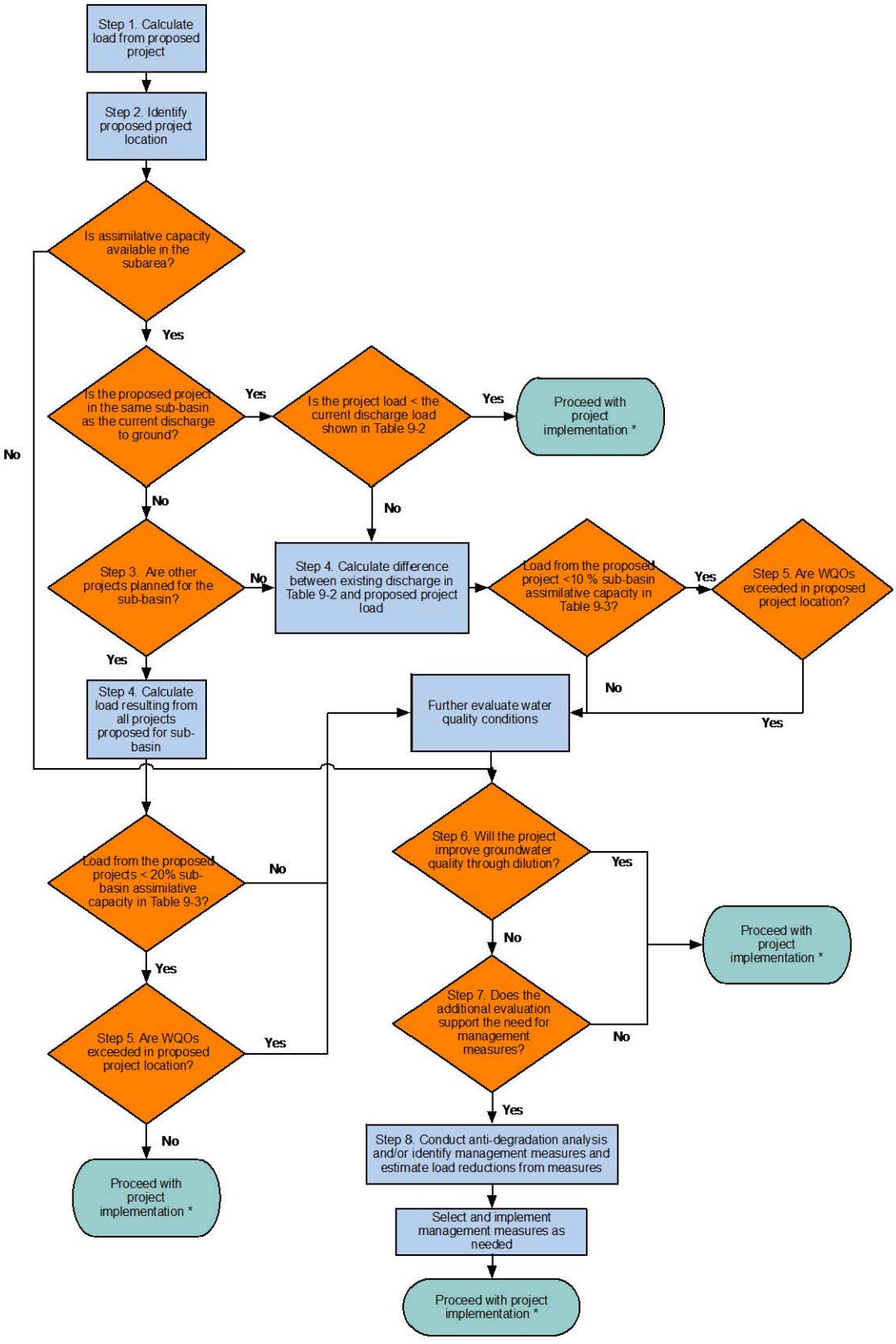
more than 10 data points, median and 90th percentile concentrations were calculated to assess the variability of the data. The analysis showed that generally basin water quality is not very variable and is not significantly influenced by hydrologic conditions. No significant difference was observed between dry and wet years in the data. Additionally, surface water recharge is the largest driver of water quality in most sub-basins and surface loadings are generally not large enough to greatly influence water quality in the sub-basins as a whole. However, in some cases single wells or small subareas exceed water quality objectives or have discernable trends. The water quality analysis is summarized in **Section 4**.

Based on the water quality analysis, the assimilative capacity of the sub-basins was calculated. To calculate the assimilative capacity, the existing water quality was calculated and compared to the water quality objective. The difference between the existing water quality and the objective is the available assimilative capacity. Existing water quality was calculated by taking the median of all wells in the dataset and plotting them on maps. From the spatial distribution of the median concentrations, zones of similar water quality were hand-delineated. The median concentrations for all the wells located within each zone of the sub-basin were averaged to provide an overall average concentration for the zone. The acreage of the zone between contours and its average concentrations were used to estimate an area-weighted average concentration for each subarea. Summary statistics for the area-weighted averages are provided to support the analysis. The area-weighted average concentrations are regarded as the existing groundwater quality. The assimilative capacity analysis demonstrated that assimilative capacity is available in all sub-basins within the planning area except for TDS in the Mound basin (**Section 5**).

PROJECT EVALUATION

A spreadsheet model was used to estimate the amount of loading that would need to be added to the groundwater basins over a 17 year period to use up 20% of the available assimilative capacity. This load estimate is considered the assimilative capacity loading threshold. The loading threshold is used in the SNMP to define the amount of allowable loading that could be added by future recycled water projects and not result in degradation of the sub-basins (**Section 7**).

Project scenarios were developed to bracket the low and high volumes of potential recycled water use based on recycled water planning documents. Planned projects were included as a scenario where information was available and other scenarios were developed to account for the range of potential future projects that were included in planning documents. The net loading from the project scenarios to the groundwater basins were compared to the assimilative capacity thresholds to provide an initial assessment of the range of potential projects. Although the initial assessment provides a good indication of whether or not a proposed project would meet the SNMP requirements, individual projects will need to be evaluated to determine their feasibility under the plan. **Section 9** provides a detailed procedure for evaluating projects. A flow chart of the project evaluation process is shown in **Figure ES-1**.



*Contingent upon compliance with other regulatory requirements

Figure ES-1. Project Evaluation Process

MANAGEMENT MEASURES

The process outlined in the **Figure ES-1** is utilized to determine if additional management measures are necessary to implement the project. Stakeholders in the planning area have a strong commitment to actively protecting the groundwater sub-basins and managing salts and nutrients. A number of management measures have already been implemented in the planning area to manage salts and nutrients and significant reductions in nutrient discharges from wastewater treatment plants have been observed as result of the actions. Some of the key management measures include:

1. Prohibitions on water softener installation in the Cities of Fillmore and Santa Paula.
2. Incentive programs to remove existing water softeners in the City of Fillmore.
3. Upgrades to and construction of new wastewater treatment plants for Piru, Fillmore, and Santa Paula to include nutrient removal.
4. Ban on commercial and industrial discharges of brine or saltwater in the City of Ventura.
5. Implementation of agricultural best management practices (BMPs) to control nutrients and salts, including fertilizer and irrigation management.
6. New development and redevelopment requirements to infiltrate stormwater where feasible.
7. Requirements to tie into the sewer within the City of Santa Paula if within 200 feet of a sewer line (septic tank policy).
8. Treatment of municipal supply within the City of Ventura to improve water quality (reducing salts) prior to providing it to customers.
9. Groundwater protection programs in the City of Fillmore to provide wellhead protection, overdraft mitigation, and replenishment of extracted groundwater.

These existing management measures have resulted in reductions in discharges of salts and nutrients in the planning area, particularly from wastewater treatment plants. Average concentrations of salts and nutrients in effluent following the upgrades have decreased compared to the concentrations prior to the upgrades. Additionally, management measures to control salts and nutrients in agricultural areas have been implemented on the majority of the acreage in the planning area. The existing management measures that have already been implemented in the watershed cover the majority of the source control and treatment activities that can be implemented at wastewater treatment plants to address salts and nutrients, with the exception of reverse osmosis treatment.

If additional management measures are needed to offset loads from a proposed project, the project proponent can select from a list of potential management measures shown in **Section 9**.

Section 10 provides a basin-wide monitoring program with provisions for monitoring constituents of emerging concern. **Section 11** provides analysis of consistency with the anti-degradation policies. The approach used to evaluate the potential projects has been designed to provide compliance with the anti-degradation policy.

List of Acronyms

AF	Acre Feet
AFY	Acre Feet Per Year
AWPF	Advanced Water Purification Facility
BGS	Below Ground Surface
BMP	Best Management Practice
BPTC	Best Practicable Treatment or Control
CDPH	California Department of Public Health
CECs	Constituents of Emerging Concern
CFR	Code of Federal Regulations
CFS	Cubic Feet Per Second
CoC	Chain of Custody
DWR	Department of Water Resources
FCGMA	Fox Canyon Groundwater Management Agency
FWRP	Fillmore Wastewater Reclamation Plant
GAMA	Groundwater Ambient Monitoring and Assessment Program
GIS	Geographical Information System
IRWMP	Integrated Regional Watershed Management Plan
LAS	Lower Aquifer System
LID	Low Impact Development
LSCR	Lower Santa Clara River
MBR	Membrane Bioreactor
MGD	Million Gallons Per Day
MS/MSDs	Matrix Spike/Matrix Spike Duplicates
MSL	Mean Sea Level
MS4	Municipal Separate Storm Sewer System
NA	Not Applicable
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
POTW	Publically Owned Treatment Works
PTP	Pumping Trough Pipeline
PV	Pleasant Valley Delivery System
QA/QC	Quality Assurance / Quality Control

RO	Reverse Osmosis
RWQCB	Regional Water Quality Control Board
SCR	Santa Clara River
SCRWC	Santa Clara River Watershed Committee
SNMP	Salt and Nutrient Management Plan
SPWRF	Santa Paula Water Recycling Facility
TAG	Technical Advisory Group
TDS	Total Dissolved Solids
TMDL	Total Maximum Daily Load
TN	Total Nitrogen
UAS	Upper Aquifer System
UWCD	United Water Conservation District
USGS	United States Geological Survey
UV	Ultraviolet
VCAILG	Ventura County Irrigated Lands Group
VWRF	Ventura Water Reclamation Facility
WCVC	Watersheds Coalition of Ventura County
WDRs	Waste Discharge Requirements
WQOs	Water Quality Objectives
WRF	Water Reclamation Facility
WWTP	Wastewater Treatment Plant

1 Introduction and Goals

In February 2009 the State Water Resources Control Board (State Water Board) adopted the Recycled Water Policy[2], which requires the development of regional or sub-regional salt and nutrient management plans (SNMPs) for groundwater basins in California by 2014. The purpose of the Recycled Water Policy is to increase the use of recycled water from municipal wastewater sources consistent with state and federal water quality laws. Since recycled water contains salts and nutrients that may cause or contribute to exceedances of water quality objectives, management of these constituents in recycled water projects is important. However, the policy recognizes that recycled water projects are not the only source of salts and nutrients to groundwater basins. As a result, the policy states:

> *"It is the intent of this Policy that salts and nutrients from all sources be managed on a basin-wide or watershed-wide basis in a manner that ensures attainment of water quality objectives and protection of beneficial uses. The State Water Board finds that the appropriate way to address salt and nutrient issues is through the development of regional or subregional salt and nutrient management plans rather than through imposing requirements solely on individual recycled water projects."*

This document provides the SNMP for the Lower Santa Clara River (LSCR) Watershed, located in Ventura County. The LSCR SNMP covers the Piru, Fillmore, Santa Paula, Mound, and Oxnard Forebay sub-basins within the Santa Clara River Groundwater Basin, as shown in **Figure 1-1**.

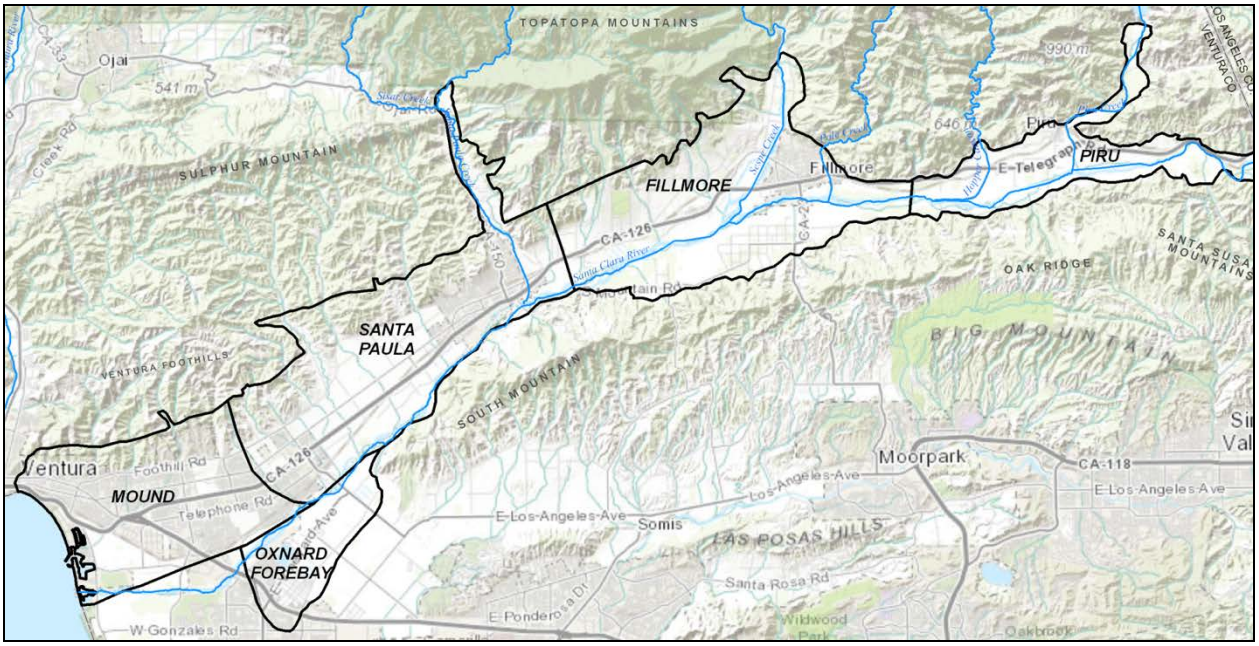


Figure 1-1 Lower Santa Clara River SNMP Area

[2] State Water Resources Control Board Resolution No. 2009-0011

The groundwater and surface water in the SNMP area are strongly interconnected. Surface water and groundwater both flow from the Upper Santa Clara River into the Lower Santa Clara River planning area and the groundwater basins are interconnected with flow generally moving from the upper portions of the watershed to the lower portion of the watershed. Surface water recharge strongly influences groundwater quality, particularly in the Piru basin.

The SNMP area includes the cities of Fillmore, Santa Paula, and San Buenaventura (Ventura), small unincorporated communities in Ventura County, and seven wastewater treatment plants (WWTPs). Five of the WWTPs have actively participated in the SNMP development and provided input into potential future plans for recycled water projects. A summary of the WWTPs is provided in **Table 1-1**.

Table 1-1 Wastewater Treatment Plants located in SNMP Planning Area

Facility	Design Flow	Sub-Basin and Subarea	Participated in SNMP
Piru Wastewater Treatment Plant	0.5 mgd	Piru-Lower Area West of Piru Creek	Yes
Fillmore Wastewater Reclamation Facility	2.4 mgd	Fillmore-Pole Creek Fan Area	Yes
Santa Paula Water Recycling Facility	3.4 mgd	Santa Paula-West of Peck	Yes
Saticoy Wastewater Treatment Plant	0.24 mgd	Santa Paula-West of Peck	
Limoneira and Olivelands Sewer Farms	0.05 mgd	Santa Paula-West of Peck	
Todd Road Jail Wastewater Treatment Plant	0.085 mgd	Santa Paula-West of Peck	Yes
Ventura Wastewater Reclamation Facility	14 mgd	Mound	Yes

1.1 PLANNING AREA BACKGROUND

Stakeholders in the planning area have a strong commitment to actively protecting the groundwater basins and managing salts and nutrients. With the exception of the western portion of the City of Ventura, all of the SNMP planning area is reliant on groundwater for their water supply. As a result, the stakeholders in the watershed have a vested interest in protecting the groundwater basins to maintain that water supply. Additionally, a chloride Total Maximum Daily Load (TMDL) and nutrient TMDL in the watershed have resulted in wastewater and agricultural dischargers implementing additional control measures to reduce salt and nutrient concentrations. As will be discussed in more detail in **Section 9**, a number of management measures have already been implemented in the planning area to manage salts and nutrients. Some of the key management measures include:

1. Prohibitions on water softener installation in the Cities of Fillmore and Santa Paula.
2. Incentive programs to remove existing water softeners in the City of Fillmore.
3. Upgrades to and construction of new WWTPs for Piru, Fillmore, and Santa Paula to include nutrient removal.

4. Ban on commercial and industrial discharges of brine or saltwater in the City of Ventura.
5. Implementation of agricultural best management practices (BMPs) to control nutrients and salts, including fertilizer and irrigation management.
6. New development and redevelopment requirements to infiltrate stormwater where feasible.
7. Requirements to tie into the sewer within the City of Santa Paula if within 200 feet of a sewer line (septic tank policy).
8. Treatment of municipal supply within the City of Ventura to improve water quality prior to providing it to customers.
9. Groundwater protection programs in the City of Fillmore to provide wellhead protection, overdraft mitigation, and replenishment of extracted groundwater.

These existing management measures have resulted in reductions in discharges of salts and nutrients in the planning area, particularly from WWTPs. Average concentrations of salts and nutrients in effluent following the upgrades have decreased compared to the concentrations prior to the upgrades. Additionally, management measures to control salts and nutrients in agricultural areas have been implemented on the majority of the acreage in the planning area (see **Section 9**).

1.2 STAKEHOLDERS

The Recycled Water Policy and the Integrated Regional Watershed Management Plan (IRWMP) grant include requirements related to public outreach and stakeholder involvement. Therefore a stakeholder process was developed to create an open locally driven and controlled, collaborative process and to provide outreach to disadvantaged communities, agricultural interests, the local communities that will benefit from the plan, the various entities that have been promoting recycled water use to improve Ventura River estuary water quality, and the Los Angeles Regional Water Quality Control Board (RWQCB).

Using a tiered stakeholder process, which included a Technical Advisory Group (TAG), the Santa Clara River Watershed Committee (SCRWC), and the RWQCB, the LSCR SNMP was developed with broad-based local community involvement.

The TAG consists of the funding agencies and stakeholders responsible for management of salts and nutrients in the watershed with representatives from agricultural, water suppliers, municipalities, including disadvantaged communities, and watershed managers. The following organizations participated on the TAG:

- Ventura County Public Works Agency Watershed Protection District;
- Cities of Ventura, Santa Paula, and Fillmore;
- United Water Conservation District (UWCD);
- Ventura County Water Works District 16; and
- Farm Bureau of Ventura County.

The SCRWC is one of three watershed groups organized under the umbrella of the Watersheds Coalition of Ventura County.

> *The Santa Clara River Watershed Committee (SCRWC) was formed in July 2006 as a coalition of stakeholders addressing issues critical to the watershed. The SCRWC is engaged in a variety of local planning efforts including development and implementation of an integrated regional water management plan (IRWMP), implementation of integrated projects identified in the IRWMP with Prop. 50 funds, and development of future project ideas to address the objectives developed by the Committee.*

As an existing and well-established watershed group that represented the stakeholders[3] in the watershed, the SCRWC served as the second tier of the LSCR SNMP stakeholder process. Updates on the progress and status of the SNMP were provided at SCRWC meetings, and the Ventura County Watershed Protection District staff served as a liaison between the SCRWC and the TAG. Documents presented on the SNMP were posted on the SCRWC website.

The final component of the stakeholder process was participation of the RWQCB. Once the TAG was established and preliminary work products were developed, the TAG engaged with the RWQCB staff, holding technical discussions meetings and invited the RWQCB staff to participate in the TAG meetings. RWQCB staff also participate in the SCRWC meetings.

1.3 SNMP GOALS AND OBJECTIVES

A key reason for developing the LSCR SNMP is to streamline requirements and encourage use of recycled water as an alternative water supply to help the state meet increasing water demands. Agencies in the region are planning for and implementing such recycling programs. Stakeholders in the LSCR watershed are reliant on groundwater for almost all of the local water supply. Significant agricultural users of groundwater also exist in the LSCR. In addition to water recycling, stormwater management practices to implement low impact development (LID) will support groundwater recharge to supplement the groundwater supply. The overarching goal of the LSCR SNMP is to: protect, conserve, and augment water supplies and to improve water supply reliability. This goal is supported by objectives of:

- Protecting Agricultural and Municipal Drinking Water Beneficial Uses of groundwater;
- Supporting increased recycled water use in the basin;
- Facilitating long-term planning and balancing use of assimilative capacity and management measures across the basin;
- Encouraging groundwater recharge in the Santa Clara River (SCR) valley; and
- Collecting, treating, and infiltrating stormwater runoff in new development and redevelopment projects.

The SNMP has been developed to support these general goals and objectives. Additionally, the stakeholders have identified recycled water and stormwater use and recharge goals for the SNMP.

[3] A list of the participants in the WCVC is available at: http://www.ventura.org/wcvc/participants.htm.

1.1.1 Recycled Water Goals

Recycling water is one key method local agencies are using to augment local water supplies. Within the LSCR basin several local agencies are currently recycling water and planning for increased future water recycling. **Table 1-2** provides a summary of current and projected recycled water projects in the basin.

Table 1-2 Current and Future Recycled Water Use

Stakeholder	Current Recycled Water Use (AFY)	Projected Recycled Water Use (AFY)
City of Fillmore	280	2,651 (by 2020)
City of Ventura	672	Up to 11,500 (by 2035)
City of Santa Paula	NA	1,622 (by 2035)
Piru (District 16)	NA	225-560 (Beginning 2016)

1.1.2 Stormwater Recharge Goals

Stormwater recharge is a component of water supply augmentation strategy. Stormwater recharge through LID techniques mimics the natural hydrologic process and encourages infiltration of stormwater throughout the urban landscape. The Ventura County stormwater permit and municipal planning processes require the implementation of LID techniques as well as source control measures to protect stormwater quality for new development and redevelopment projects. Additionally, the general plan encourages the incorporation of natural drainage features that allow for infiltration of runoff in the stormwater conveyance system and flood control features. Implementation planning efforts for TMDLs and other stormwater resource plans being developed in the watershed will identify potential stormwater recharge projects that will be considered as potential management measures under this plan. The SNMP supports the use of stormwater recharge as a management measure where appropriate.

1.4 SNMP APPROACH

The LSCR SNMP area has a number of key characteristics that provide context for the SNMP approach provided in this document.

1. The plan area is reliant on groundwater for almost all of the local water supply. As a result, groundwater management and protection has been a priority in the plan area for many years.
2. The watershed is primarily open space and agricultural land. Urban development within the plan area is currently restricted to existing urban planning areas and it is anticipated that these restrictions will remain in place and the primarily rural nature of the plan area will be maintained into the future.
3. With the exception of the Ventura Wastewater Reclamation Facility (VWRF), all of the treatment plants listed in **Table 1-1** currently either recycle their treated water or discharge all of their treated water to percolation ponds.

4. Given that land uses have been and will remain relatively unchanged and that most recycled water uses in the plan area would not represent new salt or nutrient loads to the groundwater basin, the salt and nutrient sources covered by this plan have remained fairly consistent for years and are anticipated to be similar into the future. The exceptions would be any future use of recycled water from the VWRF and any increased flows from the other treatment plants within the plan area.
5. While the WWTPs have set goals for the volume of wastewater to be reused, specific locations and plans for recycled water projects for most projects are still in development. As a result, the SNMP needs to be flexible to allow for the development and implementation of projects over time.

Based on the key characteristics outlined above, the SNMP has been developed as a flexible planning document that can guide the management and regulation of discharges of salts and nutrients as projects are implemented in the future. The SNMP builds on a range of water quality management policies and mechanisms already in place or being implemented, and is accordingly focused on management of increased recycled water utilization to benefit the study area.

In pursuit of this goal, the SNMP includes required background information and an assessment of the groundwater basins, providing a description of water recycling and stormwater recharge goals and objectives, quantification of sources, identification of loading estimates, estimates of assimilative capacity, and description of fate and transport of salts and nutrients. This assessment has led to the identification of a list of project scenarios encompassing the currently planned projects found in the recycled water planning documents and future projects that could be implemented to achieve the recycled water goals and potential management measures for both planned and potential future projects. The SNMP provides an evaluation of the scenarios, develops a structure for evaluating specific projects as they are implemented in the future, and identifies management measures where appropriate. The SNMP is organized as follows:

Section 1. Introduction and Goals

Section 2. Regulatory Framework

Section 3. Basin Setting

Section 4. Basin Water Quality

Section 5. Assimilative Capacity Analysis

Section 6. Salt and Nutrient Source Identification and Loading Estimates

Section 7. Fate and Transport Analysis

Section 8. Project Scenarios

Section 9. Implementation Measures to Manage Salt and Nutrient Loading in the Groundwater Basin on a Sustainable Basis

Section 10. Basin/Sub-Basin Wide Monitoring Plan

Section 11. Anti-Degradation Analysis