San Luis Obispo County
Master Water Report
Volume I of III

MAY 2012




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Oak Resource Conservation District

SAN LUIS OBISPO COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

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San Luis Obispo County Flood Control and Water Conservation District

SAN LUIS OBISPO COUNTY MASTER WATER REPORT

May 2012

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San Luis Obispo County Flood Control and Water Conservation District

SAN LUIS OBISPO COUNTY MASTER WATER REPORT

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MASTER WATER REPORT

With cyclical droughts, declining groundwater levels, degradation of groundwater quality, and the limited availability of surface water supplies, it is important for all entities in San Luis Obispo County ("County" for government; "county" for geographic domain) to effectively manage available water resources to protect the public health and safety, maintain viable ecosystems, avoid seawater intrusion, and allow for sustainable agriculture.

To that end, this Master Water Report (MWR) is a compilation of the current and future water resource management activities being undertaken by various entities within the County and is organized by Water Planning Area (WPA). The MWR explores how these activities interrelate, analyzes current and future supplies and demands, identifies future water management strategies and ways to optimize existing strategies, and documents the role of the MWR in supporting other water resource planning efforts.

The San Luis Obispo County Flood Control and Water Conservation District (District) initiated and completed this latest MWR update. The original 1972 Master Water and Sewage Plan (subsequent title change) was previously updated in 1986 and 1998.

ES.1 SUMMARY OF REPORT CHAPTERS

Chapter 1: Chapter 1 introduces the scope, goals and objectives, as well as the limitations, of the District's MWR.

Chapter 2: Chapter 2 describes the topical and geographical organization of the MWR and the County into three sub-regions and 16 Water Planning Areas (WPAs). Water demand, agricultural water needs, sources of supply, and other information are organized by WPA. The WPAs were intended to recognize important hydrogeologic units or water management areas throughout the County.

Chapter 3: Chapter 3 describes the existing data collection programs and the data available for completing the MWR and for managing water resources in the County.

Chapter 4: Chapter 4 evaluates and compares the available water supplies (apart from the untreated ocean) to the water demands for the different WPAs.

Chapter 5: Chapter 5 describes the relationship between the MWR and the different State, County, and local agency water related documents, programs, or policies that guide water resource management decisions. In addition, this chapter also suggests coordination efforts that should occur in future updates to the MWR that would promote consistency between it and other County, District and State documents.

ES.2 MASTER WATER REPORT RECOMMENDATIONS

This section presents a summary of the recommendations for District actions to improve water supply to meet existing and future demands throughout the County (Table ES 1). Many of the recommendations explore regional options that could be implemented County-wide to improve supply reliability and to improve the information contained in future MWRs. The analysis and support for implementing different water management strategies to meet existing and forecast demands, and to improve supply reliability for specific water providers and users are presented in Chapter 4 and will not be repeated in the Executive Summary.

ES.2.1 District's Highest Priorities

1. **District's Role with Regional Water Supply and Facilitating Interagency Arrangements:** Lead the effort to optimize the use of unsubscribed water from the State Water Project (SWP) and the Nacimiento Water Project (NWP), in conjunction with other facilities, to promote enhanced use of existing available resources that support local agency use and exchanges by:
    a. Developing policies for the use of unsubscribed water given the various needs in the County and existing County policies (for example, there is a need for increased direct deliveries in some areas of the County and a need for recharge/in-lieu delivery projects in other areas)
    b. Identifying and conducting pilot projects with the available resources to evaluate the effectiveness of various exchange concepts
    c. Establish the District's role in the development of a "boiler plate" agreement, or streamlined, standard process for local agencies to implement transfer agreements, and emergency intertie agreements.
2. **District's Role with Sub-regional Water Balance Analyses and Management**: Water demands were quantified on a WPA basis. Recognizing that some areas do not have adequate assessments of the water demand and supplies available, the District's role in and approach to analyzing water balances on a watershed and/or groundwater basin basis throughout the County should be established. Once established, specific priorities and work efforts can be identified. Two recommendations that support this effort follow:
    a. **Improve Environmental Water Demand Estimate:** Establish the District's role in implementing the recommendations associated with evaluating Environmental Water Demand in the County (for example, should the District conduct analyses, or somehow be involved with analyses, to estimate in-stream flow requirements to support the associated ecosystem?). Continue to prioritize and establish data collection locations in accordance with the District's Data Enhancement Plan, District funds, and the established role of the District.
    b. **Improve Agricultural Demand Estimate:** Future planning efforts need to include agricultural demands not captured in the Agriculture Commissioner's pesticide use permits GIS database. Also, future planning efforts should either develop more accurate agricultural demand estimates or complete a separate study that focuses solely on agricultural demands, and then incorporate the findings into future MWRs. Agricultural demand accounts for nearly 80 percent

of the total County demand. Inaccuracies in the assumptions could lead to large variances in the demand estimates.

3. **Future Master Water Report Updates:** The information in this MWR will be integrated into the region's Integrated Regional Water Management Plan (IRWM Plan). If the District continues to lead efforts in maintaining an IRWM Plan for the region (which is the County line), it may make sense to just update the IRWM Plan. Regardless of the document that houses the information contained and generated from this MWR, updates should occur on a five year cycle, following the completion of Urban Water Management Plans (UWMPs). However, the District should maintain a current inventory of other water resource data, GIS-based land use data and reports (e.g. water master plans, groundwater studies) and track progress on implementation of the recommendations to streamline future document updates. The District should encourage entities that do not prepare UWMPs to provide projected demand information.

ES.2.2 Water Management Strategies for Specific Users

The identification of water management strategies and the potential for implementing a management strategy for cities, communities, and other agencies within the County are discussed in Chapter 4. Note that the suggested water management strategies are not requirements, and most are consistent with existing water planning studies and options being considered by cities, communities, and agencies.

Interested persons not reading the entire MWR will want to become familiar with at least their own WPA as well as the regulations and planning documents of other agencies in the area where they live.

Table ES 1: Master Water Report Recommendations

Recommendation *(MWR Reference)*	Key Steps to Implementing Recommendation	Basis of Recommendation
ACTIONS TO IMPROVE FUTURE MASTER WATER REPORT UPDATES		
Create a Framework for Maintaining the Master Water Report *(MWR Section 5.2)*	• Determine whether to maintain both an IRWM Plan and a MWR - Update the MWR on a five-year cycle, following the completion of Urban Water Management Plans, in years ending in 1 or 6 (i.e. 2016, 2021, etc.) and in coordination with the County's Resource Management System. • Encourage all water purveyors to project water demand into the future. • Maintain a current inventory of other water resource data and reports (e.g. water master plans, groundwater studies). • Develop a consolidated, coordinated, web-based mechanism for improving, gathering, and sharing county-wide water supply and demand information to avoid redundancy and ensure consistency. • Utilize a web-based approach to maintain data. • Consider the analyses conducted to develop the Land Use and Circulation Element and Community 2050, and updates to the Resource Management System when updating the land-use-based water demand analysis in the MWR.	• Updating the MWR on a regular basis, consistent with UWMP timing, will provide the District and agencies in the County with a reliable planning-level document. • Will reduce the demand on District resources by streamlining processes (i.e. with UWMP efforts).
Improve Approach for Quantifying Demands *(MWR Section 4.6)*	• Refine future MWR investigation of the demand versus supply on a groundwater basin and/or watershed basis within WPAs.	• Understanding of demand and source of supply would be improved if the investigation looked more closely than the WPA level.
Improve Agricultural Demand Estimate *(MWR Sections 4.6.3 and 4.8.7)*	• Future planning efforts need to include agricultural demands not captured in the Agriculture Commissioner's pesticide use permits GIS database (e.g. irrigated pastures, livestock water use, etc.). • Define stakeholder groups in each WPA to coordinate and refine these (and other) estimates on a watershed and groundwater basin basis for their WPA. • Future planning efforts should either develop more accurate agricultural demand estimates or complete a separate study that focuses solely on agricultural demands, and then incorporate the findings into future MWRs. • Develop a voluntary pilot program where a representative percentage of agricultural water users could meter and report their water use, and the District would track actual applied water per acre for various agricultural users throughout the county.	• Agriculture accounted for nearly 80 percent of the total county current water demand. Errors in the assumptions or water duty factors could result in large increases or decreases in the total demand. • This MWR likely underestimates the agricultural demands for certain water planning areas, in particular the north coast of the county. • The irrigation factors used for each crop type could be under or over estimating the total demand. • By forming stakeholder groups, the District would encourage local participation and control for determining agricultural water demand.
Improve Rural Demand Estimate *(MWR Sections 4.6.4 and 4.8.8)*	• Utilize rural water use information made available by Resource Management System 2009 Annual Summary Report (e.g. via installation of flow meters on non-agricultural wells, monthly water use recording and semi-annual reporting for water purveyors, etc.), as it becomes available.	• Increases accuracy in rural water demand estimates and reduces need for assumptions in water duty factors.

Table ES 1: Master Water Report Recommendations		
Recommendation *(MWR Reference)*	**Key Steps to Implementing Recommendation**	**Basis of Recommendation**
Agricultural and Rural Users Water Management Strategies *(MWR Section 4.8.9)*	• The District should participate in and promote a "stakeholder driven" water balance evaluation on a watershed and groundwater basin basis within the county to better understand the relationship between supply and demand.	• The agricultural and rural water demands were quantified on a WPA basis. It is recognized that some areas do not have adequate assessments of the water supplies available to conclude whether a supply deficit exists.
Environmental Water Management Strategy *(MWR Sections 4.6.5 and 4.8.10)*	• Develop policies for District's role in further developing the Environmental Water Demand values throughout the WPAs (e.g. installing stream gauges, leading studies, promoting local control).	• Site- and project- specific instream flow requirements allow the environmental water demand to be quantified and represented on a sub-watershed or creek basis, while the current analysis considered the Environmental Water Demand on a WPA level.
PROJECTS AND PROGRAMS		
Contingency Plan or Reliability Supply *(MWR Section 4.8.1)*	• Suggest that each community in the county consider developing a contingency plan or reliability supply, if they have not already done so. Provide technical expertise or administrative support to County Service Areas.	• Facilitates implementation of a combination of emergency conservation measures/ new supplies. • Ability to address the uncertainties with climate change and the potential impacts to water supply. • Without a contingency or reliability plan, a community may be unable to respond to extended periods of below average water supply.
Stream Gauge Installation *(MWR Section 3.2.2)*	• Continue to prioritize and establish data collection locations in accordance with the District's Data Enhancement Plan, District funds, and the established role of the District in implementing the Environmental Water Management recommendations., attempting to place new sites where past, inactive gauges existed (providing a period of record that will complement any new data collected).	• Placing gauges on major creeks near the confluence with significant tributaries, on some smaller streams and tributaries, and at major cities along the major creeks would provide valuable information for developing instream flow requirements. • The eastern portion of the county (i.e., WPAs 9, 10, 11, 14, and 15) was ultimately excluded from the environmental water demand analysis due to the lack of unimpaired data and regional physiographic differences.
Water Conservation/ Water Use Efficiency *(MWR Sections 4.5, 4.7.4, and 4.8.3)*	Establish the District's role in: • Promoting agencies within the county to join Partners in Water Conservation. • Increasing communication with the agricultural and rural community, and promote use of conservation measures by rural and agricultural users. • Increasing knowledge of supply limitations and findings of this study. • Local stakeholder groups should establish conservation goals for different groundwater basins throughout the county.	• Conservation supports the Contingency and Reliability Supply Plan recommendation (e.g. secures drought buffer). • Consistent with the State's water conservation goals. • Improves management of water supplies.
Regional Water Supply Strategies *(MWR Section 4.8.2)*	• Lead the effort to optimize the use of unsubscribed SWP or NWP to promote enhanced use of existing available resources that support local agency use and exchanges.	• Optimizing the use of surface water supplies could preserve groundwater for agricultural users and County residents or for times when there are reductions in surface water deliveries.
Unsubscribed State Water Project *(MWR Sections 4.7.8, 4.8.2, and 4.8.11)*	• Understand which entities may be interested in receiving additional State Water by compiling a list of interested parties. • Complete the hydraulic capacity study of the SWP Coastal Branch to determine if sufficient capacity exists to transmit additional State Water to coastal	• This effort will identify the potential for the delivery of additional unsubscribed State Water and support the optimization of unsubscribed surface water supplies. Use of unsubscribed SWP will also be considered in evaluating and negotiating the use of any extra capacity in the Coastal Branch.

Table ES 1: Master Water Report Recommendations

Recommendation *(MWR Reference)*	**Key Steps to Implementing Recommendation**	**Basis of Recommendation**
	communities. • Understand exchange opportunities with other resources within the District that may free up a portion of the existing State Water allocation. • Develop and/or update District policies regarding which entities have priority to receive State Water. • Provide a final opportunity to existing SWP participants to execute Drought Buffer Agreements. • Negotiate use of excess capacity and District allocation with CCWA and DWR guided by District needs and priorities, as-needed.	
Streamline Institutional Agreements *(MWR Section 4.8.6)*	• Establish the District's role in developing "boiler plate" agreements, or streamlined, standard processes for local agencies to implement transfer and emergency intertie agreements. • Establish the District's role in the development of governance structures to implement future projects and programs, where appropriate (e.g. Nacimiento Project Commission).	• Local agencies have requested that the District lead the development of a template agreement for interagency agreements or water transfers.
Interagency Arrangements and Exchanges *(MWR Section 4.8.6)*	• Develop policies for District's role in promotion of opportunities to move water within the county and to match demands with available sources at different times. • Identify and conduct pilot projects to evaluate options.	• Exchanges would allow entities with water supply needs that cannot feasibly connect directly to the NWP or SWP to receive a supply from a source to which they are already connected via exchange.
Groundwater Evaluations *(MWR Section 4.8.4)*	• Develop policies for District's role in these efforts (i.e. basin monitoring programs, Groundwater Management Plans per basin, education and outreach programs).	• Updates the perennial yield and groundwater information for basins that have not been studied for years. • Promotes the management of groundwater supplies.
Groundwater Banking/ Recharge *(MWR Sections 4.7.9 and 4.8.5)*	• Develop policies for District's role in these efforts (i.e. creation of advisory committees of stakeholders to develop basin-wide groundwater management plans, manage the use of available aquifer space for recharge, identify and evaluate local opportunities to reduce runoff and increase recharge, etc.). • Develop policies or evaluate existing policies that pertain to which water supplies can be used for this purpose.	• Groundwater banking is generally viewed as being difficult to implement and monitor if overlying land owners are not part of the banking project. Overlying land owners could extract water and benefit from a project that was funded by other parties. Or the operations of the banking project, if not designed and operated properly, could negatively affect neighboring overlying users. • County policies may discourage the use of water that is available for banking from being used.

Chapter 1

INTRODUCTION

The purpose of this chapter is to introduce the scope, goals and objectives of the San Luis Obispo County Flood Control and Water Conservation District (District) Master Water Report (MWR). With the recurrence of drought, degradation of groundwater basins and the limited availability of surface water supplies, it is important for all entities of San Luis Obispo County ("County" for government; "county" for geographic domain) to effectively manage available water resources. Water resources should be managed to simultaneously protect the public health and safety, maintain ecosystems, avoid seawater intrusion, and support agriculture into the future. In order to effectively manage water resources, it is important to understand the complete picture of water resources management in the county and how the practices (i.e. water use, policy adoption, planning, and project implementation) of all entities within the county influence each other.

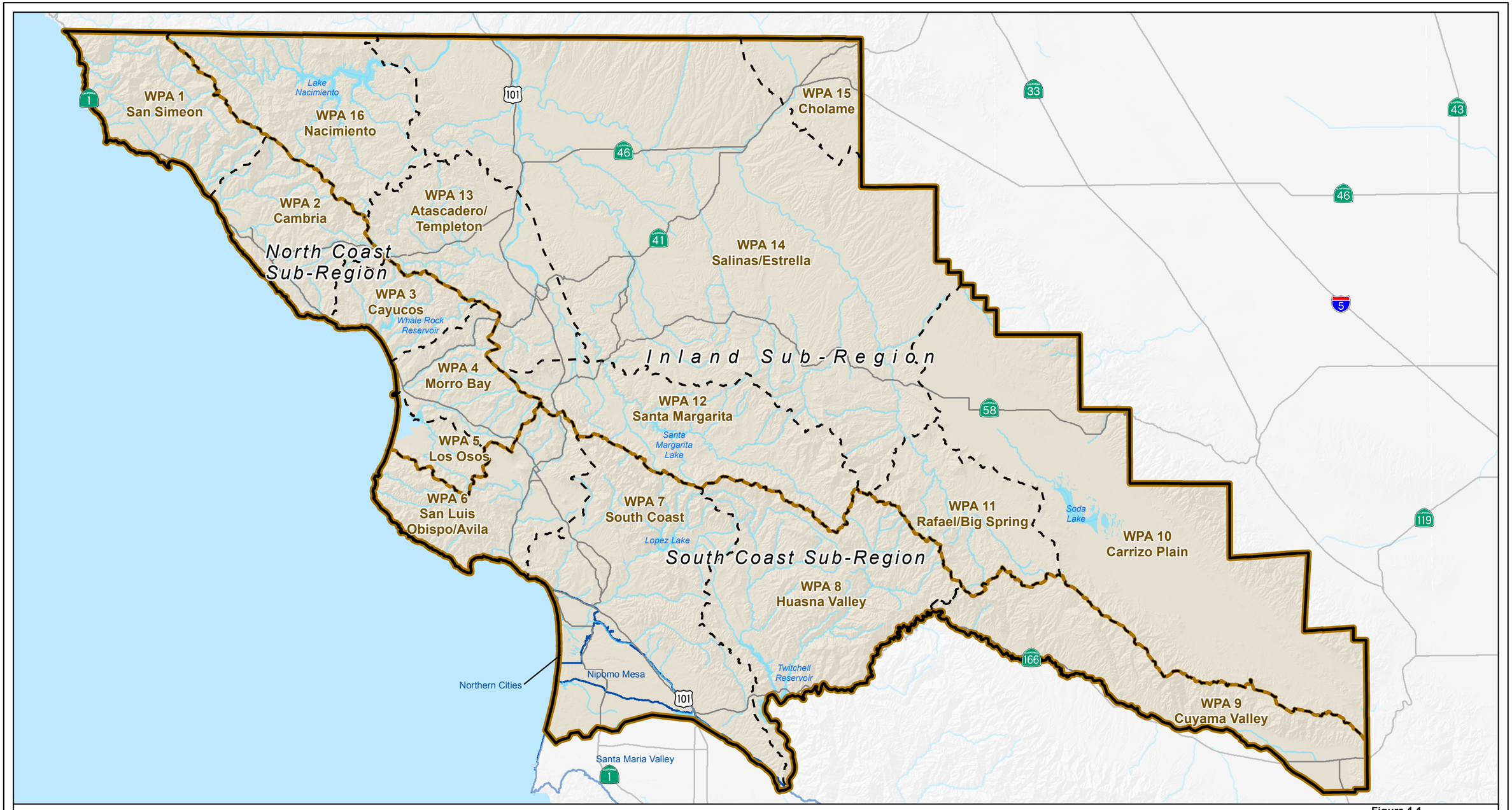
The District approached the MWR geographically by dividing the county into three (3) sub-regions (North Coast, South Coast, and Inland), and then further subdividing into water planning areas (WPAs) within each sub-region (Figure 1.1). This sub-regionalization facilitated water resources analysis by recognizing jurisdictions that overlie groundwater basins and interconnected watersheds in order to assess their relationship. The relationship between the three sub-regions that are connected by the District's/County's jurisdiction as well as the regional water projects such as the Nacimiento Water Project (NWP), Salinas Reservoir system, Whale Rock Reservoir system, Lopez Water System and State Water Coast Branch, were evaluated for their potential to be optimized to better meet the county's water needs.

It is recommended that future MWRs move away from the three sub-region and WPA approach, and focus more on individual watersheds and groundwater basins. In other words, future MWRs should become more detailed as the current WPAs are broken down further into smaller subsets that better fit the geographic and political boundaries that define local water planning efforts.

1.1 SCOPE OF MASTER WATER REPORT

The MWR is a comprehensive plan that evaluated multiple water management strategies, including optimization of existing water supplies to meet water resource needs countywide. In general, the scope of work for this project included:

- Documentation of existing water resource jurisdictions and their current and future activities/water planning efforts.
- Analysis and documentation of current and future water supply and demand on a county-wide basis.



Legend

- Highways
- Major Rivers/Streams
- Management Area
- Sub-Region
- Water Planning Area
- Water Planning Area Boundary
- Waterbodies

Text:

Sub-Region

Water Planning Area

Management Area

Hydrography

N

0 5 10 Miles

Figure 1.1
San Luis Obispo County
Sub-Regions and Water Planning Areas
Master Water Report
San Luis Obispo County Flood Control
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- Identification and analysis of potential water management strategies to address possible water supply shortfalls.
- Documentation of the role of the Master Water Report in supporting other water resource planning efforts.

1.2 GOALS AND OBJECTIVES

The main purpose of the MWR is to provide a comprehensive description and analysis of county-wide water resources and management efforts of these resources under current conditions and at general plan build-out for the different agencies within the county, and to identify and evaluate water management strategies for addressing forecast supply deficiencies, similar to Urban Water Management Plans and General Plan Water Elements.

Since many different entities have developed water resource analysis and land use planning documents for individual communities and areas in the county, the MWR combined those efforts with an analysis of the areas not covered by local plans to complete an integrated, county-wide MWR. This effort identified, consolidated, and integrated county-wide water supply and demand information to understand how water resources are influenced by urban, rural and agricultural users and to identify additional opportunities for water resource management.

Other specific goals and objectives of the MWR are discussed below.

1.2.1 Ensure Stakeholder Input/Participation

The approach for the preparation of this MWR included stakeholder input and participation. Participation was accomplished through a series of Water Resources Advisory Committee (WRAC) meetings, presentation of information to different agencies and County departments, and meetings with WRAC sub-committees and working groups. County staff and the project team met with the WRAC in a workshop setting at significant project milestones, as summarized in Table 1.1:

In addition to the WRAC meetings, the project team met with the County's Planning Department to discuss on-going studies for the unincorporated areas of the County and their impact on future development and water demands. The team also gathered data from and met individually (as needed) with some of the water agencies in the County to discuss findings and recommendations of the study.

1.2.2 Create a Framework for Maintaining the Master Water Report

The recommendation for updating and maintaining the MWR is discussed further in Chapter 5. The goal of those recommendations is to improve the process and efficiency for revising future MWRs. This will be facilitated by the County retaining the GIS shapefiles collected for the project and continually updating them as more information becomes

available. Other recommendations for creating a framework for maintaining the MWR include:

- Maintain a current inventory of water resource data and reports. Information collected to prepare this MWR is presented throughout the documents included in Appendices A through D.

Table 1.1 WRAC Workshops

Workshop No.	Date	Completed Tasks
1	June 3, 2009	WRAC Kick Off Meeting Presented goals and objectives of MWR Presented schedule and approach of study Clarify WRAC involvement
2	October 7, 2009	Presented available data Geographic organization of the County - Sub Regions and Water Planning Areas Summarized demand analysis approach - Urban, rural, agricultural, and environmental Summarized groundwater resources and water supply by WPA
3	January 6, 2010	Summarized preliminary water demand and supply analysis Presented criteria for asserting a supply shortfall and for evaluating supply strategies
4	April 7, 2010	Rated criteria for prioritizing water supply strategies Presented preliminary water management strategies Presented concepts for interagency agreements and cooperative programs to optimize existing water supplies
5	September 1, 2010	Presented demand and supply by WPA, urban agency, rural, agriculture and environmental user Presented revised water management strategies to resolve potential supply shortfalls
Working Group Meeting	November 10, 2010	Explored institutional arrangements and regional water management strategies
Working Group Meeting	December 21, 2010	Discussed preferred regional water management strategy options to optimize existing resources
6	March 21, 2011	Presented draft Master Water Report - Goals and objectives - General recommendations Presented general agricultural and rural water management strategies Presented findings and recommendations for urban users

- Improve the data sharing protocol between local agencies and the County for consistency and overlap/redundancy reduction.
- Specify how information from other water resources planning documents are used in the MWR and how information developed in the MWR can be utilized in other water resources planning documents.
- Establish a schedule for updating the MWR that is consistent with other water resources planning requirements.
- Specify the scope of work involved with updating the MWR.
- Estimate a budget for updating the MWR.

1.2.3 Accurately Present Current and Future Supply/Demand

Chapter 4 presents a summary of the county-wide water supply and demand. A reasonable level of accuracy was achieved because this project:

- Utilized recent water resource information, where available.
- Utilized land-use and demographic information.
- Utilized as much of the existing data as local resource agencies provided.
- Accounted for potential reductions in supply, reliability issues, future land use and/or conservation policies in the future water supply and demand analysis.

1.2.4 Ensure Support for Agricultural Demand Analysis

Chapter 4 summarizes the approach used to quantify the agricultural demands. The approach was presented to the WRAC and to the County's Agricultural Commissioner.

1.2.5 Ensure Support for Environmental Water Demand Characterization

Chapter 4 summarizes the approach used to quantify the environmental demands. The approach was presented to the WRAC.

1.2.6 Respect Autonomy of Individual Jurisdictions while Recognizing Differences/Conflicts

For urban users, this project relied primarily on published water master plans and water supply studies to be consistent with local purveyor water demand projections and planned water supply projects. Chapter 4 summarizes the documents used from the water purveyors within the county. In addition, each purveyor was provided multiple opportunities to review the draft memoranda and reports to ensure consistency between the MWR and their water planning documents.

1.2.7 Present Analysis of Options, Conclusions and Recommendations

Chapter 4 presents the water demand analysis for urban, rural, agricultural and environmental users in the county. It also presents the conclusions and recommendations for addressing potential water supply shortfalls, with an emphasis on promoting:

- Optimization of conservation measures.
- Optimization of unsubscribed State Water allocation.
- Optimization of unsubscribed Nacimiento Water Project allocation.
- Opportunities for optimizing other local surface water supplies.
- Opportunities for increasing the efficiency of existing infrastructure.
- Opportunities for water re-use.
- Opportunities for emergency/drought protection measures such as inter-ties and groundwater banking.

1.2.8 Ensure Compatibility with Other Documents

Chapter 5 summarizes how the MWR is related to, and coordinated with the development of several other County documents, including the:

- County's Integrated Regional Water Management Plan (IRWMP).
- Conservation and Open Space Element (COSE).
- Agricultural Element.
- Land Use Element.
- Resource Management System.

The goals, objectives and policies in the first three documents guided the analysis of water management strategies, and the data contained within and collected by the last two documents were valuable in conducting the analysis.

1.3 LIMITATIONS OF THE MASTER WATER REPORT

This document is not intended to establish water rights or to set the maximum water supply sources available to users within the County. It is primarily a "high-level" summary of available information and estimates of the water supply versus demand analysis. Comments about cities and other water suppliers are not to be interpreted as overruling the rights and powers of these agencies. Other technical limitations to this Master Water Report are presented below.

1.3.1 Technical Challenges with Demand Assessment

There were a number of technical challenges with analyzing and developing the urban, rural, agricultural and environmental demands for the MWR. Appendix D contains the technical memorandum that describes the water demand methodology used for this project and the assumptions made to facilitate the calculation of demands for the four categories. A description of the technical limitations in the approach for computing the urban, rural and agricultural demands follows, and the challenges with computing the environmental demands are discussed later in this section.

1.3.1.1 Urban Water Demand

The existing demands for urban users were based on available Water Master Plans, Urban Water Management Plans, and the County's Resource Management System. Although the demands are referred to as "existing," by the time the MWR is finalized, the data could be a few years old. This should not present a substantial problem since water demands do not fluctuate significantly from year to year. However, this minor issue highlights the difficulty in ensuring that the data presented in this report is current and that the demands are not absolute values, but approximations. Water providers should be encouraged to prepare urban water management plans, even if they are not required by California legislation, in order to maintain current demand projections and forecasts.

1.3.1.2 Rural Water Demand

The primary technical challenge with calculating rural water demands was having accurate water duty factors for rural water demands since most individual properties are not metered. Due to different climates and types of water usage, the water duty factors can vary widely between region and time of year. Coastal rural areas will generally require less water than inland rural areas due to greater evapotranspiration in the inland areas and more precipitation in the coastal areas.

1.3.1.3 Agricultural Water Demand

The Agriculture/Crop ArcGIS® layer for the County from August 2008 was used to determine existing agricultural acreage for each crop group. This layer is updated yearly with information from the pesticide use permits growers obtain through the San Luis Obispo Department of Agriculture. These permits are not entirely accurate as they occasionally include permanent crops which are planned and include many annual crops which may or may not be planted based upon various factors. The number of crop rotations varies and is not identified in the Agriculture/Crop ArcGIS® layer. The majority of irrigated vegetables are rotated numerous times throughout the year. Coastal areas with available water may have multiple crops planted in a particular year. The irrigation practices of each operation are also not accounted for. Given the current land use, the demand projection for Water Planning Area 1 in particular could be refined significantly by taking ranching operations water use and conservation easement provisions into account. Ranching operations do not

use pesticides and therefore are not included in the County's Agriculture/Crop ArcGIS® layer were not included in the demand calculation.

The agricultural crop ArcGIS® layer includes approximately 200 classifications of commodities. This included approximately 86,000 acres of rangeland and 42,000 acres of uncultivated agriculture. For purposes of this analysis, the irrigated commodities were categorized into seven groups. Although the groups are based on commodities that may have similar water requirements, the actual water usage will vary based on a number of variables including; individual commodities, soil type, and number of rotations on individual parcels.

1.3.1.4 Definition of "Build-Out" Demand

The forecast demands for urban users were based on available reports but represent the "build-out" demand of a service area, sphere of influence, or urban reserve line of an incorporated or unincorporated city in the county. There are two concerns with referring to the demands as build-out. The first is that the growth boundaries are not static. When general plans are updated, the growth boundaries typically change and expand. Therefore, the values presented in this report could increase in future MWR updates. The second concern is the year in which build-out is reached. Each community in the County grows at different rates and the year in which the forecast demand is reached is neither consistent nor fixed for each community. Therefore, the limitation with the build-out demand, which also applies to rural and agricultural demands, is the variability in future forecasts and the difficulty in estimating these values with available information.

1.3.1.5 Conservation and Irrigation Efficiencies

Since forecast demands are not absolute or fixed values, determining a range of possible demands was selected as the preferred approach. The approach to defining the low end of the demand range required some assumptions regarding conservation, development potential, and agricultural irrigation efficiencies and expansion. There are limitations to this approach because the assumptions made could vary from the actual consumption and create a potential shortfall in supply. The low forecast demand range for urban users assumed a certain amount of conservation for most communities. The amount assumed by each community depended on the anticipated level of conservation that could be achieved. The low demand range for rural users represents a percent of the development potential and recognizes that 100 percent of the property will not be developed. For agricultural demand, the approach assumed higher irrigation efficiencies for future demands than in existing demand calculations.

1.3.2 Use of Available Technical Documents

This MWR relied on and attempted to be consistent with available documents of various agencies. Terminology used in these available documents was often quoted verbatim for the MWR. Therefore, some suggested changes (i.e. comments received) to terms used in

this MWR were not adopted in order to remain consistent with respective reference documents. While this approach may cause some confusion it was believed consistency with the base document was the overriding consideration. The desired changes should be made first in the reference documents, before being incorporated into the MWR.

1.3.3 Groundwater Basin Yield Estimates

Published hydrogeologic information for many groundwater basins in the County are compiled from older reports and may not be representative of current conditions. For some groundwater basins, the safe yield estimate was based on the documented historical production that has not resulted in water supply problems. Also, the relationship between stream underflow, surface flow, and perennial yield is not adequately understood, especially for the coastal groundwater basins. In order to gain more current or detailed information for these basins, new and additional studies would be necessary. Information currently compiled by County departments (such as well logs for private wells or water quality for shared well systems) could be useful to these studies. Additional information may also be available from the DWR and private sources.

1.3.4 Use of Management Area Reports

Annual reports for the Nipomo Mesa Management Area, Northern Cities Management Area and the Santa Maria Valley Management Area are prepared in accordance with the Stipulation and Judgment for the Santa Maria Groundwater Litigation (Lead Case No. 1-97-CV-770214). The annual reports provide an assessment of hydrologic conditions for the three management areas based on an analysis of the data accruing each calendar year. Each annual report is submitted to the court annually in accordance with the Stipulation in the year following that, which is assessed in the report.

The information contained in these annual reports could change based on data collected from the previous year, and the changes may not be reflected in this MWR. Readers should acknowledge that the figures presented in this MWR may not be 100 percent current, but we attempted to provide the most current available information at the time the MWR was being written.

1.3.5 Technical Challenges with Environmental Assessment

The environmental demand estimates presented in this master water report are not absolute values. Planning-level assessments such as this one do not take the complexity of natural systems into consideration and this point should be acknowledged when using the findings in this report. The results provide a reasonable and scientifically supported estimate of environmental water demand for the purposes of evaluating water balances on an annual water planning area basis. In watersheds with creeks that have transient high flows during the winter season, the timing of the flows can be as important to biological resources as the amount of flow. Unfortunately, evaluating to this level of detail was beyond the scope of this study, and will be left to future work. The environmental demand

assessment presented in this report should be viewed as a starting point that will be refined over time.

Site- and project-specific in-stream flow requirements determined on a sub-watershed or creek basis would improve future master water plans. A more detailed analysis would moderate the need to extrapolate data from one unimpaired stream and apply it to a neighboring watershed. This approach should make the analysis more focused and increase the certainty in the results. The first steps in this effort are establishing appropriate data collection sites, identifying opportunities for coordination with appropriate entities on the data collection effort and prioritizing locations to study first.

The specific steps that could be taken by the District include (in no particular order or priority):

- Increase the number and distribution of stream flow gauges to capture unimpaired runoff flow measurements and the varying hydrologic conditions throughout the County.
- Determine other data that would be necessary to complete a stream species specific analysis.
- Select a water planning area, watershed or creek to conduct a more focused environmental water demand assessment and develop a workplan for implementing the analysis that could be applied county-wide.
- Determine role of the District, County, resource agencies, local agencies, local stakeholders (project proponents), and riparian rights holders in implementing these steps.

1.4 DEFINITION OF KEY TERMS

ArcGIS: ArcGIS is a geographic information system (GIS) software product used for working with maps and geographic information. It is used for: creating and using maps; compiling geographic data; analyzing mapped information; and managing geographic information in a database.

CCWA: The Central Coast Water Authority was formed in 1991 through a Joint Exercise of Powers Agreement among nine public agencies in Santa Barbara County and has Water Supply Agreements with five other entities. CCWA was specifically formed for the purpose of designing, building and operating the facilities needed to deliver water from the State Water Project (SWP) to the various entities with contracts to receive that water in Santa Barbara County.

CEQA: The California Environmental Quality Act is a statute that requires state and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible.

CSA: In unincorporated areas, residents of urban communities may want more services than those residing in rural areas. The County Service Area Law (Government Code §25210.1 *et seq.*) was created to provide a means for expanding service levels in areas where residents are willing to pay for the extra service. The law allows residents or county supervisors to initiate the formation of a County Service Area (or CSA). A CSA is authorized to provide a wide variety of services, including fire protection, water and garbage collection. A CSA may span all unincorporated areas of a county or only selected portions.

CSD: Community Services Districts (CSDs) are independent governmental agencies that exist separately from, and with substantial administrative and fiscal independence from, general purpose local governments. Special district governments provide specific services such as hospitals, sewerage, water and fire protection. CSDs are also subject to specific legislative and regulatory controls.

DWR: The mission of the California State Department of Water Resources (DWR) is to manage the water resources of California in cooperation with other agencies, to benefit the State's people, and to protect, restore, and enhance the natural and human environments. DWR operates and maintains the California State Water Project (SWP). Other programs work to preserve the natural environment and wildlife, monitor dam safety, manage floodwaters, conserve water use, and provide technical assistance and funding for projects for local water needs.

ISJ: Interlocutory Stipulated Judgment (ISJ) established a formal process for the County and three water purveyors in Los Osos to engage in cooperative water resources management efforts to solve groundwater overdraft and current sea water intrusion.

MOA or MOU: A Memorandum of Agreement (MOA), also known as a Memorandum of Understanding (MOU), is a formal document used to outline an agreement made between two or more separate entities, groups or individuals. An MOA usually precedes a more detailed contract or agreement between the parties, after a process of negotiations and due diligence. This MOA may be used to cooperatively work together on an agreed-upon purpose or meet an agreed objective and outline the discussed terms of a new relationship.

MWR: The Master Water Report (this document) will serve to help policy makers, planners, and the public understand the long-range availability of water resources throughout the County of San Luis Obispo.

MWC: Mutual Water Companies (MWCs) are most commonly formed as general corporations or as nonprofit mutual benefit corporations. Mutual water companies may deliver water to their shareholders for agricultural irrigation or domestic uses.

NCMA: The Northern Cities Management Area (NCMA) includes the northernmost portion of the Santa Maria Valley Groundwater Basin. The cities of Arroyo Grande, Grover Beach, and Pismo Beach, the Oceano Community Services District, the County and local landowners that signed the court-approved stipulation during the Santa Maria Groundwater Basin litigation actively and cooperatively manage surface and groundwater resources in the NCMA.

NMMA: The Nipomo Mesa Management Area (NMMA) lies to the south of the NCMA and includes ConocoPhillips, Golden State Water Company, Nipomo Community Services District, Woodlands Mutual Water Company, Rural Water Company, and other NMMA overlying landowners that signed the court-approved stipulation during the Santa Maria Groundwater Basin litigation. The NMMA Technical Group is charged with developing the technical bases for sustainable management of the surface and groundwater supplies available in this management area.

RWQCB or Regional Board: The Regional Water Quality Control Board's (RWQCB or Regional Board) mission is to develop and enforce water quality objectives and implementation plans that will best protect the State's waters, recognizing local differences in climate, topography, geology and hydrology.

TMA or SMVMA: Twitchell Management Authority (TWA)(aka the Santa Maria Valley Management Area) is the largest of the three management areas that overlie the Santa Maria Valley Groundwater Basin. This management area lies over the main Santa Maria Valley. The SMVMA encompasses the contiguous area of the Santa Maria Valley, Sisquoc plain, and Orcutt upland, and is primarily comprised of agricultural land and areas of native vegetation, as well as the urban areas of Santa Maria, Guadalupe, Orcutt, Sisquoc, and several small developments.

UWMP: Urban Water Management Plans (UWMPs) are prepared by California's urban water suppliers to support their long-term resource planning and ensure adequate water supplies are available to meet existing and future water demands. Every urban water supplier that either provides over 3,000 acre-feet of water annually or serves 3,000 or more connections is required

to assess the reliability of its water sources over a 20-year planning horizon considering normal, dry, and multiple dry years. This assessment is included in its UWMP, which are prepared every 5 years and submitted to the Department of Water Resources.

WPA: Water Planning Area(s) (WPA or WPAs) represent geographic organization of the County. Water demand, water supply, and supply sources are organized by WPA. In general, the WPA boundaries coincide with watershed or groundwater basin boundaries, and are intended primarily to recognize important hydrogeologic units or water management areas throughout the County.

For additional information on terms found in the MWR, please refer to the reference documents listed throughout the MWR. Various publications (such as the Layperson's Guide to Water Rights Law published by the Water Education Foundation) are also available online for information regarding water rights and water law in California.

PART I: BACKGROUND ON WATER RESOURCE MANAGEMENT EFFORT

2.1 WATER PLANNING AREAS

The Master Water Report (MWR) effort is organized similar to the 1998 MWR, but with some modifications. This MWR is also organized by topical and geographical discussion. The County was divided into three sub-regions, North Coast, South Coast, and Inland, and was subdivided further into "Water Planning Areas," or WPAs. The WPAs represent the geographical organization of the County. Water demand, agricultural water needs, sources of supply, and other information are organized by WPA. The WPAs discussed below were intended to recognize important hydrogeologic units or water management areas throughout the County.

In general, the following types of information (hydrogeologic variations, natural and political boundaries) were used to define the WPAs, but no single approach was followed to delineate every WPA:

- Watershed boundaries
- Groundwater basin boundaries
- Urban growth boundaries
- Water supplies and management practices
- Similar demands and climate
- Similar water supply issues

2.1.1 North Coast Sub-Region

The North Coast Sub-Region shown in Figure 2.1 spans from the County line (San Luis Obispo/Monterey) southward to the community of Los Osos, bounded to the west by the Pacific Ocean and to the east by the Santa Lucia Range. This Sub-Region includes WPAs 1 through 5. This region includes the urban areas of San Simeon, Cambria, Cayucos, Morro Bay and Los Osos, and are numbered sequentially in this order.

2.1.1.1 San Simeon WPA 1

The San Simeon WPA encompasses the community of San Simeon, Hearst Ranch, agricultural and other rural overlying users in the northern-most portion of WPA 1. The primary groundwater supplies include the San Carpoforo, Arroyo De La Cruz, and Pico Creek Valley Groundwater Basins. The issues in this WPA include seawater intrusion and limited groundwater basin yield.

San Carpoforo Valley
Arroyo De La Cruz Valley
WPA 1
San Simeon
Pico Creek
San Simeon
San Simeon Valley
Santa Rosa Valley
WPA 2
Cambria
Cambria
Villa Valley
Cayucos Valley
WPA 3
Cayucos
Old Valley
Cayucos
Toro Valley
Morro Valley
WPA 4
Morro Bay
Morro Bay
Chorro Valley
Los Osos Valley
Los Osos
WPA 5
Los Osos
Oak Shores
Lake
Nacimiento
Intake PS
Heritage Ranch
Whale Rock
Reservoir
San Miguel
Camp
Roberts Tank
Paso Robles
Whitley Gardens
Santa Ysebel PS
Templeton
Creston
Atascadero
Rocky Canyon
Tank and PS
Tank #2
Garden Farms
Santa Margarita
Cuest Tunnel
and Tunnel Tank
Santa
Margarita
Lake
San Luis
Obispo WTP
San Luis Obispo
1
101
46
41

Legend

Water Facilities

- WTP
- Reservoir/Tank and/or WTP
- Local Facility
- Pump Station
- Turnout
- Tunnel Unit
- Water Transmission Line

Color Scheme

- California State Coastal Branch
- Lopez Water System
- Lake Nacimiento Water Project
- Salinas Reservoir System
- Whale Rock Reservoir System
- Chorro Valley Pipeline
- Highways
- Major Rivers/Streams
- Urban Reserve and Village Reserve Lines (URL/VRL)
- Management Areas
- North Coast Sub-Region
- Water Planning Area
- Water Planning Area Boundary
- Groundwater Basins
- Waterbodies

Text:

Water Planning Area
Groundwater Basin
URL/VRL
Water Facility
Management Area
Hydrography

Miles
0 3 6

Figure 2.1
North Coast Sub-Region (WPAs 1-5)
Master Water Report
San Luis Obispo County Flood Control and Water Conservation District

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2.1.1.2 Cambria WPA 2

The Cambria WPA includes the community of Cambria, agricultural and other rural overlying users. The primary groundwater supplies include the San Simeon, Santa Rosa, and Villa Valley Groundwater Basins. The issues in this WPA include the potential for seawater intrusion, drought impacts to groundwater supplies, and limited groundwater basin yield.

2.1.1.3 Cayucos WPA 3

The Cayucos WPA includes the Cayucos Area Water Organization (CAWO) members (Morro Rock Mutual Water Company, Paso Robles Beach Mutual Water Company, County Service Area 10A, and the Cayucos Cemetery District), agricultural and other rural overlying users. The primary groundwater supplies include the Cayucos, Old and Torro Valley Groundwater Basins. CAWO members receive potable water predominantly from Whale Rock Reservoir. The issues in this WPA include drought impacts to groundwater supplies and limited groundwater basin yield.

2.1.1.4 Morro Bay WPA 4

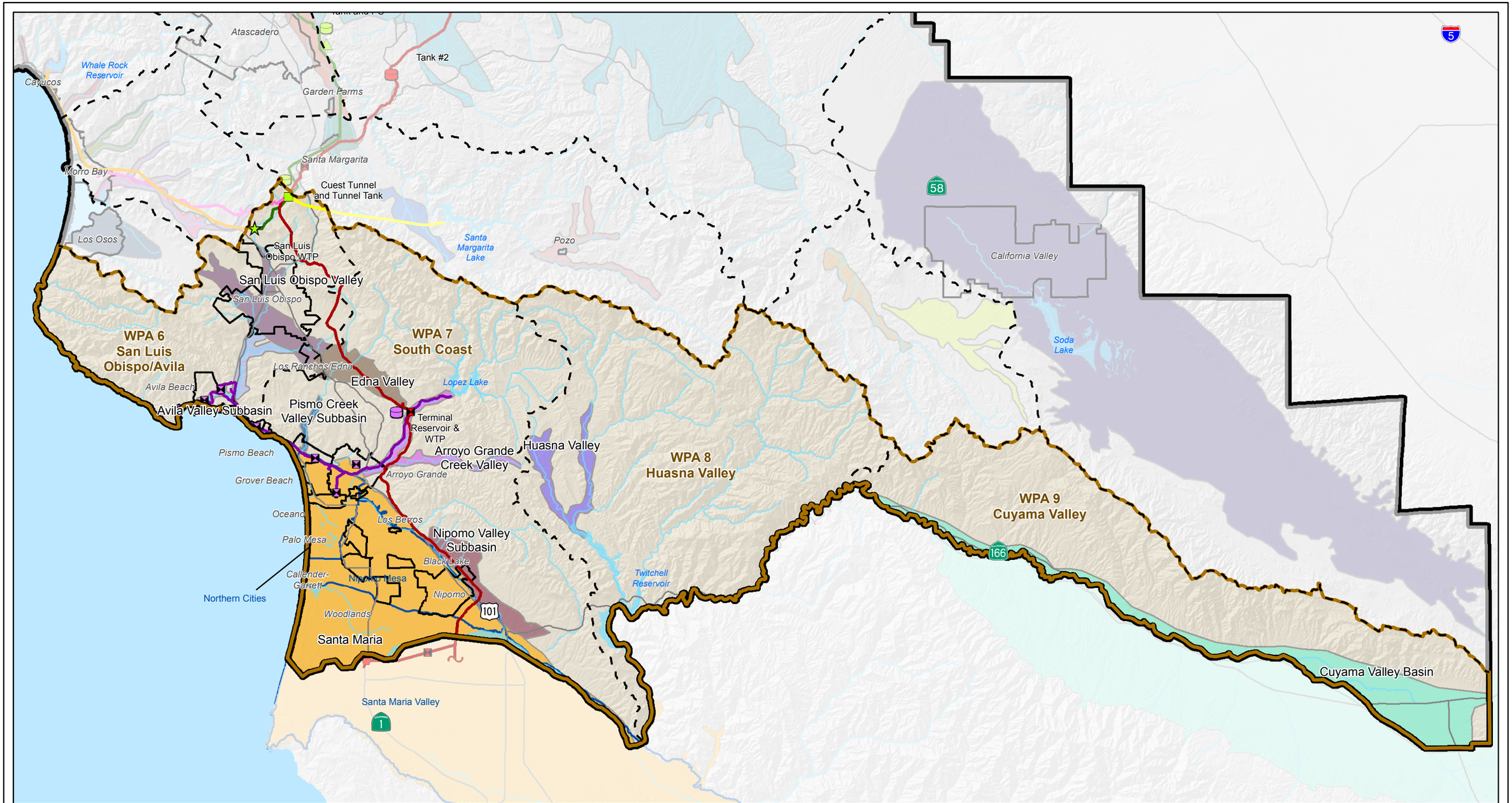
The Morro Bay WPA includes the City of Morro Bay, the Chorro Valley Water System (California Men's Colony, Cuesta College, Camp San Luis Obispo (National Guard), County Operations Center/Office of Education), agricultural and other rural overlying users. The only groundwater supplies include the Morro and Chorro Valley Groundwater Basins. Other major supply sources include the State Water Project, desalination (City of Morro Bay), Whale Rock Reservoir, Chorro Reservoir, and recycled water. The issues in this WPA include drought impacts to groundwater supplies and groundwater quality, and availability/reliability of State Water from year to year.

2.1.1.5 Los Osos WPA 5

The Los Osos WPA includes the community of Los Osos, agricultural and other rural overlying users. The primary groundwater supply is the Los Osos Valley Groundwater Basin. The issues in this WPA include drought impacts to groundwater supplies, groundwater quality and documented seawater intrusion.

2.1.2 South Coast Sub-Region

The South Coast Sub-Region shown in Figure 2.2 spans from the City of San Luis Obispo south to the County (San Luis Obispo/Santa Barbara) line, east to the Cuyama Valley, and west to the community of Avila Beach, and includes WPA 6 through 9. This WPA includes the urban areas of San Luis Obispo, Avila Beach/Port San Luis, Pismo Beach, Arroyo Grande, Grover Beach, Oceano, and Nipomo.



Legend

Water Facilities
- WTP
- Reservoir/Tank and/or WTP
- Local Facility
- Pump Station
- Turnout
- Tunnel Unit
- Water Transmission Line

Color Scheme
- California State Coastal Branch
- Lopez Water System
- Lake Nacimiento Water Project
- Salinas Reservoir System
- Whale Rock Reservoir System
- Chorro Valley Pipeline
- Highways
- Major Rivers/Streams
- Urban Reserve and Village Reserve Lines (URL/VRL)
- Management Areas
- South Coast Sub-Region
- Water Planning Area
- Water Planning Area Boundary
- Groundwater Basins
- Waterbodies

Text:
Water Planning Area
Groundwater Basin
URL/VRL
Water Facility
Management Area
Hydrography

0 4 8 Miles

Figure 2.2
South Coast Sub-Region (WPAs 6-9)
Master Water Report
San Luis Obispo County Flood Control and Water Conservation District

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2.1.2.1 San Luis Obispo/Avila WPA 6

The San Luis Obispo/Avila WPA includes the City of San Luis Obispo, County Airport, Cal Poly, Avila Beach Community Services District (Avila Beach CSD), Avila Valley Mutual Water Company (Avila Valley MWC), San Miguelito Mutual Water Company (San Miguelito MWC), County Service Area 12 (CSA 12), Port San Luis, agricultural and other rural overlying users. The primary groundwater supplies include the San Luis and Avila Valley Sub-basins. Other major supply sources include the State Water Project, Whale Rock Reservoir, Salinas Reservoir, Nacimiento Water Project, Lopez Lake Reservoir, and recycled water. The issues in this WPA include limited groundwater supplies.

2.1.2.2 South Coast WPA 7

The South Coast WPA includes Edna Valley (Golden State Water Company); the Northern Cities Management Area (NCMA), which includes the Cities of Pismo Beach, Arroyo Grande, and Grover Beach, Oceano Community Services District, agricultural and rural overlying users; the Nipomo Mesa Management Area (NMMA), which includes the Golden State Water Company, Nipomo Community Services District (NCSD), Rural Water Company, Woodlands Mutual Water Company (Woodlands MWC), ConocoPhillips, agricultural and rural overlying users; the Santa Maria Valley Management Area (SMVMA), which includes the City of Santa Maria, agricultural and rural users; and agricultural and rural users outside of the three management areas.

The primary groundwater supplies include the Edna, Pismo Creek, and Arroyo Grande Valley Sub-basins, the Santa Maria Valley Groundwater Basin, and the Pismo Formation. Other major supply sources include the State Water Project, Lopez Lake Reservoir, and recycled water. A potential water supply project is the Nipomo Supplemental Water Project. The issues in this WPA include adjudicated groundwater basins, limited groundwater supply, and to some extent groundwater quality.

2.1.2.3 Huasna Valley WPA 8

The Huasna Valley WPA includes agricultural and rural users only. There are no large population centers with urban demands in this WPA. The primary groundwater supply is the Huasna Valley Groundwater Basin. The issue in this WPA includes limited available data on the groundwater supply's safe yield.

2.1.2.4 Cuyama Valley WPA 9

The Cuyama Valley WPA includes agricultural and rural users, and some oil fields. There are no large population centers with urban demands in this WPA. The primary groundwater supply is the Cuyama Valley Groundwater Basin. Twenty-two percent of basin is in San Luis Obispo County, and the remainder of the basin resides in the counties of Santa Barbara, Kern, and Ventura. There is no separate yield estimate for the San Luis Obispo

County portion. The primary issues in this WPA include critical overdraft of the groundwater basin and water quality.

2.1.3 Inland Sub-Region

The Inland Sub-Region shown in Figure 2.3 essentially includes the WPAs that do not drain directly to the ocean, and includes WPA 10 through 16. The Inland sub-region therefore extends inland from the San Luis Obispo/Santa Barbara County line north to the San Luis Obispo/Monterey County line, bounded to the east by Kern and Fresno Counties, and to the west in part by the Santa Lucia range.

2.1.3.1 Carrizo Plain WPA 10

The Carrizo Plain WPA includes agricultural and rural users, and potentially future solar farms. There are no large population centers with urban demands in this WPA. The primary groundwater supply is the Carrizo Plain Groundwater Basin. The primary issues in this WPA include water quality and limited groundwater supply.

2.1.3.2 Rafael/Big Spring WPA 11

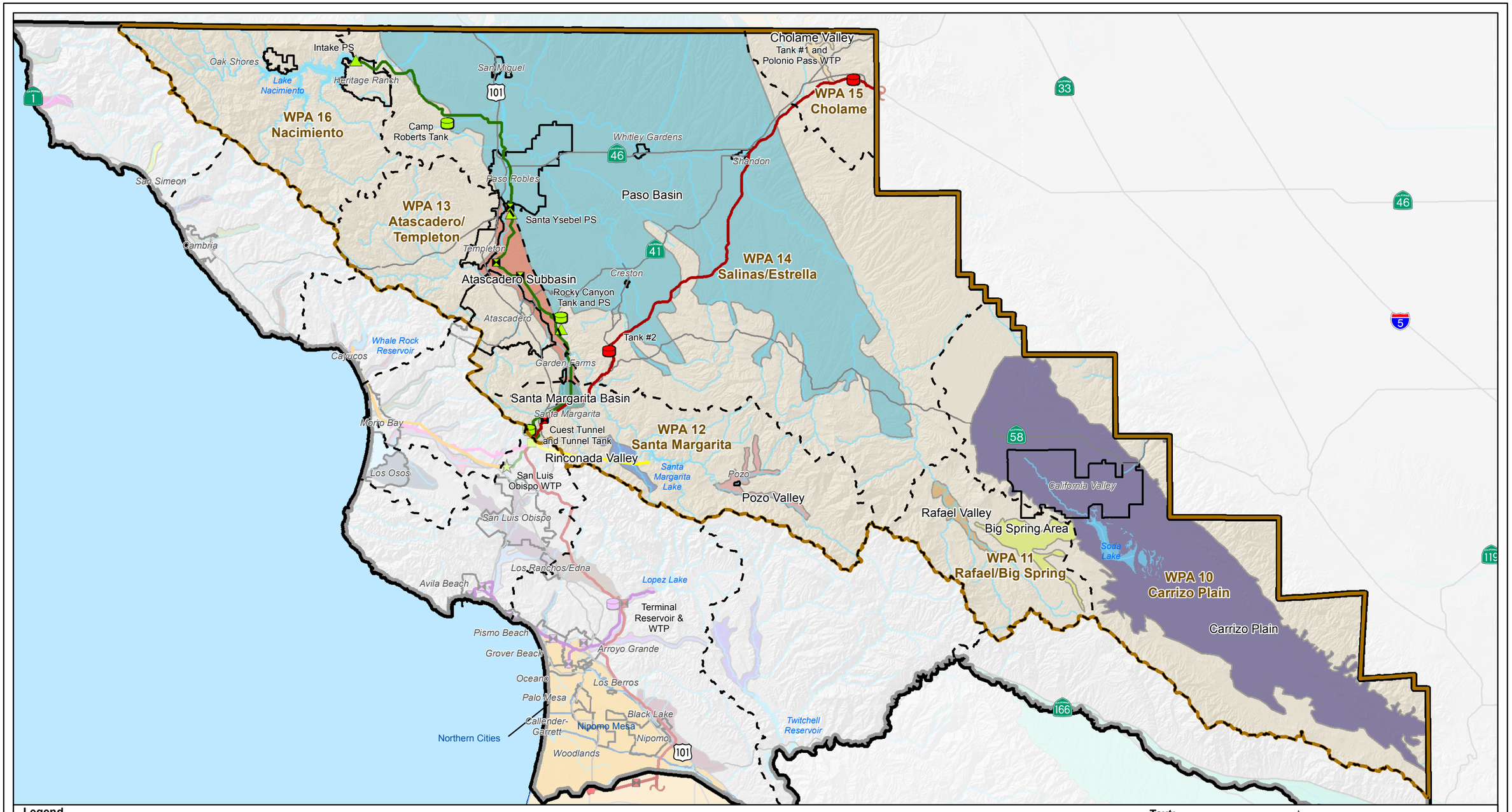
The Rafael/Big Spring WPA includes agricultural and rural users only. There are no large population centers with urban demands in this WPA. The primary groundwater supplies are the Rafael and Big Spring Valley Groundwater Basins. The issue in this WPA includes limited available data on the groundwater basin's safe yield.

2.1.3.3 Santa Margarita WPA 12

The Santa Margarita WPA includes Santa Margarita Ranch, County Service Area 23, agricultural and rural users. The primary sources of water supply for this WPA are the Santa Margarita, Rinconada, and Pozo Valley Groundwater Basins, and the Santa Margarita Creek Alluvial Aquifer. The primary issues in this WPA include limited available data on basin safe yield and limited groundwater supply.

2.1.3.4 Atascadero/Templeton WPA 13

The Atascadero/Templeton WPA includes the Templeton Community Services District (Templeton CSD), Atascadero Mutual Water Company, Garden Farms Community Water District, agricultural and rural users. The primary sources of water supply for this WPA are the Atascadero Groundwater Sub-basin (Paso Robles Formation and Salinas River Underflow), recycled water, and the Nacimiento Water Project. The issues in this WPA include limited basin yield and State managed water rights to the Salinas River underflow.



Legend

Water Facilities
- WTP
- Reservoir/Tank and/or WTP
- Local Facility
- Pump Station
- Turnout
- Tunnel Unit
- Water Transmission Line

Color Scheme
- California State Coastal Branch
- Lopez Water System
- Lake Nacimiento Water Project
- Salinas Reservoir System
- Whale Rock Reservoir System
- Chorro Valley Pipeline
- Highways
- Major Rivers/Streams
- Urban Reserve and Village Reserve Lines (URL/VRL)
- Management Areas
- Inland Sub-Region
- Water Planning Area
- Water Planning Area Boundary
- Groundwater Basins
- Waterbodies

Text:
Water Planning Area
Groundwater Basin
URL/VRL
Water Facility
Management Area
Hydrography

0 5 10 Miles

Figure 2.3
Inland Sub-Region (WPAs 10-16)
Master Water Report
San Luis Obispo County Flood Control and Water Conservation District

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2.1.3.5 Salinas/Estrella WPA 14

The Salinas/Estrella WPA includes the San Miguel Community Services District (San Miguel CSD), Camp Roberts, City of Paso Robles, County Service Area 16 (Shandon), agricultural and rural users. The primary sources of water supply for this WPA are the Paso Robles Groundwater Basin (Paso Robles Formation and Salinas River Underflow) and the Nacimiento Water Project. The issues in this WPA include water quality, State-managed water rights to Salinas River underflow, and declining groundwater levels.

2.1.3.6 Cholame WPA 15

The Cholame WPA includes agricultural and rural users only. There are no large population centers with urban demands in this WPA. The primary groundwater supply is the Cholame Valley Groundwater Basin. The issue in this WPA includes limited available data on the groundwater quality and basin safe yield.

2.1.3.7 Nacimiento WPA 16

The Nacimiento WPA includes Oak Shores, Heritage Ranch Community Services District, agricultural and rural users. The primary source of water supply for this WPA is Lake Nacimiento. The issue in this WPA is water supply reliability.

2.2 WATER SERVICE COOPERATIVE AGREEMENTS AND OTHER COORDINATION EFFORTS

This section discusses the various cooperative agreements and other inter-agency coordination efforts related to water supply throughout the County. A brief overview of these agreements and efforts is provided, listed in order by WPA:

- WPA 3, 4 and 6 - Whale Rock Reservoir Water Supply
- WPA 4 - City of Morro Bay/Whale Rock Commission
- WPA 4 – Chorro Valley Water System
- WPA 4, 6, 7 and 14 - State Water Contract
- WPA 5 – Los Osos Interlocutory Stipulated Judgment (ISJ)
- WPA 6 – Santa Margarita Lake/Salinas Reservoir
- WPA 6 and 7 - Lopez Lake Zone 3 Water Supply Project
- WPA 7 – Groundwater Management Agreement/Northern Cities Management Area
- WPA 7 – Nipomo Mesa Management Area (NMMA)
- WPA 4, 6, 13 and 14 - Nacimiento Water Supply Project
- WPA 13 and 14 - Paso Robles Groundwater Management Plan and Basin Agreement

2.2.1 WPA 3, 4 and 6 – Whale Rock Reservoir Water Supply

Whale Rock Reservoir is located on Old Creek Road approximately one-half mile east of the community of Cayucos. The project was planned, designed, and constructed under the supervision of the State Department of Water Resources. Construction took place between October 1958 and April 1961. The reservoir is jointly owned by the City of San Luis Obispo, the California Men's Colony (CMC), and Cal Poly. These three agencies, with the addition of a representative from the Department of Water Resources, form the Whale Rock Commission, which is responsible for operational policy and administration of the reservoir and related facilities. Day-to-day operation is provided by the City of San Luis Obispo.

Several agreements establish policy for the operation of the Whale Rock system and actions of the member agencies. These agreements cover aspects such as distribution of capital costs for the project construction, operations and apportionment of operations costs, downstream water rights, fish and wildlife protection, and other items.

In April 1996, the downstream water rights agreement was amended and replaced with a new agreement, establishing water entitlements for adjacent and downstream water users. The downstream water users (Cayucos Area Water Organization or CAWO) affected by this agreement consist of three public water purveyors and the cemetery, plus two other rural/agricultural users, all in the Cayucos area. These agencies are the Paso Robles Beach Water Association, Morro Rock Mutual Water Company, County Service Area 10A, and Cayucos-Morro Bay Cemetery District.

2.2.2 WPA 4 - City of Morro Bay/Whale Rock Commission

A mutual aid agreement exists between the Whale Rock Commission and the City of Morro Bay, dated 2000, relative to water resources in the event of an emergency. The SWP shuts down for annual maintenance activities each fall/winter during which the City has used its alternative supplies. In 2008, the SWP shutdown took place also when groundwater quality issues were limiting the City’s use of well water. The shortfall was made up for through this agreement with CMC to provide Morro Bay with water during that period. Treated Whale Rock water from CMC water treatment plant is conveyed to Morro Bay via the Chorro Valley Pipeline.

2.2.3 WPA 4 - Chorro Valley Water System

The Chorro Valley Water System includes these entities: CMC, Camp San Luis Obispo, Cuesta College, and San Luis Obispo County Operations Center/Office of Education**.** CMC operates a water treatment plant to provide potable water to CMC facilities and wheels water to Camp San Luis Obispo, Cuesta College, County Operations Center (which includes Fleet Services, Water Quality Lab, Juvenile Detention Center, County Jail, Office of Emergency Services), and County Office of Education. These entities have several inter-entity agreements relating to entitlements to their shared water supplies, which include

Whale Rock Water, Chorro Reservoir, and State Water. Camp San Luis Obispo also has first rights to one on-site well (County Well No. 1).

2.2.4 WPA 4, 6, 7, and 14 -State Water Project

The California Department of Water Resources (DWR) owns and operates the State Water Project (SWP). It is the largest state-built water and power project in the United States. The SWP first started delivering water to Californians in the 1960s. In 1963, the San Luis Obispo County Flood Control and Water Conservation District (District) contracted with DWR for 25,000 acre feet per year (AFY) of State Water. However, the Central Coast was not served with State Water until 1997 when the Coastal Branch conveyance and treatment facilities, serving Santa Barbara and San Luis Obispo counties, were completed.

The treatment facility for State Water delivered through the Coastal Branch, Polonio Pass Water Treatment Plant (PPWTP), is owned, operated and maintained by the Central Coast Water Authority (CCWA) for users in San Luis Obispo and Santa Barbara Counties. The Coastal Branch conveyance system is owned by DWR, which also operates and maintains the raw water portion of the system. The treated water portion is operated and maintained by CCWA. Agreements between CCWA, the Santa Barbara County Flood Control and Water Conservation District, the San Luis Obispo County Flood Control and Water Conservation District (District) and DWR are in place to establish these roles and relationships.

Upon initiation of the development of the Coastal Branch in the early 1990s, entities within the District came forward with Water Service Amount (WSA) requests for portions of the District's allocation of State Water. After extensive policy discussions regarding the use of State Water, the District entered into Water Supply Agreements with the agencies identified in Chapter 3, Table 3.5, and Master Water Treatment and Coastal Branch construction agreements with CCWA for treatment of and associated delivery capacity for 4,830 AFY of State Water.

Water purveyors receiving State Water include the following:

- WPA 4 - City of Morro Bay, CMC, County Operations Center, Cuesta College
- WPA 6 - San Miguelito MWC, Avila Beach CSD, Avila Valley MWC, San Luis Coastal USD.
- WPA 7 - City of Pismo Beach and Oceano CSD.
- WPA 14 - Shandon (not currently receiving – anticipated to receive in 2013).

2.2.5 WPA 5 – Los Osos Interlocutory Stipulated Judgment (ISJ)

The following three water purveyors serve the community of Los Osos:

- Los Osos Community Services District (Los Osos CSD)

- S & T Mutual Water Company (S&T MWC)
- Golden State Water Company (GSWC)

These three water agencies and overlying water users utilize the same groundwater basin in the Los Osos Valley. The three local water purveyors, along with the County of San Luis Obispo, are currently preparing a Basin Management Plan under a court-approved Interlocutory Stipulated Judgment (ISJ).

2.2.6 WPA 6 – Santa Margarita Lake/Salinas Reservoir

The Salinas Dam was built in 1941 by the War Department to supply water to Camp San Luis Obispo and, secondarily, to meet the water needs of the City of San Luis Obispo. The Salinas Reservoir (Santa Margarita Lake) captures water from a 112 square mile watershed and can currently store up to 23,843 acre-feet (AF). In 1947, the Salinas Dam and delivery system was transferred from the regular Army to the U.S. Army Corps of Engineers. Since 1965, the District has operated this water supply for the City under a lease from the U.S. Army Corps of Engineers. Water from the reservoir is pumped through the Cuesta Tunnel (a one mile long tunnel through the mountains of the Cuesta Ridge) and then flows by gravity to the City's Water Treatment Plant on Stenner Creek Road. Transfer of dam ownership to the District from the U.S Army Corps of Engineers is under consideration.

2.2.7 WPA 7 – Groundwater Management Agreement/Northern Cities Management Area

The Northern Cities (including the cities of Arroyo Grande, Grover Beach, and Pismo Beach, and the Oceano Community Services District) have a long history of cooperatively managing the groundwater underlying the Northern Cities area. The 1983 "Gentlemen's Agreement," as amended, was reaffirmed in a 2002 Agreement Regarding the Management of the Arroyo Grande Groundwater Basin ("2002 Groundwater Management Agreement"). The 2002 Groundwater Management Agreement was incorporated into the 2005 Stipulation, which was ultimately affirmed by the Court within the 2008 Judgment. For more information on the Santa Maria Valley Groundwater Basin litigation, see section 4.2.2.2.3.

The 2002 Groundwater Management Agreement established a safe yield for the Arroyo Grande Groundwater Basin of 9,500 AFY. The safe yield included subdivisions for agricultural irrigation (5,300 AFY), subsurface flow to the ocean (200 AFY) and urban uses (4,000 AFY). It also provided that urban groundwater allocations can be increased when land within the incorporated boundaries is converted from agricultural uses to urban uses, referred to as an agricultural conversion credit, or "ag credit." Accordingly, the Cities of Arroyo Grande and Grover Beach have increased their groundwater allocations through the conversion of agricultural uses to urban uses within their service areas. The 2010 Annual Report for the Northern Cities Management Area (NCMA) summarizes the groundwater allocations for the Northern Cities as follows:

Urban Area	Groundwater Allotment (from 2002 Groundwater Management Agreement), AFY	Ag Credit, AFY	Total, AFY
Arroyo Grande	1,202	112	1,314
Grover Beach	1,198	209	1,407
Pismo Beach	700	0	700
Oceano CSD	900	0	900
Total	4,000	321	4,321

In addition to the monitoring and reporting requirements described in the Stipulation, representatives from the NCMA frequently meet and coordinate with representatives from the Nipomo Mesa Management Area and the Santa Maria Valley Management Area (SMVMA) through the SMVMA's Technical Subcommittee.

2.2.8 WPA 6 and 7 – Lopez Lake Zone 3 Water Supply Project

The District completed the Lopez Dam in 1968 to provide a reliable water supply for agricultural and municipal needs as well as flood protection for coastal communities. Allocations for Lopez water are based on a percentage of the safe yield of the reservoir, 8,730 AFY. Of that amount, 4,530 AFY are for pipeline deliveries and 4,200 AFY are reserved for downstream releases. The dam, terminal reservoir, treatment and conveyance facilities are a part of Flood Control Zone 3.

There are two reports under development that relate to Zone 3 operations and water supply management. The Arroyo Grande Habitat Conservation Plan addresses downstream releases and coordination of reservoir storage operations with ecosystem needs and water rights. Additionally, a study is being conducted to consider the feasibility of modifying the dam to augment capacity of the reservoir.

The agencies that contract for Lopez water in Zone 3 include the communities of Oceano, Grover Beach, Pismo Beach, Arroyo Grande, and County Service Area (CSA) 12 (including the Avila Beach area).

2.2.9 WPA 7 – Nipomo Mesa Management Area

The Nipomo Mesa Management Area (NMMA) is part of the Santa Maria Valley groundwater basin adjudicated area. Basin groundwater users in the NMMA include Golden State Water Company, Rural Water Company, Woodlands, ConocoPhillips, Nipomo Community Services District, Lucia Mar Unified School District, small public water systems (serving residential, industrial and nursery/greenhouse operations), and commercial, agricultural and residential overlying users.

The Nipomo Mesa area is currently in a certified Level of Severity III for water supply (resource capacity has been met or exceeded), as defined by San Luis Obispo County. The

County's Level of Severity III led to the preparation of a water conservation ordinance (SLO County Code, Title 8 Chapter 8.92, effective September 25, 2008).

The NMMA Technical Group has established a groundwater monitoring plan that uses coastal and inland key wells to assess the condition of the basin. The 2008 Annual Report indicates that a potentially severe water shortage condition exists. This condition calls for voluntary actions under a response plan, with recommendations to draft a Well Management Plan and a conceptual plan to identify specific actions to be taken (NMMA Technical Group, 2009). Efforts to better understand groundwater conditions in the NMMA continue, and in addition to the monitoring and reporting requirements described in the Stipulation, representatives from the NMMA frequently meet and coordinate with representatives from the Northern Cities Management Area and the SMVMA through the SMVMA's Technical Subcommittee.

2.2.10 WPA 4, 6, 13 and 14 - Nacimiento Water Supply Project

The Nacimiento Dam was constructed in 1957 by Monterey County Flood Control and Water Conservation District (now known as the Monterey County Water Resources Agency (MCWRA)). The dam and reservoir continue to be operated by MCWRA. The lake has a capacity of 377,900 acre feet and a surface area of 5,727 acres. Water is collected from a 324 square mile watershed that is comprised of grazing lands and rugged wilderness.

In 1959, the District secured the rights to 17,500 AFY from Lake Nacimiento, with 1,750 AFY reserved for lakeside users and the Heritage Ranch Community Services District (CSD). After a long series of studies and negotiations, the Nacimiento Water Project (NWP) was initiated. The NWP is the single largest project that the District has ever undertaken. The total project cost, including design, construction, construction management, environmental permitting, and right-of-way, is approximately $176 million. Raw water deliveries recently began in 2010, with the City of San Luis Obispo taking first water deliveries at the Stenner Creek WTP.

Current NWP subscribers have contracted for a total of 9,655 AFY of the available 15,750 AFY, and include:

- WPA 4, CSA 10A (via exchange)
- WPA 6, City of San Luis Obispo
- WPA 13, Templeton CSD, Atascadero MWC
- WPA 14, City of Paso Robles

Heritage Ranch CSD's allocation of Nacimiento Reservoir water of 1,100 AFY is part of the 1,750 AFY reserved for County residents in the Lake Nacimiento area. It is sufficient to provide water for build-out demand, but the configuration of the delivery system (drawing from the river downstream of the Nacimiento Dam) leaves the Heritage Ranch CSD vulnerable to a cut off of its water supply in an extreme drought. Heritage Ranch CSD,

under mandate by California Department of Public Health, is currently in the process of developing an emergency water supply project. As part of this project, the County of San Luis Obispo and County of Monterey are currently in the process of reviewing water rights and operational issues of Nacimiento Dam under such drought conditions when the lake levels reach dead pool elevation (elevation at which water no longer can be released by gravity through the dam).

2.2.11 WPA 13 and 14 - Paso Robles Groundwater Management Plan and Basin Agreement

2.2.11.1 Paso Robles Groundwater Management Plan

The Paso Robles Basin Regional Groundwater Management Plan (Groundwater Management Plan) was prepared coincident with other ongoing studies to develop a stakeholder-driven voluntary plan to provide a framework for future groundwater management activities. This project was funded by a grant from the Local Groundwater Assistance Act of 2000 (California Water Code Section 10795 et seq.) to provide grants to public agencies to conduct groundwater studies or to carry out groundwater monitoring and management activities.

The purpose of the Groundwater Management Plan is to develop a common understanding of the groundwater issues and management opportunities in the Paso Robles Basin and identify and support projects such as conjunctive use, recycled wastewater, and demand management, which will improve groundwater management. Following development of the Groundwater Management Plan, the goal is to implement the activities identified in the plan to achieve the Basin Management Objectives that are identified in the plan.

The effects of these groundwater management activities are expected to result in changed groundwater conditions, which are monitored and reported to the agencies, interested parties, and stakeholders.

2.2.11.2 Paso Robles Groundwater Basin Agreement

The Agreement was entered into on August 19, 2005 by the District, several overlying landowners who have organized as the Paso Robles Imperiled Overlying Rights (PRIOR) group, and the City of Paso Robles and County Service Area No. 16 (collectively referred to as Municipal Users). Since 2005, additional overlying landowners and the San Miguel Community Services District, as a Municipal User, have also signed the Agreement. The Agreement requires the District to declare the Paso Robles Groundwater Basin to be in a state of overdraft, when appropriate, at which point a period of time is conferred to allow overlying landowners sufficient time to react to such a declaration. In the Agreement, the District serves as the technical advisor to both the Landowners and Municipal Users.

The Agreement recognizes the need for monitoring and appropriate management of the existing basin supplies and also recognizes that bringing additional water resources to the basin could delay or avoid entirely the Paso Robles Groundwater Basin becoming

overdrafted in the future. The Agreement also recognizes signatories' desire to preserve their respective groundwater rights, notwithstanding implementation of any management measures, thereby providing the framework for cooperation among the Landowners and Municipal Users to participate in the development of a groundwater management plan.

2.3 RESOURCE AGENCIES

This section discusses and recognizes the roles of the non-purveyor type entities (i.e. State agencies, agricultural groups, and environmental groups) that have some involvement in water resources management/issues, such as resource conservation districts, the Central Coast Regional Water Quality Control Board (Region 3) and State Water Resources Control Board, State Department of Water Resources (DWR), Morro Bay Estuary program, Central Coast Vineyard Team, San Luis Obispo County Farm Bureau and others. It is important to understand their influence and involvement on water resources management efforts within the County, and that they have either contributed to the development of this Master Water Report, or should be coordinated with in future efforts to better understand the conditions in different water planning areas.

2.3.1 State Agencies

DWR – The State DWR mission statement is "To manage the water resources of California in cooperation with other agencies, to benefit the State's people, and to protect, restore, and enhance the natural and human environments." DWR programs and roles include development and implementation of the California Water Plan, grant program administration, conservation and urban water management planning regulation, groundwater basin and watershed planning/management, State Water Project ownership and operation, and a number of other functions. Excerpts from the California Water Plan are utilized in the Water Management Strategies discussion of this MWR.

State/Regional Water Board – The State Water Board's mission is to preserve, enhance and restore the quality of California's water resources, and ensure their proper allocation and efficient use for the benefit of present and future generations. The Water Boards regulate wastewater discharges to surface water (rivers, ocean, etc.) and to groundwater (via land). The Water Boards also regulate storm water discharges from construction, industrial, and municipal activities; discharges from irrigated agriculture; dredge and fill activities; the alteration of any federal water body under the 401 certification program; and a number of other activities with practices that could degrade water quality. Their programs also address water rights, grant program administration, and guidance to assist with these efforts. From the State Board web site; programs offered by the State and Regional Board include biosolids, dredge/fill (401) wetlands, irrigated lands, land disposal (landfills, waste piles), waste discharge requirements (non-Subchapter 15), NPDES Surface Water, recycled water, sanitary sewer overflows, stormwater, and timber harvest activities.

2.3.2 Agricultural Organizations

These include, among others, the San Luis Obispo Coastal and Upper Salinas-Las Tablas RCDs, University of California Davis Cooperative Extension, San Luis Obispo County Farm Bureau, San Luis Obispo Cattlemen's Association, Paso Robles Wine Country Alliance, Central Coast Vineyard Team and entities representing particular crop types – each have a variety of roles which may include conservation and water quality efforts, data collection, special studies, policy review, and overall stakeholder review of issues.

2.3.3 Environmental Organizations

These include, among others, Central Coast Salmon Enhancement, Sierra Club, Morro Bay National Estuary Program and Coast Keepers - each have a variety of roles, which may include conservation and water quality efforts, data collection, special studies, policy review, and overall stakeholder review of issues.

PART II: AVAILABLE DATA

3.1 OBJECTIVES

The purpose of this chapter is to describe the existing data collection programs and the data available for completing the Master Water Report and for managing water resources in the County.

3.2 DATA COLLECTION EFFORTS OR PROGRAMS

Appendix A includes the Data Summary Memorandum prepared by Wallace Group and others. This memorandum summarizes the information used to determine existing and forecast water demands and available supplies. In addition to this memorandum, excerpts from the County's Data Enhancement Plan, which describes the County's water resources data collection network, are provided below.

3.2.1 Groundwater

Groundwater data has been collected for many years in the region. Primarily the San Luis Obispo County Flood Control and Water Conservation District (District) has been the lead agency to collect this information from water providers, local agencies, and land owners.

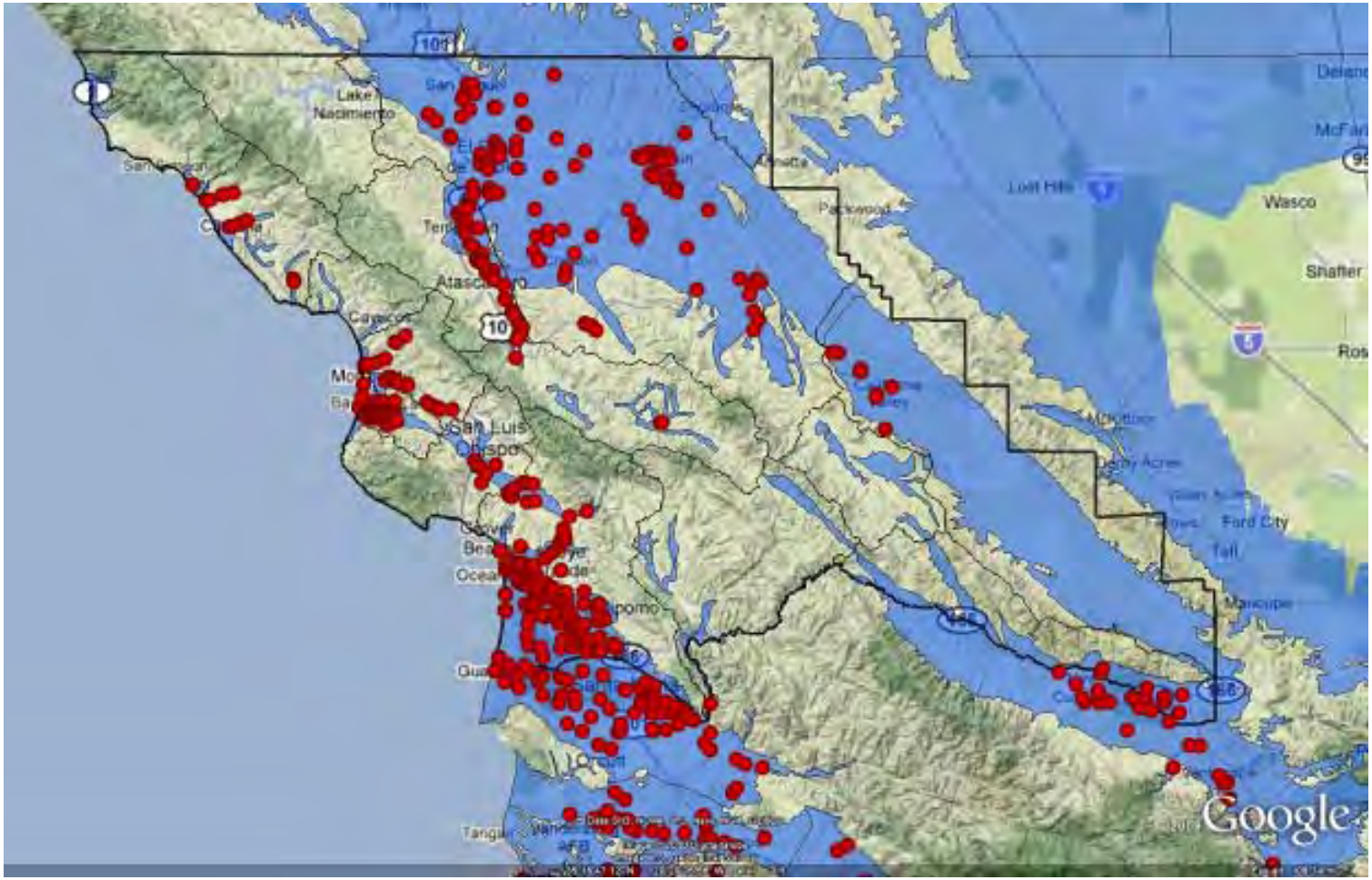
3.2.1.1 Water levels

Water levels throughout the region have been collected in the primary groundwater basins of the region, as shown in Figure 3.1. The colored regions delineate the defined groundwater basins of the region. Red circles indicate active well sites.

3.2.1.1.1 *District Groundwater Level Measuring Program*

Groundwater levels have been measured by the District in selected wells on a semi-annual basis to provide data for planning and engineering purposes. The monitored wells are located within groundwater basins and sub-basins of the Central Coast Hydrologic Region described in Department of Water Resources Bulletin 118. Program wells are selected based on aquifer definition and uniform aerial distribution.

The District maintains a database with hundreds of wells. Readings started in the early 1950s. Water level readings are taken in April and October. The groundwater elevation data obtained from this monitoring program collected over time provide a general indication of ground water basin conditions. This information is used in determining groundwater availability and basin yield estimates, and for hydrogeologic and geotechnical impacts and assessment studies on potential projects.



MEASURED REGIONAL GROUNDWATER WELLS

FIGURE 3.1

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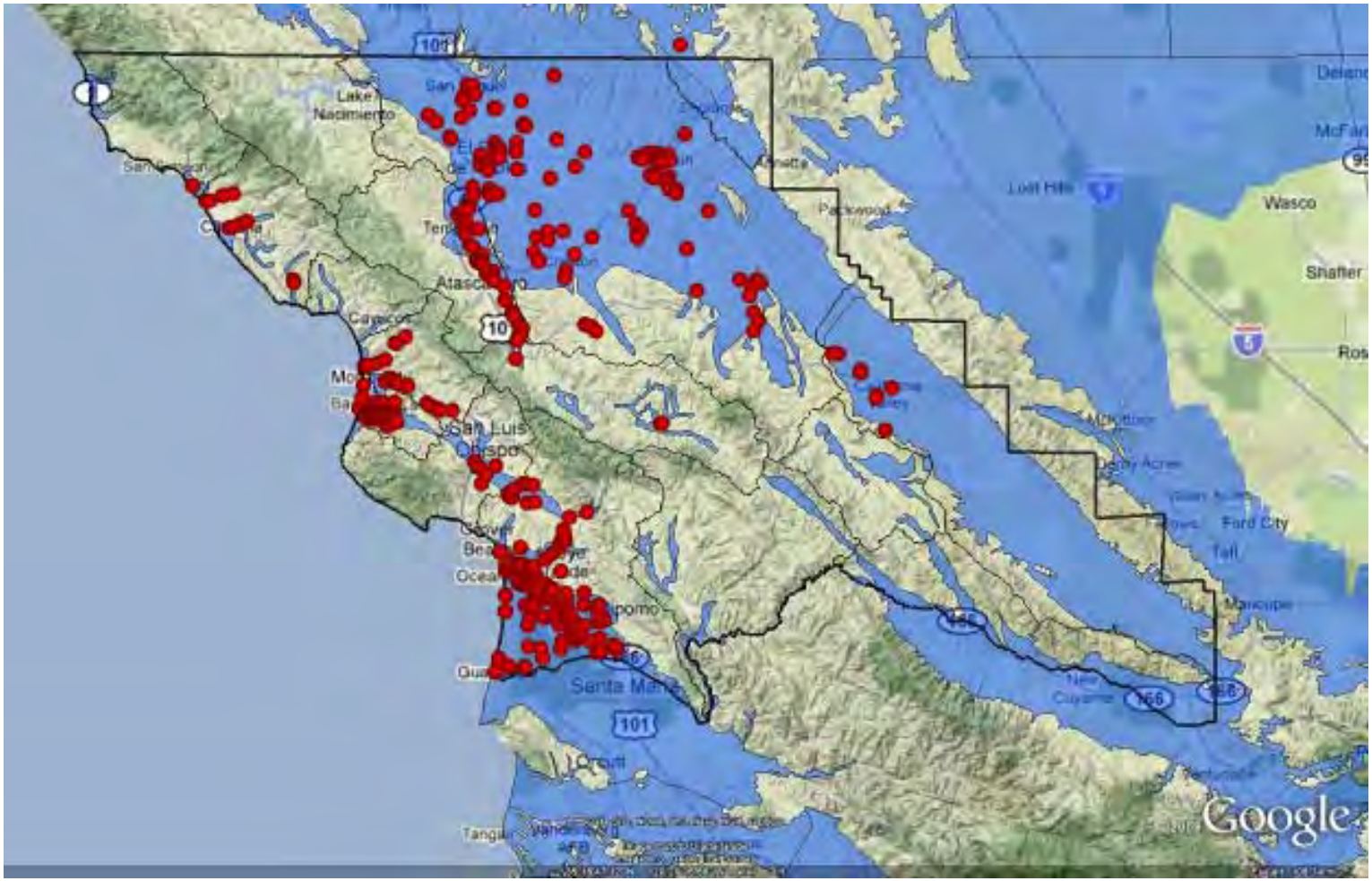
The Salinas River corridor of the Paso Robles Basin, Los Osos Valley, Nipomo Mesa, San Luis Obispo Valley, and the Tri-Cities Mesa have a large number of program wells because of their high population density. The Chorro Valley, Guadalupe hydrologic area, Morro Valley, Creston area, San Juan area, and Shandon areas have a large number of program wells because of their greater agricultural land use.

The current active wells measured in the region by the District, and the regional groundwater basins are shown in Figure 3.2. The majority of well owners participate on a voluntary basis and the wells are typically production wells, which create certain challenges with maintaining an accurate, long-term record, making information available to the general public and understanding the condition of every groundwater basin in the County. The District is initiating the development of a more formal groundwater monitoring program for approval by the Board of Supervisors and with elements that can be adopted by ordinance. The program will, at a minimum, address groundwater level and usage data collection. Effort to develop the program will include town-hall meetings to ensure stakeholder involvement. Issues to be addressed during the development of the program would include, but not be limited to, gaps in the existing monitoring network, voluntary versus non-voluntary participation, distinguishing how different users (urban, agricultural, rural) would be involved/affected/not affected, education and outreach, understanding what other amendments to County Code related to groundwater data collection are being developed, and the legal authorities of the County/District.

In early 2008, Cleath & Associates evaluated the San Luis Obispo County well measuring program. Their analysis recommended that 48 wells should be eliminated, and 66 wells should be added to the program. The total number of wells in the updated monitoring program would be 485 monitoring wells. Additionally, one well should be established in each of the un-gauged groundwater basins of the region. The following basins are currently un-gauged and should have at least one centrally located well:

- Arroyo De La Cruz Valley
- Big Spring Area
- Cayucos Valley
- Huasna Valley
- Old Valley
- Rafael Valley
- Rinconada Valley
- San Capoforo Valley
- Toro Valley



DISTRICT GROUNDWATER MEASURING PROGRAM

FIGURE 3.2

SAN LUIS OBISPO COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
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3.2.1.1.2 *U.S. Geological Survey*

The USGS measures depth to groundwater in thousands of wells throughout the Nation. Their groundwater database contains records from about 850,000 wells that have been compiled during the course of ground-water hydrology studies over the past 100 years.(Figure 3.3)

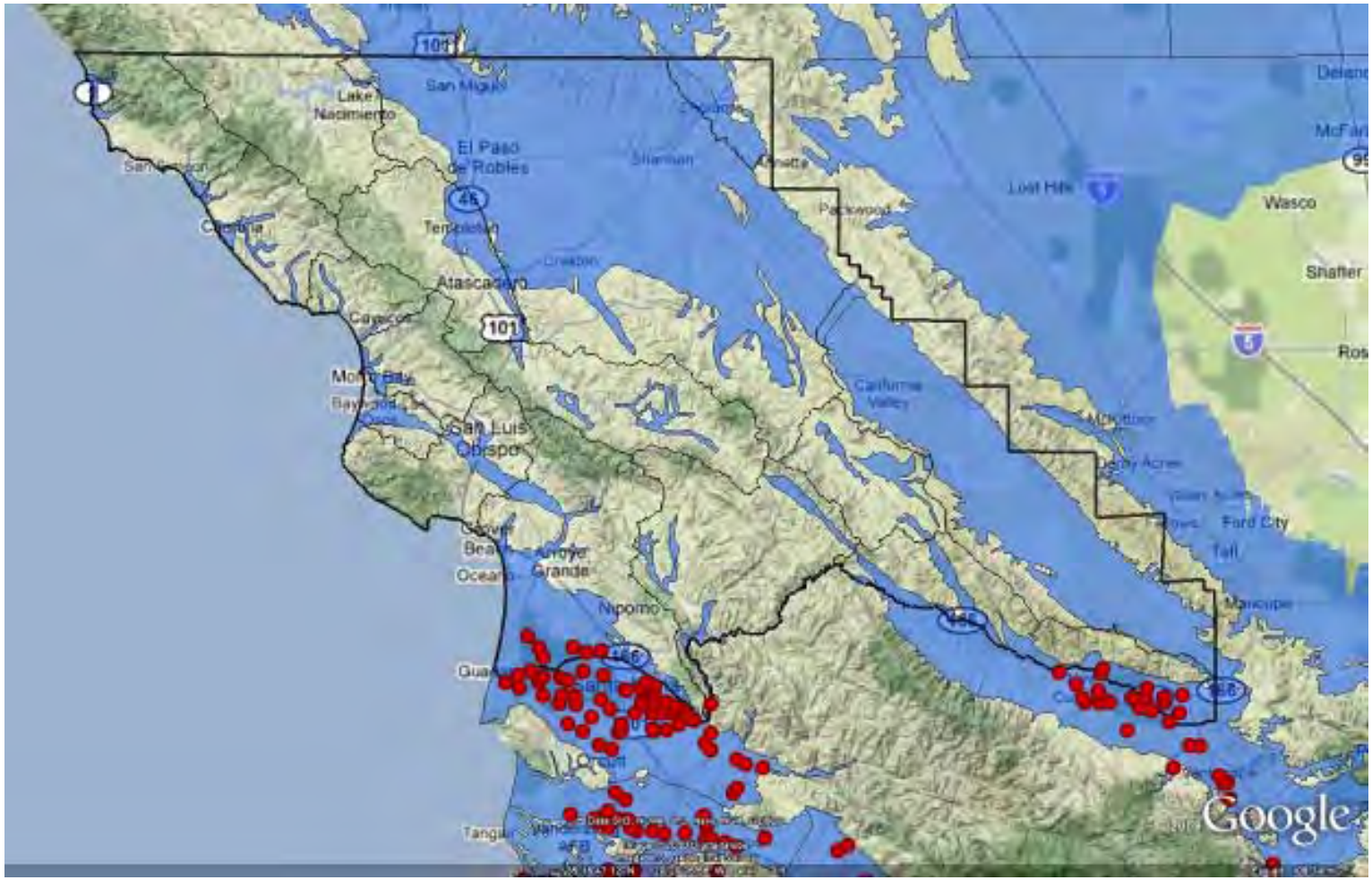
The USGS is responsible for measuring the wells in Santa Barbara County's groundwater program. Locally, only a few wells are measured by the USGS, all of which are located on the southern county border in the vicinity of Santa Maria and Cuyama. Information from these wells is served via the internet through NWISWeb, the National Water Information System Web Interface. NWISWeb provides all USGS ground-water data that are approved for public release. More information can be found at: http://waterdata.usgs.gov.

3.2.1.2 Geologic Data and Well Logs

Perhaps thousands of well logs are on file for locations throughout the county, and legislators are currently working on legislation to clarify the availability of well log information to the public. The County's Environmental Health Department is responsible for the collection of well log information as a part of its permitting process. Some well logs are also on file at both the County Public Works Department and the State Department of Water Resources.

Well construction data may not be available for all wells currently included in the monitoring network. Downhole surveys of some of the existing wells currently being monitored could be conducted to obtain construction details and determine which aquifers are being monitored. These downhole surveys would improve the understanding of the groundwater levels and groundwater movement in the area of the well.

For wells without construction records, video logs could be performed during pump maintenance. Recent technology developments allow down-hole investigation of wells without having to remove their pumps and can provide a video survey to determine their screen intervals; estimate the amount of flow contributed by aquifer (allowing the aquifer characteristics to be estimated) and collect water quality samples by aquifer. These video surveys do have limitations due to the pump column being in the well during the survey. The well owner could notify the District and the well logging service to coordinate these efforts with their pump maintenance.



U.S. GEOLOGICAL SURVEY
WELL MEASURING PROGRAM

FIGURE 3.3

SAN LUIS OBISPO COUNTY FLOOD CONTROL AND
WATER CONSERVATION DISTRICT
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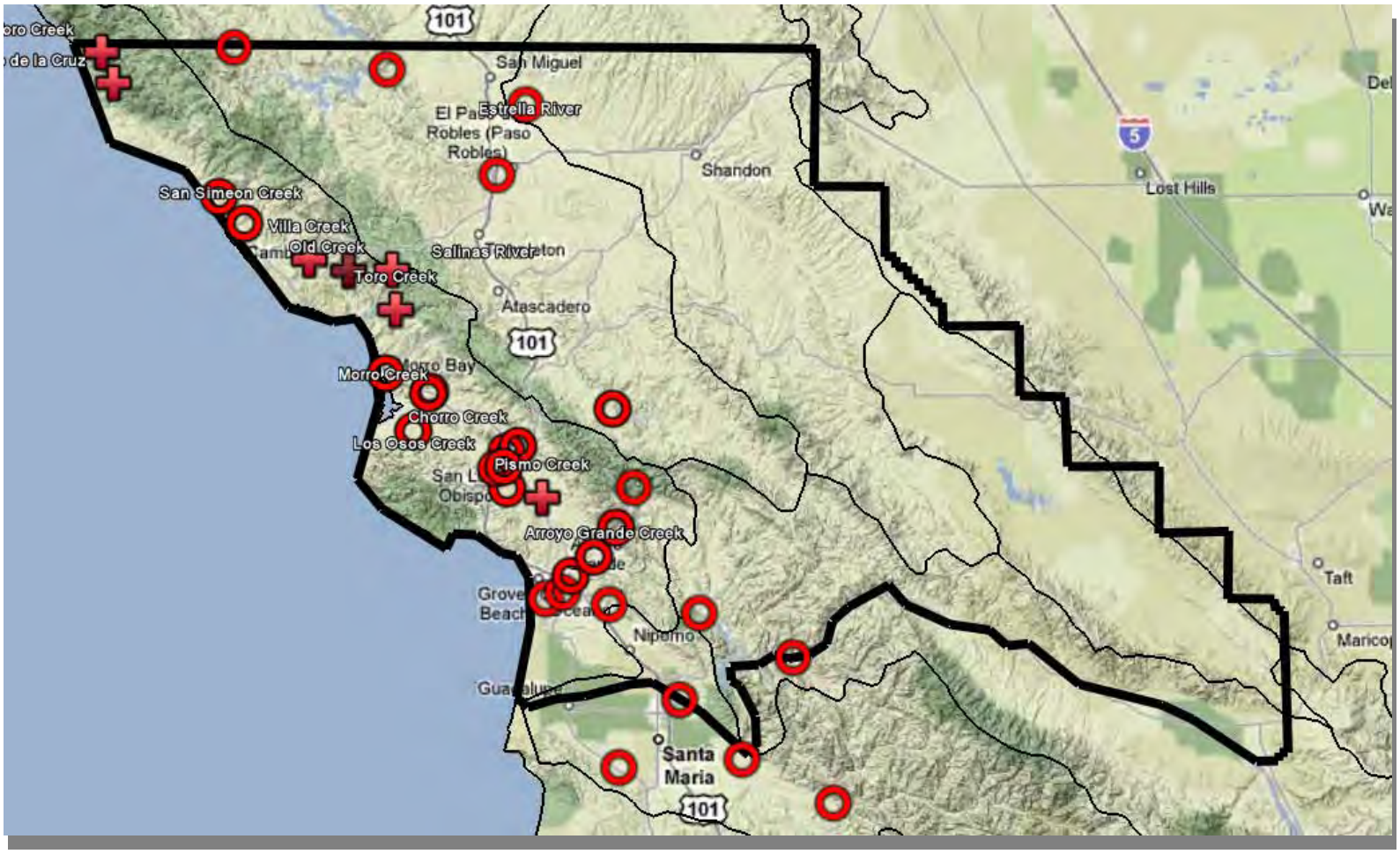
3.2.2 Stream Flow

Water levels are typically collected in streams as part of a stream flow monitoring program. In addition, water levels are also collected in streams to support flood protection activities, and in reservoirs to assist with daily operations.

The major streams and rivers in the region include:

- Arroyo De La Cruz Creek
- Arroyo Grande Creek*
- Cayucos Creek
- Chorro Creek*
- Estrella River*
- Los Osos Creek*
- Morro Creek*
- Old Creek
- Pismo Creek
- Salinas River*
- San Capoforo Creek
- San Luis Obispo Creek*
- San Simeon Creek*
- Santa Rosa Creek*
- Toro Creek
- Villa Creek

The streams marked with an "*" indicate streams that have current gauge stations, and are shown as red circles in Figure 3.4 on the next page.



STREAM WITH CURRENT GAUGE STATIONS

FIGURE 3.4

SAN LUIS OBISPO COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

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There are seven major streams in the region that do not currently have stream gauges, as suggested in the above figure. Those streams are marked by a red cross (“+”) on the map above. (Existing streams are marked by a red circle.) Those streams include:

- Arroyo De La Cruz Creek
- Cayucos Creek
- Old Creek
- Pismo Creek
- San Capoforo Creek
- Toro Creek
- Villa Creek

In order to measure stream flow at the outlet of each Hydrologic Catalog Unit within the region, stream gauges should be placed at the outlet of each of the above creeks. The Salinas River, Santa Maria River, and Estrella River watersheds all have USGS stream gauges that measure streamflow from their respective accounting units. When adding new sites to the stream network, using past, inactive gauges, which may have a period of record that will complement any new data collected, should be considered.

Once each major stream in the region has a stream gauge, it would be worthwhile to gauge some of the smaller tributaries and creeks in the region. County basins that would significantly benefit from enhanced stream flow monitoring conducted for land use and water resources planning include the Paso Robles Basin, San Simeon Basin, Santa Rosa Basin, Los Osos Basin, San Luis Obispo/Edna Valley Basin, Arroyo Grande Basin, Nipomo Mesa Basin, and the Santa Maria Basin. When enhancing the monitoring in these regions, placing gauges on major creeks near the confluence with significant tributaries, on some smaller streams and tributaries, and at major cities along the major creeks should be considered.

To manage water resources for "in-stream" values and functions such as recreation, aesthetic enjoyment, and habitat for aquatic ecosystems, it is important to measure the stages of streams in the region. The recommendations above meet this data requirement. To understand the regional natural flow regime, there should be a number of stream gauges in natural watersheds. The recommendations above meet this need.

An enhanced flood warning system may be used to some extent in many communities of the region. With adequate warning, property owners may have time to install flood gates or move valuable objects to higher ground. Unfortunately, times of concentration of creeks and rivers in the county are relatively short – only a few hours or less. A flood warning system would only allow enough time for the most basic preparations. Communities with historic flooding that may benefit from a flood warning system include Cambria and other north

coast communities, San Luis Obispo to Avila Beach, Five Cities/Arroyo Grande Watershed, Los Osos, Shandon, and old town Nipomo.

In particular, the following roads are consistently flooded in storm events and would benefit from the installation of a real-time stage gauge:

- Airport Road at the Estrella River in Paso Robles
- Buena Vista Drive at Huerohuero Creek in Paso Robles
- San Luis Bay Drive at San Luis Obispo Creek (near Monte Road towards Avila)
- Shell Creek Crossing near Shandon (flash floods potential)
- Turri Road in Los Osos (roughly 1.5 miles upstream of South Bay Drive)
- Upper Santa Rosa Creek Road in Cambria

There are two agencies that collect stream flow information in the region: District and the United States Geological Survey, as discussed below. Stream flow data is also collected on occasion through the Central Coast Ambient Monitoring Program (CCAMP), but only when water quality samples are collected. The CCAMP does not use permanent stream flow gauges.

3.2.2.1 District Stream Measuring Program

The District has records of various length from over 30 stream gauging stations, including six stations that were acquired from the USGS. Currently, 18 stream gauge stations located throughout San Luis Obispo County are maintained the County Public Works Department. Each of the gauge stations measure the depth of flow or “stage” of the stream which can be used to estimate the stream discharge at the gauge location.

These sites are maintained to support District reservoir operations, flood control, and other water resources purposes. Most of the District gauges are on coastal creeks and rivers, with the exception of one gauge on the Salinas River, just downstream of the Salinas Dam, as shown in Figure 3.5.

For more information of the District’s Stream Gauges, go to: http://www.slocountywater.org/site/Water%20Resources/Data/maps/stream-flow.htm.

3.2.2.2 U.S. Geological Survey Stream Gauging Program

The U.S. Geological Survey (USGS) stream gauging program provides streamflow data for a variety of purposes that range from current needs, such as flood forecasting, to future or long-term needs, such as detection of changes in streamflow due to human activities or global warming. The development of data on the flow of the Nation's rivers mirrors the development of the country. From the establishment of the first stream gauging station operated by the USGS in 1889, this program has grown to include 7,292 stations in operation as of 1994. Data from the active stations, as well as from discontinued stations,

SAN LUIS OBISPO COUNTY STREAM MEASURING PROGRAM

FIGURE3.5

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are stored in a computer data base that currently holds mean daily-discharge data for about 18,500 locations and more than 400,000 station-years of record. The stream-discharge data base is an ever-growing resource for water resources planning and design, hydrologic research, and operation of water resources projects.

The U.S. Geological Survey's National Streamflow Information Program (NSIP) operates and maintains approximately 7,500 stream gauges which provide long-term, accurate, and unbiased information on streamflow to meet the needs of many diverse users. The mission of NSIP is to provide the streamflow information and understanding required to meet local, State, regional, and national needs.

Streams maintained by the USGS tend to be on inland streams and rivers, and are typically funded, at least in part, at a local level. Most stream gauges in the region, if not all, support local reservoir operations (Figure 3.6).

3.2.3 Precipitation

Many agencies collect precipitation data in the region. The major rain gauge networks are shown on Figure 3.7 and discussed below.

3.2.3.1 District Recording Rain Gauge Program

There are a number of recording rain gauges in operation in the County. These gauges provide a record of accumulated precipitation versus time. The District Recording Rain Gauge network consists of 13 recording gauges located throughout the region. The distribution and density of recording rain gauges in the region is fairly limited, and noticeably lacking in the northern and eastern part of the region (Figure 3.8).

USGS STREAM GAUGE SITES

FIGURE 3.6

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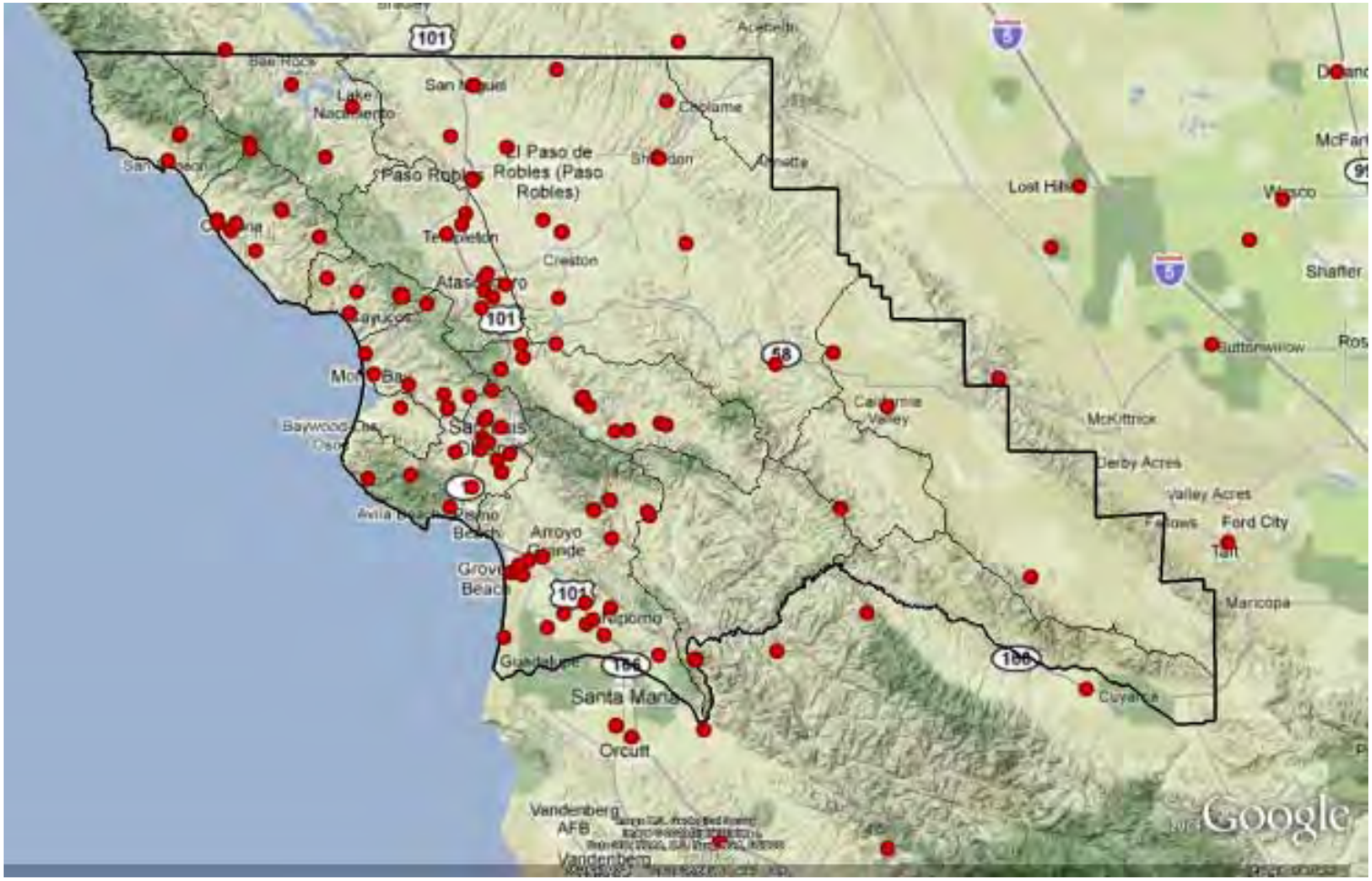
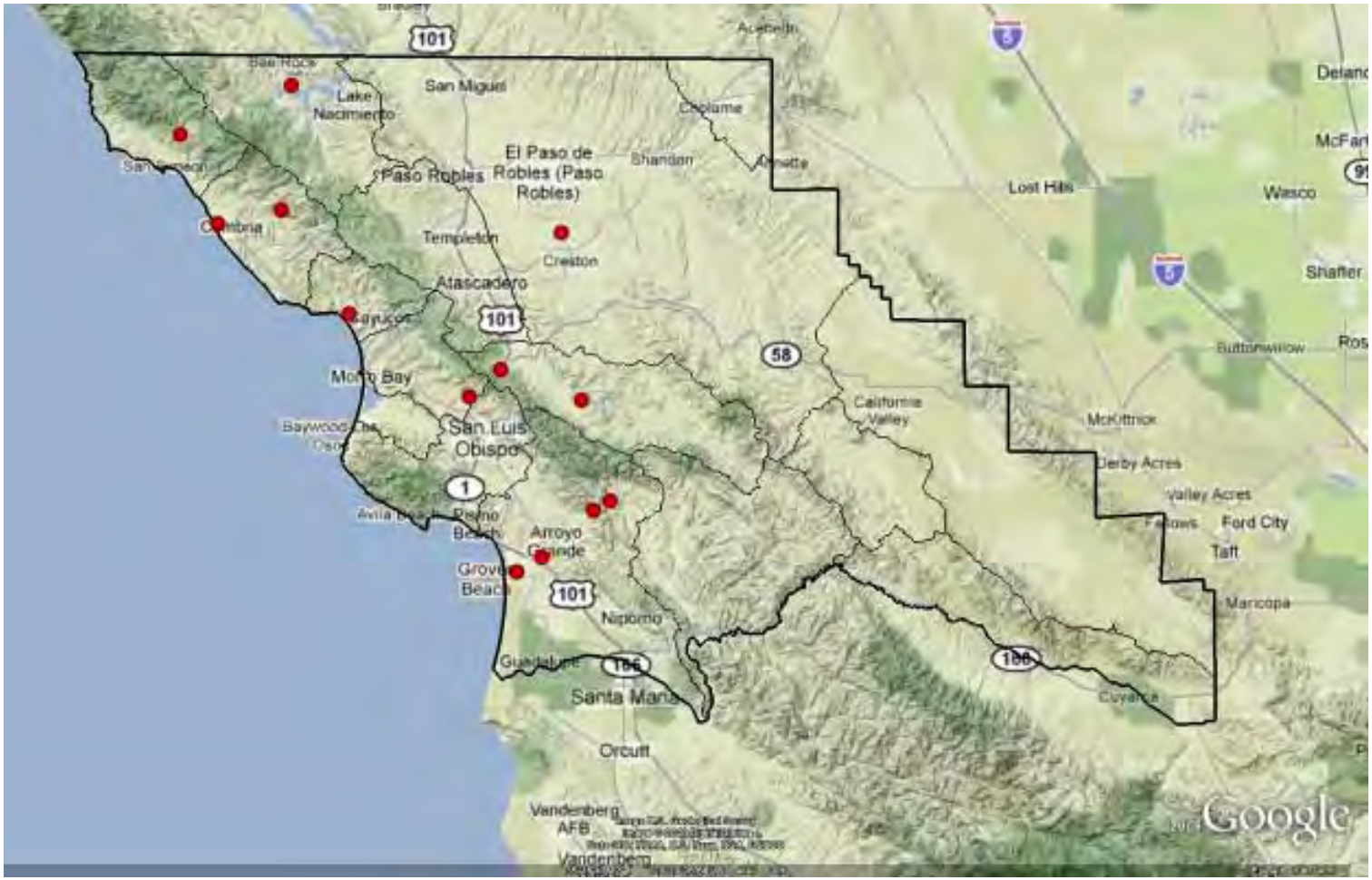


REGIONAL RAIN GAUGE NETWORK

FIGURE 3.7



COUNTY RECORDING RAIN GAUGE DISTRIBUTION

FIGURE 3.8

It is recommended that recording rain gauges be installed in the following areas:

- Avila Beach
- Baywood/Los Osos
- California Valley (rural area and community area)
- Cholame
- Grover Beach
- Halcyon
- Harmony
- Pismo Beach
- San Simeon
- Santa Margarita
- Shandon (rural area and community area)
- Templeton

Another three (3) standard rain gauges in Pismo Beach, and one each in Paso Robles, Atascadero, Los Osos and Nipomo are recommended to improve the density of information.

3.2.3.2 District Volunteer Precipitation Program

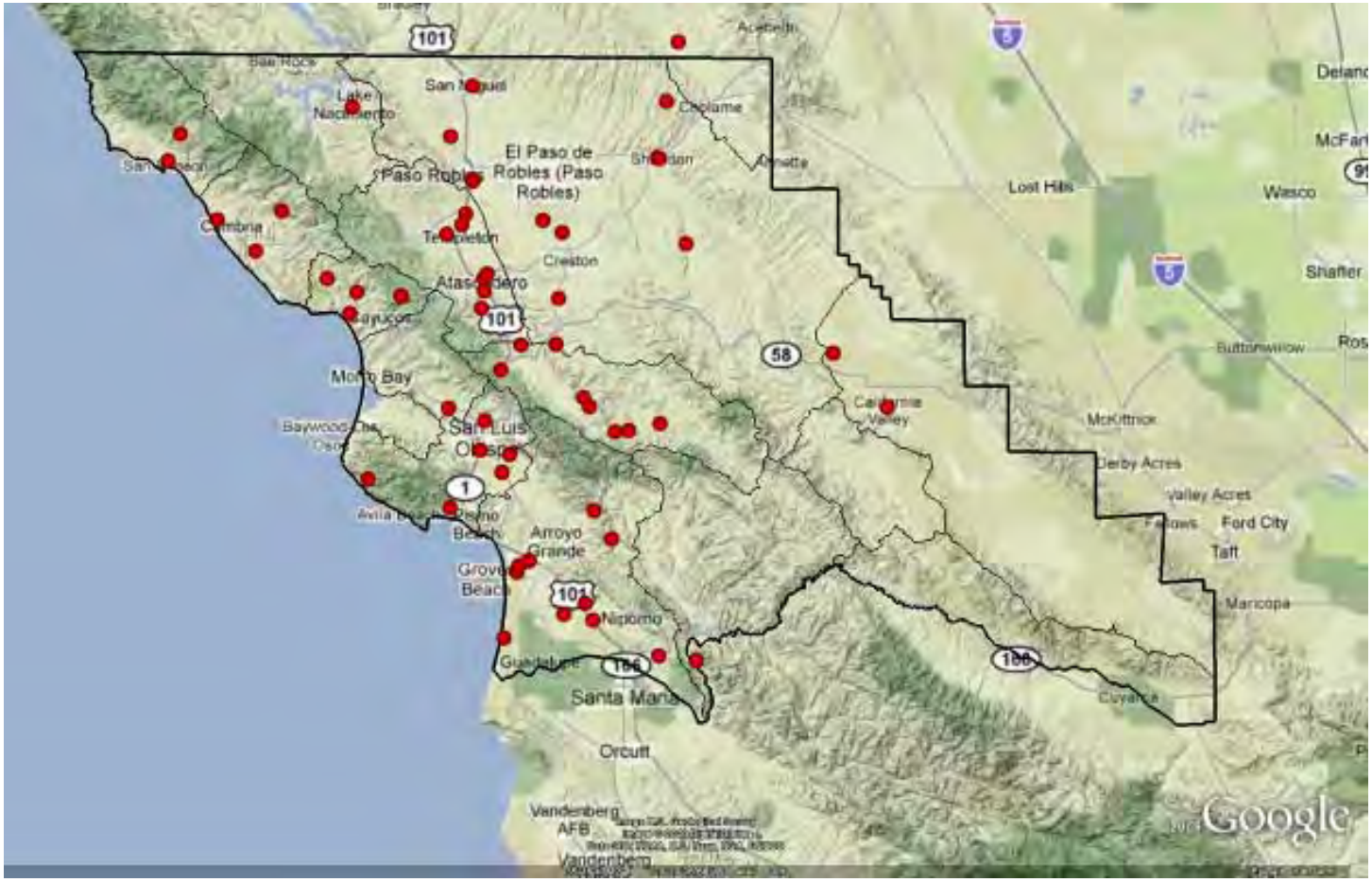
Precipitation data from approximately 50 stations throughout San Luis Obispo County are collected by the County Public Works Department. These records are usually in the form of daily entries of the precipitation occurring during the preceding 24-hour periods. These daily records are summarized in monthly totals.

Volunteer rain gauges are generally operated at-will, by regional residents, business owners, or local agencies. The volunteers independently collect precipitation data and provide it to the District or other agency on an annual basis.

There are a significant amount of volunteer rain gauges in the region, particularly in urban and suburban areas. As with the District recording rain program, the east portion of the region is particularly under represented (Figure 3.9).

3.2.3.3 District ALERT Rain Gauge Program

ALERT is an acronym for Automated Local Evaluation in Real Time, which is a method of using remote sensors in the field to transmit environmental data to a central computer in real time. This standard was developed in the 1970's by the National Weather Service and



COUNTY VOLUNTEER RAIN GAUGE DISTRIBUTION

FIGURE 3.9

SAN LUIS OBISPO COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
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has been used by the National Weather Service, Army Corps of Engineers, Bureau of Reclamation, as well as numerous state and local agencies, and international organizations (footnote 1).

The District ALERT System was developed in cooperation with the National Oceanic and Atmospheric Administration (NOAA) which is a primary user of the information. The District ALERT System consists of one computer base station located at the County Courthouse and radio repeaters that receive and retransmit telemetry from remote sensors located at various locations throughout the County.

Data from these gauges serves to provide real-time information to flood forecasters and engineers during storm events. Due to the inconsistency of ALERT data transmissions, historic data for these gauges is typically unreliable and/or unavailable. For key sites (Figure 3.10), the District has converted some ALERT gauges to recording rain gauges that will provide accurate time-series precipitation data. Additional ALERT gauges would be beneficial in the extreme northwest corner of the County, the Hearst Castle area, the Cayucos area and the Templeton area.

3.2.3.4 California Irrigation Management Information System (CIMIS) Stations

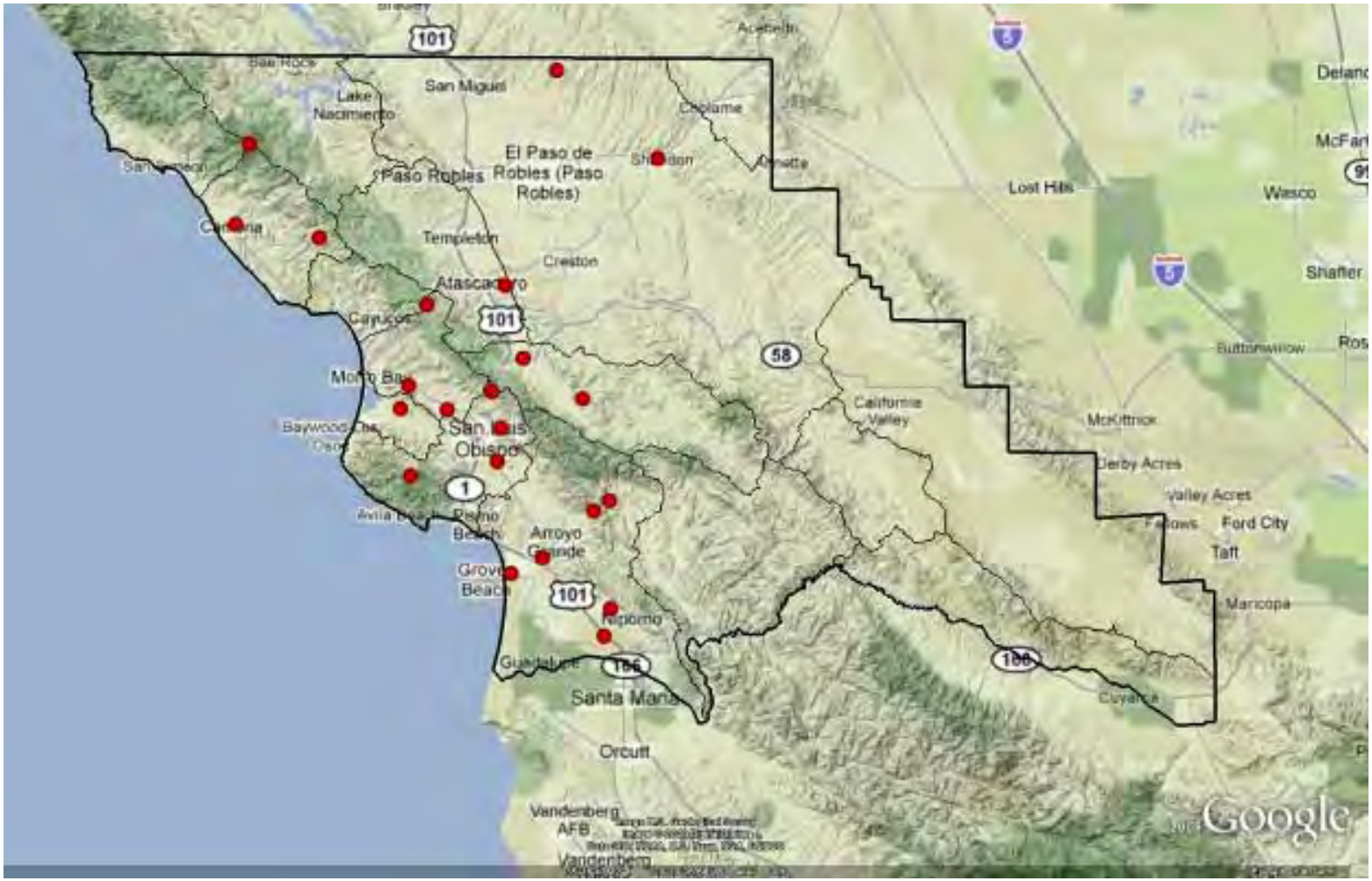
In 1982, through a joint research and development effort between UC Davis and DWR a computerized weather station system was established as a more cost effective method for estimating crop water use. This program was given the name "California Irrigation Management Information System" or CIMIS. In 1985, the administration and implementation of the program, and its further development, were turned over to DWR.

The California Irrigation Management Information System (CIMIS) is a program of the Office of Water Use Efficiency, California Department of Water Resources (DWR) that manages a network of over 120 automated weather stations in the state of California. CIMIS was developed to assist irrigators in managing their water resources efficiently. Efficient use of water resources benefits Californians by saving water, energy, and money.

The CIMIS stations gather climatic data (precipitation, temperature, humidity, solar radiation, etc.), which is used to calculate the evapotranspiration (ET). ET is the loss of water to the atmosphere by the combined processes of evaporation (from soil and plant surfaces) and transpiration (from plant tissues). It is an indicator of how much irrigation water is needed (or used) for healthy growth and productivity.

CIMIS stations are maintained by local agencies that use standard equipment and maintenance procedures. The data seems to be reliable, particularly for hourly rainfall information during storms.

[1] Descriptions of the ALERT system are based on information provided in the websites for Orange County and the World Meteorological Organization



DISTRICT REAL-TIME RAIN GAUGE NETWORK

FIGURE 3.10

As shown on the Figure 3.11, there are four (4) CIMIS stations currently in operation throughout the region. Those stations are located in southeast Atascadero, west of Nipomo, 6.5 miles northwest of San Luis Obispo, and on the Cal Poly Campus. To help estimate agricultural water use in each climatic region and to supplement evaporation data collected at reservoirs and by weather stations, it is recommended that two additional evaporation pans (or weather stations) are established around Cambria (or further north) and east of Paso Robles.

3.2.3.5 National Oceanic and Atmospheric Administration / National Weather Service Cooperative Observer Network

The National Weather Service Cooperative Observer Program (COOP) was formally created in 1890 under the Organic Act. Its mission is to provide observational meteorological data (usually consisting of daily maximum and minimum temperatures, snowfall, and 24-hour precipitation totals) and to provide observational meteorological data in near real-time to support forecast, warning and other public service programs of the NWS.

More than 11,000 volunteers take observations on farms, in urban and suburban areas, National Parks, seashores, and mountaintops. A cooperative station is a site where observations are taken or other services rendered by volunteers or contractors. A cooperative station may be collocated with other types of observing stations such as standard observations stations, Flight Service Stations, etc.

This network was established to provide near real-time data. Unfortunately, the historic dataset for many of these gauges is not complete. It is recommended that data from these gauges not be used for water resources planning. It should be noted that this is a generalization regarding gauges in this network, primarily since these gauges are maintained by different sorts of volunteers and there does not appear to be consistent data maintenance or reporting.

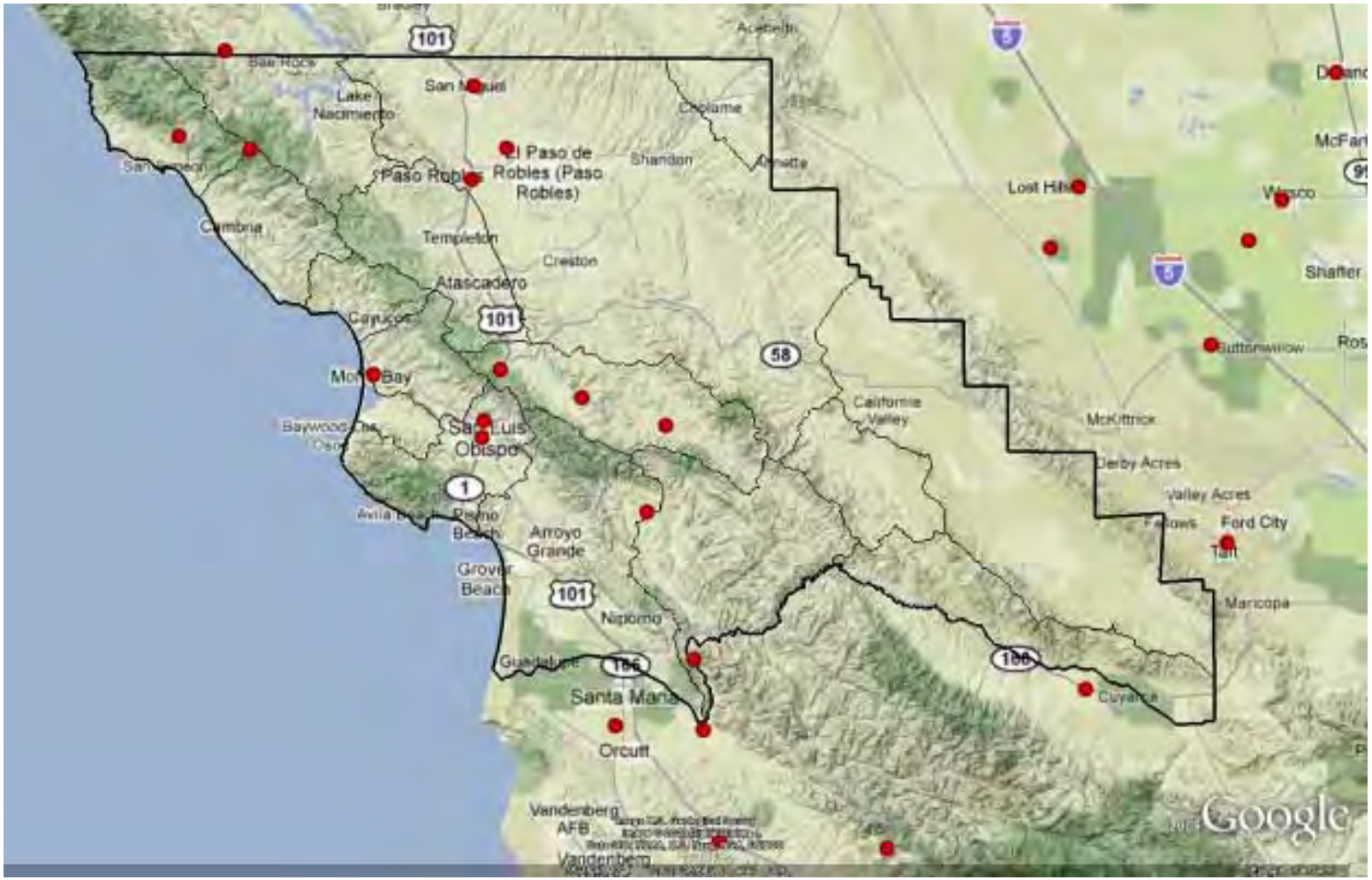
There are twelve active COOP stations in the region, as shown in Figure 3.12. More information about the COOP can be found at: http://www.ncdc.noaa.gov/oa/ncdc.html and at: http://www.nws.noaa.gov/om/coop/.

3.2.3.6 Citizen Weather Observer Program (CWOP)

The Citizen Weather Observer Program (CWOP) allows users with computerized weather stations to send their information via a website to be included into the United States Mesonet. This data is then used by the Rapid Update Cycle (RUC) forecast model to produce short term forecasts (3 to 12 hours into the future) of conditions across the United States' lower 48 states.

REGIONAL CIMIS GAUGES

FIGURE 3.11



REGIONAL COOP STATIONS

FIGURE 3.12

The CWOP is a private-public partnership with three main goals: 1) to collect weather data contributed by citizens; 2) to make these data available for weather services and homeland security; and 3) to provide feedback to the data contributors so that they have the tools to check and improve their data quality. In fact, the web address, www.wxqa.com, stands for weather quality assurance. There are over 6,000 registered CWOP members worldwide and roughly eight in the region.

CWOP is a group of ham radio operators and other private citizens around the country that have volunteered the use of their weather data for education, research and use by interested parties. The APRS-IS collects weather data transmitted from individual stations and communicates these data to the amateur radio findU server where the data are organized and made available to the MADIS Program at 15-minute intervals. The CWOP data also go to the MADIS Quality Control and Monitoring System (QCMS) which checks data quality using a variety of techniques. Based on these checks, data may be declared questionable. Occasional questionable data is normal. However, a high percentage of questionable data may indicate instrument or siting problems.

CWOP members send their weather data by internet alone and internet-wireless combination to the findU server and then every 15 minutes, the entire data set is sent from the findU server to the NOAA MADIS server. The data are checked for quality and then redistributed to users. There are over 500 different user organizations of mesonet data, including the National Weather Service (Figure 3.13).

For more information on the Citizen Weather Observer Program, go to: www.wxqa.com.

3.2.3.7 Remote Automated Weather Station (RAWS) Gauges

There are nearly 2,200 interagency Remote Automated Weather Stations (RAWS) strategically located throughout the United States. These stations monitor the weather and provide weather data that assists land management agencies with a variety of projects such as monitoring air quality, rating fire danger, and providing information for research applications.

Most of the stations owned by the wildland fire agencies are placed in locations where they can monitor fire danger. RAWS units collect, store, and forward data to a computer system at the National Interagency Fire Center (NIFC) in Boise, Idaho, via the Geostationary Operational Environmental Satellite (GOES). The GOES is operated by the National Oceanic and Atmospheric Administration (NOAA). These data are automatically forwarded to several other computer systems including the Weather Information Management System (WIMS) and the Western Regional Climate Center (WRCC) in Reno, Nevada.

Fire managers use these data to predict fire behavior and monitor fuels; resource managers use the data to monitor environmental conditions. Locations of RAWS stations can be searched online courtesy of the Western Regional Climate Center.

CITIZEN WEATHER OBSERVER PROGRAM GAUGES

FIGURE 3.13

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The United States Forest Service and National Park Service use RAWS gauges for vegetation mapping, fire fuel mapping, fire risk estimates and fire detection, post-fire severity mapping, insect-infestation mapping, and relative water stress monitoring (Figure 3.14).

3.2.3.8 NWS Automated Surface Observing System (ASOS) Stations

Federally funded, ASOS is a joint program of the National Weather Service, the Federal Aviation Administration, and the Department of Defense. The ASOS systems serve as the Nation's primary surface weather observing network. ASOS works non-stop, 24 hours a day, every day of the year. ASOS is installed at more than 900 airports across the country, where they make observations.

ASOS's constant stream of data benefits the forecast and research communities and promotes more accurate forecasts of all kinds.

ASOS reports the following basic weather elements:

- Sky conditions such as cloud height and cloud amount up to 12,000 feet,
- Surface visibility up to at least 10 statute miles,
- Basic present weather information such as the type and intensity for rain, snow, and freezing rain,
- Obstructions to vision like fog, haze, and/or dust,
- Sea-level pressure and altimeter settings,
- Air and dew point temperatures,
- Wind direction, speed and character (gusts, squalls),
- Precipitation accumulation, and
- Selected significant remarks including- variable cloud height, variable visibility, precipitation beginning/ending times, rapid pressure changes, pressure change tendency, wind shift, peak wind.

Besides serving aviation needs, ASOS serves as a primary climatological observing network in the United States, making up the first-order network of climate stations. Because of this, not every ASOS is located at an airport; for example, one of these units is located at Central Park in New York City and another is located on Cabbage Hill near Pendleton, Oregon, for the sole purpose of providing climatological observations.

REMOTE AUTOMATED WEATHER STATION (RAWS) GAUGES

FIGURE 3.14

Regionally, there are three ASOS systems. These stations are located at the Paso Robles, San Luis Obispo, and Santa Maria airports, as shown on Figure 3.15. For more information on FAA ASOS Stations, go to: http://www.faa.gov/airports_airtraffic/weather/asos/?state=CA.

3.2.3.9 National Weather Service Precipitation Forecasts (QPF)

The generation of increasingly accurate quantitative precipitation forecasts (QPFs) has been identified as a top priority of the National Weather Service and United States Weather Research Program. The primary applications of QPFs are:

- Flood forecasting,
- Water resource management, and
- Prediction of significant snowfall.

In light of the devastating socioeconomic impacts of flash and river flooding and significant snowfall, QPFs have emerged as a critical facet of the end-to-end forecast process. Timely and accurate flood and winter storm forecasts are essential for the preservation of life and property. In an average year, the number of fatalities and property damage owing to flash and river flooding exceeds that for all weather-related natural phenomena. Although the death toll associated with heavy snow events is typically small, heavy snow can cripple transportation and often has a prolonged economic impact.

Improving QPF and its effect on flood forecasting and water resource management is being recognized as an immense challenge, and will require that the academic and research communities be engaged through the Collaborative Science, Technology, and Applied Research Program and the United States Weather Research Program. Progress in QPF, especially in flash-flood forecasting, will require better understanding of cloud microphysical processes and of land-surface-atmospheric interactions, improved measurements of atmospheric water vapor, better understanding of the dynamics of mesoscale convective systems, better parameterizations of cloud turbulent and microphysical processes, and further development of mesoscale numerical models.

In addition to the many scientific issues relating to QPF, there are also issues in provision of improved, real-time service to users, not the least of which involves the interaction of the important components of the modernized National Weather Service, including the National Centers for Environmental Prediction (NCEP), the Weather Forecast Offices (WFOs), and the River Forecast Centers (RFCs) that constitute an end-to-end forecast process. Several years ago, an operations concept was developed for the production and use of quantitative precipitation information in the modernized NWS. The next task is to develop a QPF implementation plan based on these concepts which accounts for the role of NCEP Service Centers, the WFOs and RFCs, and the implementation of Advanced Weather Interactive Processing System (AWIPS) (Figure 3.16).

FAA ASOS STATIONS

FIGURE 3.15

LOCAL NATIONAL WEATHER SERVICE QPFS

FIGURE 3.16

There are three National Weather Service QPF points in the region and one in the City of Santa Maria, as shown below. For more information on Local National Weather Service QPFs, go to: www.wrh.noaa.gov/lox/main.php?suite=hydrologyandpage=observations.

3.2.4 Reservoirs

3.2.4.1 Local Reservoir Operations

Daily surface water levels are measured for most major reservoirs in the region as part of daily reservoir operations. The County maintains reservoir operational records for two reservoirs – Lopez and Salinas. Other agencies collect and maintain reservoir operation data for the other major reservoirs, shown on Figure 3.17.

Data for each reservoir is available from the agency that operates the reservoir. As part of regular reservoir operations, daily lake elevation values are recorded at the following reservoirs:

- Chorro
- Lopez (includes Terminal Reservoir)
- Nacimiento
- Salinas
- Whale Rock
- Twitchell

Daily stage and storage values for these reservoirs are reported to the District on a daily basis.

3.2.5 Water Quality

Numerous federal, state, and local agencies and organizations have conducted water quality monitoring in the region over the past several decades. Non-profit organizations and other agencies in San Luis Obispo County are currently monitoring water quality in the County and the Central Coast region. These groups have relatively well-developed programs. Continued monitoring at the County level will provide a better overall picture of water quality in the County and will make the most efficient use of County resources[2]. Some regional water quality monitoring efforts are described below.

3.2.5.1 Sampling Surface Water

3.2.5.1.1 *Public Water Systems Monitoring*

Operators of public water systems (any system that serves drinking water to at least 24 persons for at least 60 days out of the year, or who serves domestic water to 15 or more service connections, is a public water system and must have a domestic water supply permit) conduct routine monitoring to ensure that the water they produce complies with Safe Drinking Water Act standards. Results are reported to the State of California

[2] San Luis Obispo County Stormwater Management Plan, June 2006.

RESERVOIR LOCATIONS

FIGURE 3.17

Department of Public Health (CDPH). Monitoring broadly encompasses several categories of constituents: microorganisms, disinfectants, disinfection byproducts, inorganic chemicals, organic chemicals, and radionuclides.

Sampling is conducted at treatment plants, within distribution systems, and at the tap, and monitoring results are evaluated to ensure that applicable drinking water quality standards are met. For regulated constituents, results are compared to Primary and Secondary MCLs, and unregulated contaminants are evaluated against CDPH Detection Limits for Purposes of Reporting (e.g., color, corrosivity, and odor).

Small water systems[3] are also required to conduct routine monitoring and report to the Environmental Health Services Division of the San Luis Obispo County Public Health Department.

3.2.5.1.2 *Surface Water Ambient Monitoring Program (SWAMP)*

The Surface Water Ambient Monitoring Program (SWAMP) is intended to integrate existing water quality monitoring activities of the State Water Resources Control Board and the Regional Water Quality Control Boards, and to coordinate with other monitoring programs.

Ambient monitoring refers to any activity in which information about the status of the physical, chemical, and biological characteristics of the environment is collected to answer specific questions about the status and trends in those characteristics. For the purposes of SWAMP, ambient monitoring refers to these activities as they relate to the characteristics of water quality. Only a small portion of SWAMP can be implemented at its current funding level. As a result, resources are focused where monitoring information is most needed to support regional program priorities, such as maintaining high quality waters, such as Lake Tahoe, or supporting the restoration of priority watersheds.

SWAMP is a statewide monitoring effort designed to assess the conditions of surface waters throughout the state of California. The program is administered by the State Water Resources Control Board. Responsibility for implementation of monitoring activities resides with the nine Regional Water Quality Control Boards that have jurisdiction over their specific geographical areas of the state. Monitoring is conducted in SWAMP through the Department of Fish and Game and U.S. Geological Survey master contracts and local Regional Boards monitoring contracts.

SWAMP is also intended to capture monitoring information collected under other State and Regional Board Programs such as the State's TMDL (Total Maximum Daily Load), Nonpoint Source, and Watershed Project Support programs. SWAMP does not conduct effluent or

[3] Systems having between 15 - 199 service connections and regularly serving 25 or more individuals daily at least 60 days out of the year, or systems that have 5-14 service connections and not regularly serving more than an average of 25 individuals daily for more than 60 days out of the year

discharge monitoring, which is covered under National Pollutant Discharge Elimination System permits and Waste Discharge Requirements.

Data from sites that are a part of the SWAMP can be obtained online at: http://bdat.ca.gov.

3.2.5.1.3 *303(d) Clean Water Act*

Under section 303(d) of the Clean Water Act, states, territories, and authorized tribes are required to develop lists of impaired waters. These are waters that are too polluted or otherwise degraded to meet the water quality standards set by states, territories, or authorized tribes. The law requires that these jurisdictions establish priority rankings for waters on the lists and develop total maximum daily loads (TMDLs) for these waters. A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still safely meet water quality standards.

3.2.5.1.4 *National Pollutant Discharge Elimination System Compliance Monitoring*

As authorized by the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. Point sources are discrete conveyances such as pipes or man-made ditches. Industrial, municipal and other facilities must obtain permits if their discharges go directly to surface waters.

EPA conducts inspections of facilities subject to the regulations to determine compliance. EPA inspections involve:

- Reviewing discharge monitoring reports
- Interviewing facility personnel knowledgeable of the facility
- Inspecting the processes that generate and treat wastewater
- Sampling wastewater discharges to navigable waterways and other points in the generation or treatment process
- Reviewing how samples are collected and analyzed by the laboratory

3.2.5.2 Streams, Lakes & Reservoirs

3.2.5.2.1 *Central Coast Ambient Monitoring Program (CCAMP)*

The Central Coast Regional Water Quality Control Board (Regional Board) is responsible for maintaining and enhancing water quality throughout central coastal California, including 370 miles of coastline in San Mateo, Santa Cruz, Monterey, San Luis Obispo, and Santa Barbara counties. In 1998, the Regional Board initiated the Central Coast Ambient Monitoring Program (CCAMP), with a broad mandate to gather water quality data in groundwater, rivers, streams, estuaries, and the ocean, throughout the Regional Board's jurisdiction. It is the Regional Board's goal to "collect, assess, and disseminate water quality information to aid decision-makers and the public in maintaining, restoring, and enhancing

water quality and associated beneficial uses". Currently there are 23 river/stream sites in the region, as shown in Figure 3.18. Flow data is also collected at some but not all of these sites when the water quality samples are collected. These are not permanent stream flow gauges. Some monitoring within the Morro Bay watershed is also completed by the Morro Bay National Estuary Program (MBNEP). MBNEP data is compatible with CCAMP data management systems.

3.2.5.2.2 *SLO County Water Quality Lab*

Water sampling and analysis for District-provided water supplies are performed by the San Luis Obispo County Water Quality Laboratory. This lab is certified by the DHS as an environmental testing laboratory for bacteriological and chemical analyses. The lab performs analyses on water and wastewater for all County Special Districts, including:

- Cayucos
- County Airport
- Lopez Recreation Area
- Lopez WTP
- Nipomo
- Oak Shores
- Operations Center
- Salinas Project
- SLO Country Club
- Santa Margarita
- Shandon
- State Water

3.2.5.2.3 *Waste Discharge Compliance Monitoring*

Under Federal Clean Water Act Section 401, every applicant for a federal permit or license for any activity that may result in a discharge to a water body must obtain state water quality certification that the proposed activity will comply with state water quality standards.

The Regional Board regulates point source discharge of wastewater to land and surface waters of the region so that the highest quality and beneficial uses of these waters are protected and enhanced. Regulation is by issuance of either Waste Discharge Requirements (WDRs) or National Pollutant Discharge Elimination System (NPDES) permits. Both WDRs and NPDES permits contain monitoring requirements to verify compliance with applicable conditions. These requirements vary according to those specific conditions.

All persons or agencies discharging (or proposing to discharge) pollutants from a point source into any waters of the state are required to apply for and have a permit under the NPDES program and/or WDRs (issued by the Regional Board) to discharge. Typically publicly owned treatment works are regulated, through NPDES permits and/or WDRs, to monitor water quality for all points of water discharge.

CENTRAL COAST AMBIENT MONITORING PROGRAM

FIGURE 3.18

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Key permit conditions applicable to all NPDES permits or WDRs include those for monitoring. These conditions apply to both stormwater and non-stormwater discharges. Although the state, local authority, or EPA's general permits can impose additional requirements, the permit holder must typically monitor discharges within the following parameters:

- Flow
- Pollutants listed in the terms of the permit conditions
- Pollutants that could have a significant impact on the quality of the receiving streams
- Pollutants specified as subject to monitoring by EPA regulations
- Other pollutants for which the EPA requests monitoring in writing

Each of these monitoring parameters must be measured at the frequency specified in the NPDES permit, WDR, or at intervals sufficiently frequent to yield data that would characterize the nature of the discharge. Examples of cities and agencies that are currently operating wastewater collection, treatment and disposal systems under a NPDES permit include:

- City of Paso Robles
- City of Atascadero
- Atascadero State Hospital
- Templeton CSD
- San Miguel CSD
- South San Luis Obispo County Sanitation District
- City of Pismo Beach

3.2.5.3 Estuaries and Wetlands

Current monitoring in estuaries and wetlands is summarized below. Note that there is significant estuarine monitoring that is conducted by other federal agencies, state and local agencies, and the academic community that may not be discussed here.

3.2.5.3.1 *San Luis Obispo Science and Ecosystem Alliance (SLOSEA)*

As mentioned above, SLOSEA monitors water quality in the Morro Bay Estuary at the following sites and hopes to map spatial and temporal changes in the physical and chemical characteristics of water quality in the Morro Bay ecosystem.

Conductivity (and salinity), temperature, dissolved oxygen, oxygen saturation, fluorescence (a proxy for chlorophyll-a), turbidity, nitrate, current/current profile, and depth of water are

measured at these sites (Figure 3.19). More information on the sites maintained by SLOSEA can be found here: http://www.slosea.org.

3.2.5.3.2 *EPA's National Coastal Assessment*

The US EPA's National Coastal Assessment surveys the condition of the Nation's coastal resources by creating an integrated, comprehensive monitoring program among the coastal states.

To answer broad-scale questions on environmental conditions, EMAP and its partners have collected estuarine and coastal data from thousands of stations along the coasts of the continental United States. EMAP's National Coastal Assessment comprises all the estuarine and coastal sampling done by EMAP beginning in 1990. This includes the sampling done in the biogeographic provinces as well as data from the Regional EMAP (REMAP) studies done by EPA Regional Offices. Locally there are five stations in the region, see Figure 3.20, several of which are off-shore, coastal sampling sites. This data can be retrieved and stations mapped online at: http://oaspub.epa.gov/coastal/coast.search.

3.2.5.4 Oceans and Beaches

3.2.5.4.1 *California Clean Beaches Program*

The Beaches Environmental Assessment and Coastal Health (BEACH) Act of 2000 requires that coastal and Great Lakes states and territories report to United States Environmental Protection Agency (US EPA) on beach monitoring and notification data for their coast recreation waters. The BEACH Act defines coastal recreation waters as the Great Lakes and coastal waters (including coastal estuaries) that states, territories, and authorized tribes officially recognize or designate for swimming, bathing, surfing, or similar activities in the water.

The BEACH Program focuses on the following five areas to meet the goals of improving public health and environmental protection for beach goers and providing the public with information about the quality of their beach water:

- Strengthening beach standards and testing
- Providing faster laboratory test methods
- Predicting pollution
- Investing in health and methods research
- Informing the public

SLOSEA SITES

FIGURE 3.19

EPA'S NATIONAL COASTAL ASSESSMENT

FIGURE 3.20

The County's Environmental Health Services Division monitors beach water quality for recreational use through a California State grant between April 1 and October 31 of each year. Monitoring includes ocean water samples collected from the County's most visited beaches on a weekly basis. Shoreline samples are analyzed for bacterial indicators.

Locally, the County's Environmental Health Services Division conducts the public health beach monitoring and regulatory program. In 2010, nineteen (19) locations were analyzed for three indicator bacteria: enterococcus, total coliform, and fecal coliform. Beaches monitored included (Figure 3.21):

- Pismo State Beach, Oceano
- Pismo Beach
- Shell Beach
- Avila Beach
- Olde Port Beach
- Hazard Canyon
- Morro Bay City Beach
- Cayucos Beach
- Pico Ave., San Simeon

3.2.5.4.2 *National Data Buoy Center*

The National Oceanic and Atmospheric Administration (NOAA) National Data Buoy Center (NDBC), a part of the National Weather Service, designs, develops, operates, and maintains a network of data collecting buoys and coastal stations.

The major marine observing systems that form the US national marine observations backbone are:

- NOAA's National Weather Service's NDBC Ocean Observing System (NWS NOOS),
- NOAA's National Ocean Service's (NOS) National Water Level Observation Network (NWLON) and their Physical Oceanographic Real-Time System (PORTS)
- NOAA's Tropical Moored Buoy (TMB) projects
- NOAA's OAR drifting buoy programs.

COUNTY PUBLIC HEALTH BEACH MONITORING 2010

FIGURE 3.21

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NWS forecasters need frequent, high-quality marine observations to examine conditions for forecast preparation and to verify their forecasts after they are produced. Other users rely on the observations and forecasts for commercial and recreational activities. NDBC provides hourly observations from a network of about 90 buoys and 60 Coastal Marine Automated Network (C-MAN) stations to help meet these needs. All stations measure wind speed, direction, and gust; barometric pressure; and air temperature. In addition, all buoy stations, and some C-MAN stations, measure sea surface temperature and wave height and period. Conductivity and water current are measured at selected stations.

There are a few stations in the region, as shown on Figure 3.22. More information on stations that are a part of the National Data Buoy Center can be found at: http://www.ndbc.noaa.gov.

3.2.5.5 Sampling Groundwater

Groundwater is often sampled to determine the chemistry of the groundwater for purposes of utilizing the water for human consumption. Public water supply systems are subject to regulation by the California Department of Public Health, which specifies minimum guidelines for sampling frequency and sampling procedures that must be followed by any water system operator.

3.2.5.5.1 *United States Geological Survey (USGS)*

The USGS has conducted water quality sampling at more than 150 sites in the County since the 1920s. (Figure 3.23) Analytical parameters vary, but can include physical measures (e.g., pH and temperature) nutrients, major inorganics (e.g., chloride, potassium, and sulfate), and minor inorganics (e.g., boron and manganese). The USGS also conducts research and special studies to further the development of scientific knowledge and its application to real world management problems.

3.2.5.5.2 *Waste Discharge Compliance Monitoring*

The Regional Board regulates discharges of wastewater to groundwater or surface water so that the highest quality and beneficial uses of these waters are protected and enhanced. Regulation is by issuance of either Waste Discharge Requirements (WDR) or NPDES permit. WDRs contain monitoring requirements to verify compliance with applicable conditions. These requirements vary according to those specific conditions.

WDR permit requirements often include groundwater monitoring. For example, the Regional Board has established monitoring programs for recycled water and wastewater operations that discharge to groundwater. Dischargers must periodically collect and analyze groundwater quality samples from wells representative of the receiving groundwater.

NATIONAL DATA BUOY CENTER

FIGURE 3.22

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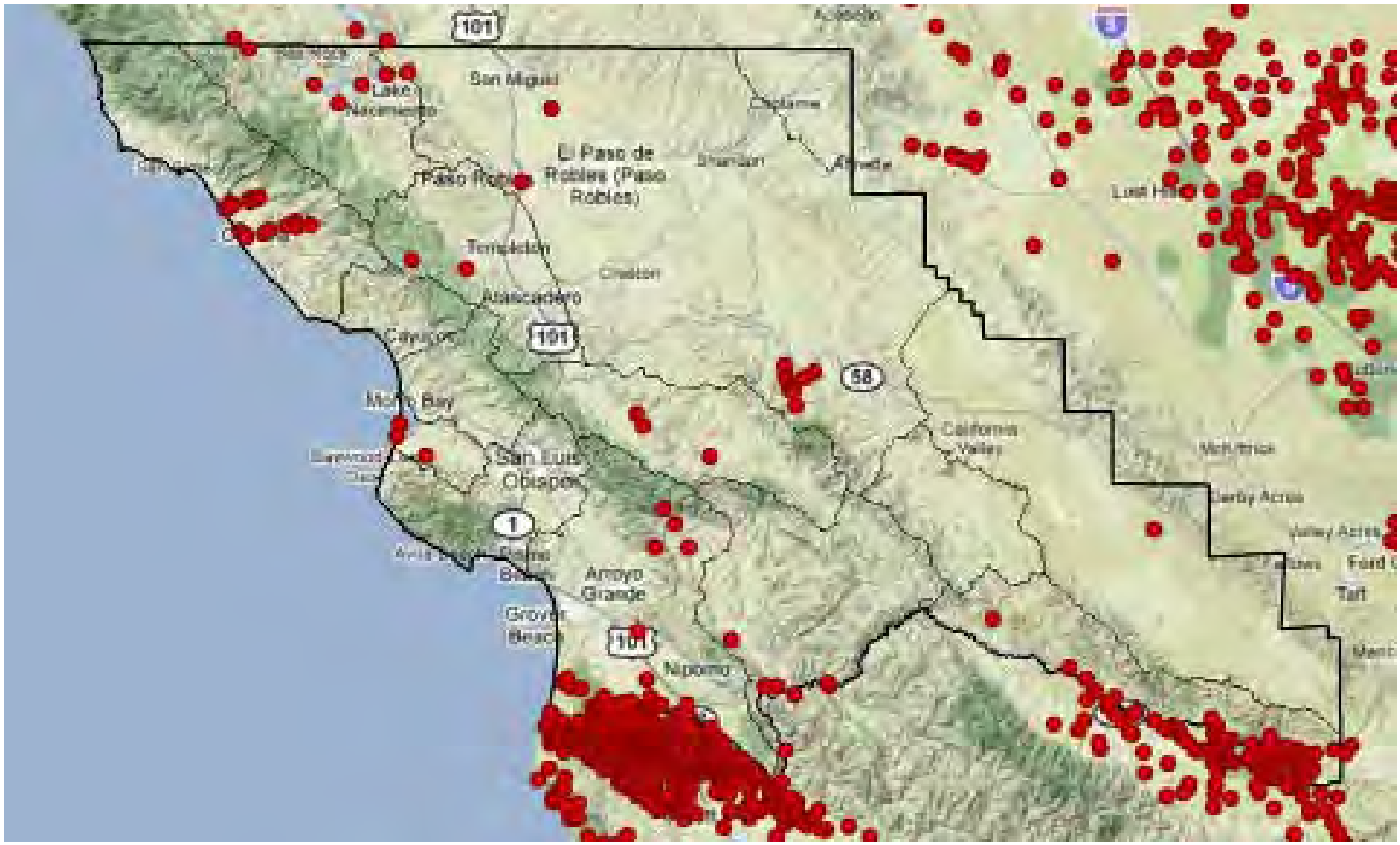


HISTORIC UNITED STATES GEOLOGICAL SURVEY (USGS) WATER QUALITY MONITORING SITES

FIGURE 3.23

For a list of adopted orders, permits, resolutions, and settlements issued by the Central Coast Regional Water Quality Control Board, go to:
http://www.waterboards.ca.gov/centralcoast/board_decisions/adopted_orders/

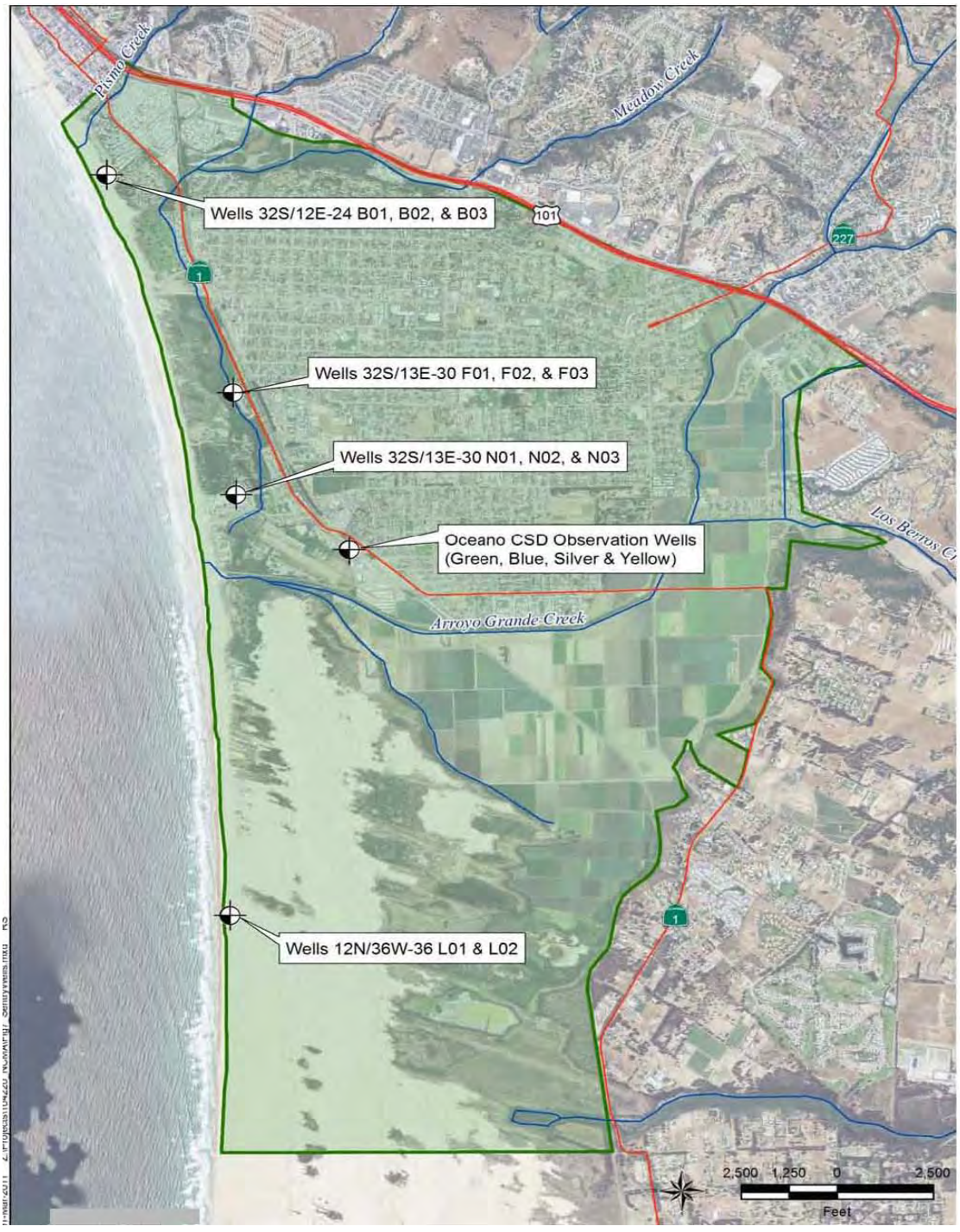
3.2.5.5.3 *State Water Resources Control Board Ground-Water Ambient Monitoring and Assessment Program (GAMA)*

The Ground-Water Ambient Monitoring and Assessment Program (GAMA) program is a comprehensive assessment of statewide groundwater quality. The program is designed to help better understand and identify risks to groundwater resources. Ground water will be sampled at many locations across California in order to characterize its constituents and identify trends in groundwater quality. The results of these tests will provide information for water agencies to address a variety of issues ranging in scale from local water supply to statewide resource management.

The GAMA program was developed in response to the Ground-Water Quality Monitoring Act of 2001 (Sections 10780-10782.3 of the Water Code): a public mandate to assess and monitor the quality of groundwater used as public supply for municipalities in California. The goal of the act was to improve statewide groundwater monitoring and facilitate the availability of information about groundwater quality to the public. The State Water Resources Control Board is implementing the GAMA Program in coordination with the U.S. Geological Survey and Lawrence Livermore National Laboratory.

3.2.5.5.4 *Coastal Sentry Well Monitoring*

Management areas and communities along the coast monitor for seawater intrusion. For example, the Northern Cities Management Area (NCMA) conducts quarterly monitoring of four coastal “sentry wells”, along with an Oceano observation well, all of which are shown in Figure 3.24. Each well location includes a “cluster” of individual well completions at various depths. Quarterly monitoring includes level measurement, as well as sampling and analysis for water quality. The monitoring results are presented in the NCMA Annual Report, which is filed with the Court. The coastal sentry wells monitored by the NCMA were renovated in 2010 to raise the surface completions above grade and secure them within locking enclosures. In early 2011, the NCMA agencies installed combination pressure transducers and conductivity probes in four of the sentry wells: 32S/12E-24B1; 32S/12E-24B2; 32S/13E-30F03; and 32S/13E-30N02. These probes allow the NCMA agencies to observe short duration variations in groundwater levels and quality to better characterize short and long-term trends as they relate to variables such as tidal variation, precipitation patterns and urban pumping.



NCMA COASTAL SENTRY WELLS

FIGURE 3.24

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3.2.5.5.5 *Other Groundwater Management Efforts*

Various groundwater management efforts in the County also include groundwater quality sampling. These include efforts in basins under adjudication that are required to monitor and report annually and/or develop Groundwater Management Plans, where a Groundwater Management Plan is voluntarily being developed, where an entity is implementing a project with monitoring requirements, where individual entities or groups are developing Salt and Nutrient Management Plans in accordance with the State Water Board's Basin Plan, where seawater intrusion is of concern to agencies that rely on coastal groundwater basins for their water supply, and where individual property owners check the quality of their drinking and/or irrigation water supply. The availability of the information varies with each effort, making it challenging to fully understand the condition of all groundwater basins. Sharing of this data with governmental agencies or regional groups conducting groundwater basin studies and, when appropriate, the public at-large, should be encouraged.

3.2.6 Unimpaired Runoff

As part of the Environmental Water Demand analysis, annual unimpaired (i.e., unregulated by impoundments or dams and not substantially effected by the diversion or pumping of water) flow statistics (e.g., mean, median, FMF) were calculated for select locations throughout San Luis Obispo County. The record/flow statistic(s) at long-term gaging stations were used to extend the record/flow statistic(s) of short-term gaging stations, and these in turn were used to estimate the flow statistic(s) at ungaged locations.

The environmental water demands were quantified for areas where data were available and unimpaired runoff data could be obtained, calculated, or estimated. Unimpaired runoff estimates were calculated by developing regional, multiple regression relationships that predict runoff at an ungaged, or partially gaged, location as a function of runoff at a gaged location. Once the estimated unimpaired runoff has been established, the environmental water demand was calculated by using the median annual discharge methodology (Hatfield and Bruce, 2000).

The eastern portion of the County (i.e., WPAs 9, 10, 11, 14, and 15) was ultimately excluded from the environmental water demand analysis due to the lack of unimpaired data and regional physiographic differences. The District should consider installing stream gages in these WPAs to collect flow statistics, which would aid in determining environmental water demands for the eastern portion of the County.

The DWR has identified over 1,000 water rights applications and permits for San Luis Obispo County (DWR 2009b). For purposes of this analysis, the unimpaired mean annual discharge and environmental water demand is presented without including an analysis of the 1,000 diversion rights in the County. However, some of the established instream flow requirements are included. In order to obtain a better understanding of how much surface

water is available for aquatic life, the District would need to identify and quantify all diversion rights and instream flow requirements in the watershed.

3.2.7 Land Use

3.2.7.1 Urban Land Uses

Urban land uses refer to the unincorporated communities and incorporated cities in the County, and include residential, commercial, industrial, parks, institutions, and golf courses. Primary sources of water demand data for urban centers came from water system master plans (WSMP) and urban water management plans (UWMP) prepared by water purveyors, incorporated cities, and unincorporated communities. Additionally, the County's Annual Resource Summary Report 2008 (ARS) provides projected water demand and population data for these areas.

Since existing water demands and future water demand projections are based on information from WSMPs and UWMPs, land use information was not used to calculate water demand. The urban water demand for individual areas in the County was associated with a GIS layer that included the existing and future urban demand for each unincorporated community and incorporated city.

More information on the summary of urban water demands is provided later in this chapter.

3.2.7.2 Rural Land Uses

Rural water demands for unincorporated areas of the County that are outside population centers discussed above were calculated using the County's Land Use ArcGIS® layer, which includes land use and potential dwelling units (DUs) per acre for all unincorporated areas of the County. Vacant and developed properties and potential subdivisions and units in the unincorporated areas of the County were used to calculate a rural water demand. Additional sources include information from purveyors, water management plans, and the County's ARS.

See Appendix D for a description on the methods that the County used to prepare the land use data and for a detailed discussion of how the study utilized the County Land Use ArcGIS® database. For the rural demand analysis, all areas in the County that were accounted for with urban or agricultural water demand were excluded. However, rural home sites on agricultural lands were included in the rural land use demand analysis. Existing and projected future nurseries and vineyards present in the Land Use ArcGIS® layer were merged into the agriculture ArcGIS® layer and included in the agricultural demand analysis.

More information on the approach to calculating rural water demands is provided later in this chapter.

3.2.7.3 Agricultural Land Uses

The Agriculture/Crop GIS layer for the County from August 2008 was used, as well as other information provided by the Agricultural Commissioner's office. This land use layer is updated yearly with information from the pesticide use permits obtained through the San Luis Obispo County Department of Agriculture. The pesticide use permits provide the most accurate information available regarding the location of planned commercial agricultural production during the year, but in some instances may not be entirely accurate. Occasionally sites that obtain permits are not planted for a variety of reasons, and many vegetable crop sites may be planted with more than one crop rotation during a year (Isensee, 2009). The project team estimated agricultural production based on available information. The records do capture most organic operations usage. Use of water for ranching and pasture irrigation, among other uses not captured in pesticide permits, are not included. In Water Planning Areas where the majority of land is used for these purposes, the agricultural water demand may be significantly underestimated. Analysis of diversion rights records would help to address this issue in future updates to the Master Water Report.

The agricultural crop GIS data was used to determine crop acreages throughout the County. Additional information from the Agricultural Commissioner's office, UC Farm Advisors, and Cachuma Resource Conservation District (CRCD) Irrigation Specialist was utilized to estimate existing and future agricultural water demand. More information on the approach to calculating agricultural water demands is provided later in this chapter.

3.2.8 Population

Population information was taken from WSMPs, UWMPs, and the County's *Annual Resource Summary* Report.

3.2.9 Water System Production and Consumption

3.2.9.1 Water Quantity/Quality

A thorough understanding of the quantity of water required for various uses is critical for developing sustained use of the region's water resources. Sufficient quantities of fresh water are necessary, not only for economic development, agriculture, and recreation, but also for supporting ecosystems. Many programs in government agencies and other organizations use water quantity data and information.

Improving water quantity data and characterization, strengthening cooperation between water management programs, and preparing now for future water quantity concerns have been identified as key issues that require water quantity data.

Water quantity is also linked to water quality with regards to issues such as pollutant concentration levels, wastewater discharge requirements, and anthropogenic impacts associated with rainfall/recharge events. Environmental and climatic conditions play a major

role in the demands for and the availability of water supplies. Effective decision making relies on water quantity data and information from both naturally occurring events and human activities. Tracking data and information on droughts, floods, storm water runoff, instream flows, ground water recharge, water withdrawals, development related storm drainage, and water diversions is critical. Managing the region's water resources for sustained use cannot be successful without the knowledge and understanding of the hydrologic cycle, the myriad of demands on the resource and fluctuation in ground and surface water supplies.

3.2.9.2 Water Use Data

Water use is not monitored by a regional authority. It is the responsibility of each water provider to monitor their customers' water use. Fortunately, most water providers in the region meter their customers' water use and, therefore, have information on their customers' water use. Annually, water use data is requested by the County from these water providers.

Water users that own or use private wells and individuals that live outside of established city limits are typically not required to monitor or report their water use to any agency. One of the largest groups of water users that do not have their water use monitored are agricultural water users, who use a relatively large amount of water. Similarly, insufficient data for rural residential properties is a limitation in this study, but rural demands account for less than five percent of the total county demand.

Recommendations adopted by the County Board of Supervisors in the 2009 Annual Resource Summary Report, listed below, serve to address this issue, which will improve data availability for use in future updates to the Master Water Report.

- Installation of flow meters on all new non-agricultural wells, record water use and other information monthly and report semi annually
- Require all water purveyors (including mutual water companies) with over 10 connections to record water use and other information monthly and report semi-annually
- Encourage voluntary well metering, monitoring and reporting

3.2.10 Agriculture

Since agricultural water predominately comes from groundwater sources, and is generally not provided – or metered – by a water supply system, a representative percentage of agricultural water users could meter and report their water use. Ideally, all meter readings would be recorded every month and reported to a central agency on an annual basis. Water use information provided to the State Water Board by landowners is also useful for water resources planning efforts.

3.2.10.1.1 *Agriculture and Irrigation Water Uses*

The County should consider facilitating a voluntary pilot program that would track actual applied water per acre for various agricultural users throughout the County. The vineyard community in the North County is participating in a program led by the University of California, Davis, Cooperative Extension to estimate applied water per acre that may serve as a model for implementation throughout the County.