San Luis Obispo County
Watersheds Management Plan

Phase I – Vision, Framework & Methodology Development

July 2014

Prepared By:

RESOURCE
CONSERVATION DISTRICTS

of San Luis Obispo County

(This page intentionally left blank)

Prepared By:

Coastal San Luis Resource Conservation District

The Coastal San Luis RCD developed all materials related to the South County sub-region, Morro Bay watershed and the San Luis Obispo County Instream Flow Assessment.

Board of Directors

Neil Havlik, President
Jean-Pierre Wolff, Vice-President
Linda Chipping
Robert Rutherford
Cheryl Lenhardt
Kathie Matsuyama
David Alford

Participating Staff

Nicole Smith, Conservation Programs Manager
Lorraine Clark, Project Coordinator
James Tomac, Intern

Upper Salinas - Las Tablas Resource Conservation District

The Upper Salinas - Las Tablas RCD developed all materials related to the North Coast and North County sub-regions and the SLOWatershedProject.org website.

Board of Directors

Michael Broadhurst – President
Susan Cochrane – VP
Tom Mora – Secretary
Robert Hartzell – Treasurer
John De Rosier
Randy Heinzen
Mike Bonnheim
Chuck Pritchard

Participating Staff

Devin Best, Executive Director
Laura Edwards, Program Director
Kelly Gleason, Ag & Natural Resources Planner
Jillian Cole, Engineer, Mapping
Jacob Hernandez, Intern, Research
Amy Smart, Conservation Technician
Erin White, Administrative Coordinator

Public Committees

Technical Advisory Committee

Daniel Bohlman, Land Conservancy of SLO
Ethan Bell, Stillwater Sciences
Freddy Otte, City of San Luis Obispo
George Kendall, retired geologist and farmer
Mark Hutchinson, County of San Luis Obispo
Stephanie Wald, Central Coast Salmon Enhancement

Watershed Working Group

Daniel Bohlman
Dorothy Jennings
Ethan Bell
Freddy Otte
George Kendall
Greg O'Sullivan
Gwen Pelfrey
Jacqueline Tilligkeit
Lisa McCann
Marc Lea
Mark Hutchinson
Michael Conger
Stephanie Wald

Table of Contents

Figures

Appendices

1. Introduction

Communities depend on the natural resources in their area to survive and prosper. In California and the County of San Luis Obispo (County) water is a resource that is increasingly stressed. Reductions in local water supplies have been linked to significant periods of drought and increasing expansion of residential and agricultural development. Residents, and visitors alike, enjoy the County's natural environment as well as depend on it for water supply, flood control, recreation, agriculture, and commerce among other services. These products, goods and services are a focal point for land managers, policy makers, resource professionals and the community. As such, it is essential all community members have access to the most current data to better understand the interactions between natural and anthropogenic components of the local environment and the subsequent outcomes of management decisions. It is also essential to highlight and quantify the goods and services provided by the natural environment for improved management and enhancement.

The Resource Conservation Districts (RCDs) of San Luis Obispo County interact with individuals, municipalities, conservation organizations and other community members. The RCDs guide, partner, interpret, and educate regarding natural resource issues. The complexity of issues, compounded by the conflicting resource demands, makes decision making difficult. Due to the nature of the resource issues and the community needs, no single individual or entity makes all the decisions. With a lack of detailed watershed data accessible to the public – and in one convenient location – the RCDs identified an opportunity to raise awareness about watersheds and the essential resources contained within.

The purpose of the SLO County Watershed Management Plan was to grow the knowledge and value of watersheds and their related services in the community and to strengthen documentation of issues and needs in an effort to encourage faster implementation of appropriate watershed restoration projects. The outcomes of this project are meant to initiate countywide discussions and encourage public engagement.

This project was a team effort between the San Luis Obispo County RCDs through a grant provided by the Department of Water Resources and the County's Integrated Regional Water Management Plan Update. This Phase1 Project included: 1) the collection and organization of existing watershed data into watershed characterization snapshots; 2) analysis of limitations and identification of gaps in the compiled data (used to inform Phase 2); 3) the creation of an interactive website to make snapshot and mapping data accessible to the public; 4) facilitation of resource manager stakeholder meetings to set the stage for development of the first County Watershed Management Plan in Phase 2; and, 5) completing a countywide Instream Flow Assessment.

The San Luis Obispo County Watershed Management Plan will include several consecutive and possibly concurrent phases including Phase 1 – Visioning, Framework & Methodology Development (this document), Phase 2 – Plan Development, and Phase 3 – Plan Implementation. Concurrently, it will be necessary to close key data gaps.

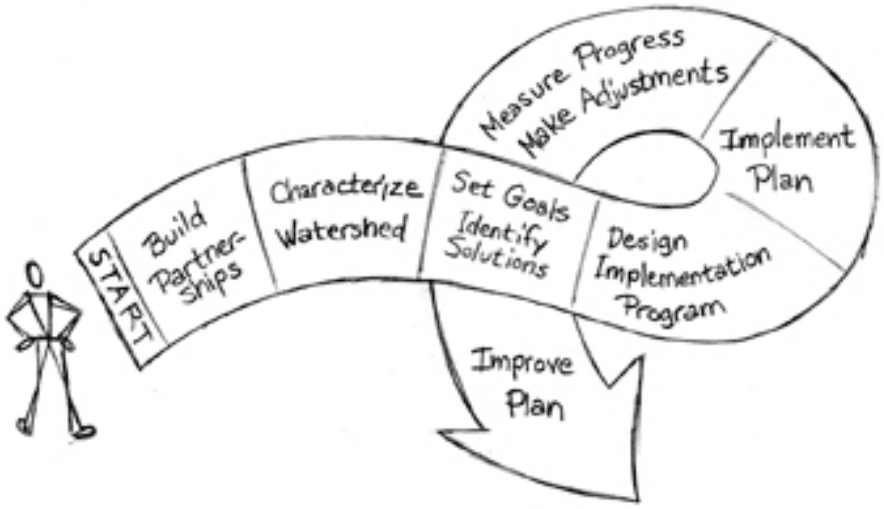
The two RCDs in San Luis Obispo County are the Upper Salinas Las Tablas RCD and the Coastal San Luis RCD. The Upper Salinas Las Tablas RCD developed all materials related to the North Coast and North County water planning areas and the www.SLOWatershedProject.org website and data repository. The Coastal San Luis RCD developed all materials related to the South County water planning area, Morro Bay Watershed Snapshot and the San Luis Obispo County Instream Flow Assessment.

2. Development of SLO County Watersheds Project

Using the watershed scale can help communities identify and solve resource issues. The expanded perspective of a watershed approach looks beyond political boundaries and can create a more comprehensive picture of SLO County's resources, which may include water quantity and quality, fish and wildlife, cultural, economics, recreation, aesthetics, and anything a community finds relevant. At the State level, a watershed approach is supported through many efforts including the California Water Plan, the State Water Board's Watershed Management Initiative, and the Department of Water Resources' Integrated Regional Water Management Plan. Locally, Watershed Management Plans can help define watershed specific goals, existing conditions, critical issues and management recommendations as well as engage the community in framing resource issues and defining action items.

The SLO County Watershed Management Plan: Phase 1 Visioning, Framework & Methodology Development (hereafter referred to as "the Plan") lays the foundation for future watershed planning, research and restoration. Watershed Snapshots and the website (www.slowatershedproject.org), which collects, warehouses, and disseminates information publicly, provide the knowledge base and identify areas with deficient data. In addition, two (2) committees were formed to start conversations in the community about watershed planning at the County scale. Additional phases, incorporating community input, will guide future planning process throughout the County. Figure 1 illustrates the typical watershed planning process. The Plan focused on building partnerships, characterizing watersheds and outlining a framework as a foundation for Phase 2 – Plan Development. To ensure success, these steps should be reevaluated to allow for adjustments and local community input.

FIGURE 1. TYPICAL WATERSHED PLANNING PROCESS



2.1. Determining Watershed Scale

The Environmental Protection Agency (EPA) states, "a watershed is defined as the area of land where all of the water that is under it or drains off of it goes into the same place" (2014). Watersheds can vary in shape and size and the communities and resources within a given watershed are inevitably linked.

For the purpose of the Plan, the watershed scale was defined to allow similar sub-watersheds to be grouped while maintaining boundaries between unique drainage areas. Boundaries defined by CalWater (hydrologic units), the Regional Water Quality Control Board (landscape units), the County (water planning areas), and groundwater basins were taken into consideration by the project team and the Technical Advisory Committee. These considerations guided the RCDs to utilize the Calwater/USGS Hydrologic Unit 10 scale at the start and then modify the boundaries to account for local characteristics, variations, underlying geology that could affect management strategies, and areas with which the community strongly identifies. As a result, the County was divided into 25 watershed areas containing a total of 264 sub-watersheds. A map of these watersheds can be found in Chapter 3 and Appendix A of the Plan followed by the watershed snapshots with detailed information gathered for each of the watersheds.

2.2. Community Committees / Peer Review

In an effort to garner community input as well as solicit technical advice related to the compilation and organization of the watershed snapshots, two committees were established as part of this process - a Technical Advisory Committee (TAC) and a Watershed Working Group (WWG). The TAC, consisting of local hydrology, geology, and biology specialists as well as municipal staff (listed on the title page), was assembled to provide a collaborative forum for guiding collection of existing watershed data and for specialized peer review. Several TAC meetings were held to discuss the types and sources for data. The WWG, consisting of TAC members, resource professionals, community members, and local advisory group members (listed on the Title Page) was assembled to assist with project visioning, goal setting and to act as a sounding board for strategies. WWG meetings were held to introduce the project and initial strategies for Phase 2 as well as review the draft report. As the project moves into future phases, the WWG will guide the overall project and the TAC will become an ad-hoc sub-committee. A summary of outcomes from the WWG and TAC meetings is available in Appendix B.

In order to develop a watershed approach specific to San Luis Obispo County, the RCDs and the TAC reviewed plans and studies which adopted a wide range of approaches from process / relationship-based to weighted metrics to data heavy assessments. Plans reviewed included the following:

- Amador County Watershed Plan
- Bay Area Watershed Component of IRWM
- Birch Bay, Washington Watershed Characterization and Watershed Planning Pilot Study
- Nature Serve Vista Software
- New Loudon Comprehensive Watershed Management Plan
- Santa Cruz Watershed Restoration Program

Through discussions with the TAC, Regional Water Quality Control Board (RWQCB), and municipalities, the preferred approach would have a strong basis in science, address land use and its relationship to natural resources, and support watershed restoration by empowering multiple stakeholders or audiences. Based on these goals, the TAC thought a plan, which provides a scientific approach focused on watershed functions, similar to the Birch Bay Pilot Study, should be the long term end goal. However, it was understood interim steps are needed to reach a data intensive model, such as the Birch Bay Pilot Study. The approach described in Chapter 5: Next Steps outlines the planning process depicted in Figure 1.

2.3. Public Participation

Outreach efforts, including presentations, one-on-one meetings, surveys, and information provided on RCD and County IRWMP websites, were made to garner input and participation from the community at large.

The Instream Flow Assessment and the overall status of the project were presented at two Water Resources Advisory Committee (WRAC) meetings. Drafts of the Instream Flow Assessment and Watershed Snapshots were posted on the County's Integrated Regional Water Management Plan (IWRMP) and the RCDs websites. Members of the WRAC were invited to take a survey that assessed preference related to the Phase 2 approach in a follow-up meeting. Surveys were completed by 14 WRAC participants and helped the project team further develop an approach for Phase 2. Survey results are included in Appendix B.

In addition to meeting with WRAC members, one-on-one meetings were held with municipalities to further improve the project team's understanding of individual needs of municipalities as well as to increase awareness of the project. The majority of cities completed surveys on the municipality's relationship to existing and future watershed management plans and community services districts in the County. The surveys provided perspective on the project audience and their needs.

The RCDs and County's IRWMP websites were used to post basic information about the project as well as draft forms of the watershed snapshots and insteam flow study.

Two 30-day public comment periods are included; one for the Watershed Snapshots and Instream Flow Assessment and a second for the draft final report attached to the Integrated Regional Water Management Plan Update.

2.4. Interactive GIS Website and Information Repository

A new online repository was created to allow easy navigation for users to find watershed data, interactive watershed maps, GIS shapefiles, data resources and all the other features outlined in this county-wide watershed planning project – all in one easy location: www.slowatershedproject.org. This website is user-friendly with easy download features via a Wordpress platform. All documents developed throughout this project are integrated into these primary navigation tabs:

1.) Home- Interactive Map
2.) Introduction
3.) Watersheds

4.) Resources- Additional Assets for Download
5.) Contributors
6.) FAQ
7.) Contact

The www.slowatershedproject.org website also links viewers to various other data sources, including www.SLOdatafinder.org, and SLO Regional GIS Collaborative (SLORGC). SLO DataFinder began as a joint project of Cal Poly's Kennedy Library and the San Luis Obispo County Planning Department with the purpose of facilitating access and information to GIS datasets. The SLO GIS collaborative is being led by the San Luis Obispo Council of Governments (SLOCOG) to coordinate the sharing of GIS data county-wide, across multiple agencies utilizing GIS data and technology. The www.slowatershedproject.org site is unique in it stores datasets that are focused on watersheds and natural resources, which are often difficult datasets to locate. In the future, SLORGC hopes to integrate the natural resource data collected by the RCDs into the activities of the SLORGC, making these data resources readily available to multiple agencies across the region.

The interactive mapping capabilities of the website allows users to interact with the County's watersheds and key information overlays. The RCDs hope to provide watershed level information to resource planners, community members, and regulatory entities facilitating more informed land use planning and land management efforts. By providing links to GIS shapefiles in the resource library, advanced users also are able to download expanded mapping tools enabling them to create custom watershed maps with a variety of compiled county-wide information. As the RCDs have worked hard to compile these varied data sources specific to San Luis Obispo County, we are able to expand our mapping services throughout the County and can provide watershed and sub-watershed maps to community members and other interested parties upon request.

The expanded accessibility to key mapping and data source information provides a solid base for watershed level planning and exploration of compatibilities and relationships with land use planning efforts and land management strategies. Ongoing maintenance, data posting, and updating snapshots is contingent on future funding.

3. Watershed Snapshots

3.1 Introduction

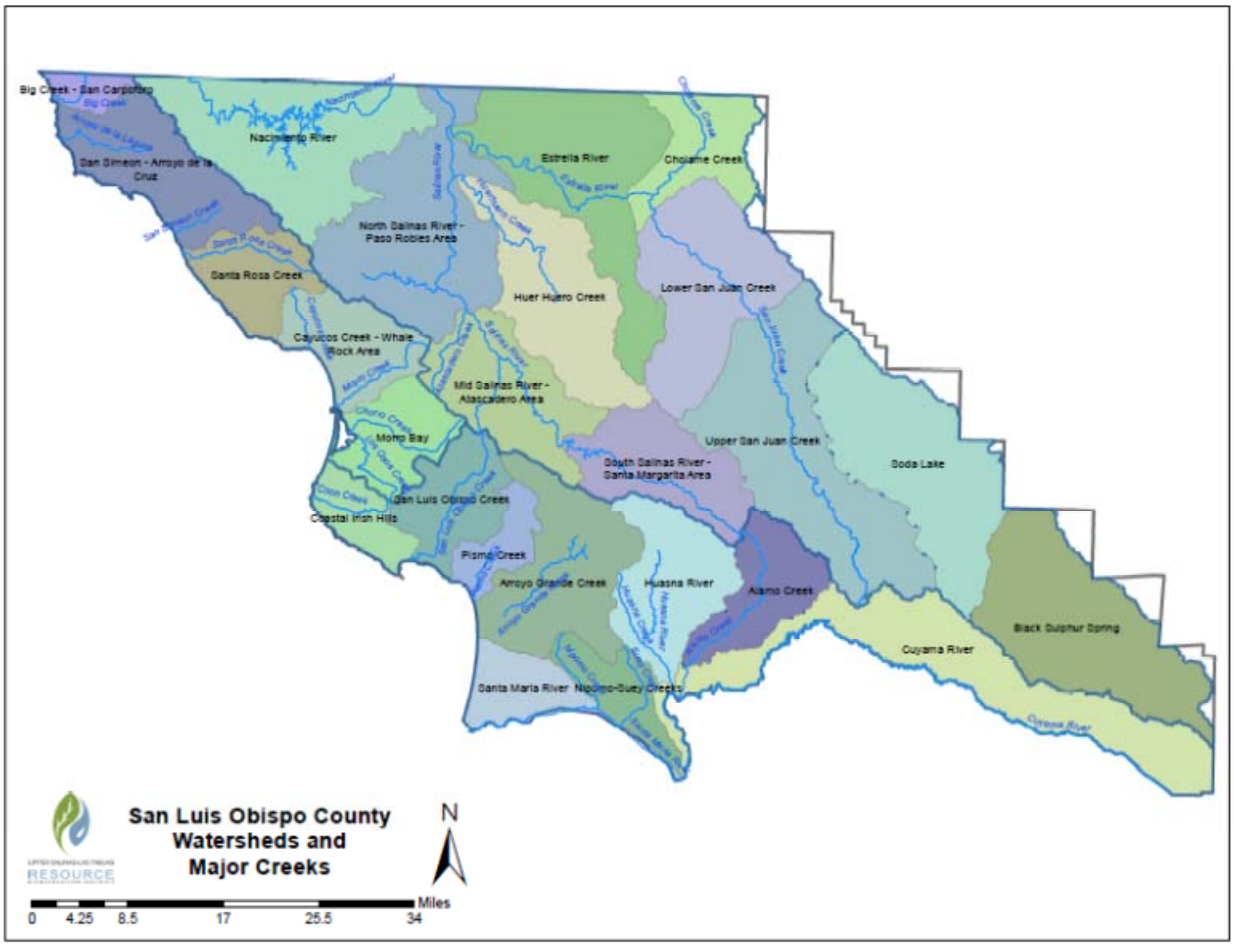
Watersheds in the County are diverse and can be thought of in three primary hydrologic types. There are 1) small coastal watersheds with their headwaters in the coastal ranges running to the Pacific Ocean such as the Santa Rosa Creek Watershed, 2) large watersheds with numerous sub-watersheds that span multiple Counties before meeting the Ocean such as the Salinas River Watershed, and 3) large land-locked basins that primarily drain to an ephemeral lake, rarely reaching the Ocean such as the Soda Lake Watershed.

As mentioned in Chapter 2, watershed and natural resource data is difficult to obtain and/or locate. In SLO County, existing data is not always available for all watersheds nor is it always accessible to the general public. Watershed Snapshots were created as a resource library tool for diverse resource managers to more fully understand the resources in San Luis Obispo County. Watershed specific information could then be used by resource professionals, jurisdictional agencies, and the public to better assess resources and implement projects within a specific region. In addition, the data could be used to navigate through regulatory processes, provide policy guidance, and provide supporting information when pursuing funding opportunities.

3.2 Data Collection Methodology

Watersheds and watershed areas were determined by using the Calwater/USGS Hydrologic Unit 10 scale at the start and then modified to account for local characteristics, variations, underlying geology that could affect management strategies, and areas with which the community strongly identifies. As a result, the County was divided into 25 watershed areas containing a total of 264 sub-watersheds (Figure 2).

FIGURE 2. MAP OF SAN LUIS OBISPO COUNTY WATERSHED AREAS



Twenty five (25) watershed snapshots were developed to characterize the County's watersheds in a quick and easy-to-read way (Appendix C). A list of the watershed areas by sub-region is provided in Figure 3. A template outlining physical, biological, and cultural characteristics of a watershed was used to maintain consistency in data collection and result in information that could be compared between watersheds. This approach emulated the Watershed Characterizations Atlas completed for the Watershed Component of the Bay Area IRWMP.

Each snapshot compiles and organizes baseline data, providing an overview of the watershed and its main characteristics. Additionally, reference links to expanded documents and studies of interest are provided. Having each snapshot organized in the same manner allows for ease of finding information

and comparing and contrasting watersheds throughout the County. Specifically, each snapshot provides an overview of the following categories of information:

- Watershed Description
- Physical Setting
- Hydrology
- Biological Setting
- Land Use
- Demographics
- Water Supply
- Water Use
- Other Unique Characteristics
- Climate Change Considerations
- Watershed Codes
- Major Changes in the Watershed
- Watershed Health by Major Tributary
- Watershed Health by Groundwater Basin
- Primary Issues

Existing data for the Watershed Snapshots was collected in April through September of 2013. Data was pulled from a variety of local and technical sources, including interviews with local experts, scientific professionals, municipalities, water districts, environmental consultants, and community members. The search relied heavily on digital searches for technical documents and published information, including GIS shapefiles and online databases. Other sources included County documents and plans, Watershed Management Plans, Community Service District Documents, Engineering Studies, Biological Assessments, Environmental Impact Reports, Transportation Studies, City Reports and Documents, as well as online databases and resources.

Peer reviews were conducted for the Watershed Snapshots and Data Gaps to ensure information obtained was as accurate and complete as possible. While this was challenging based on the accelerated timeframe of the project, peer reviewers from County staff, Community Service District staff, City staff, Central Coast Regional Water Quality Control Board staff, Caltrans, Althouse and Meade, Central Coast Salmon Enhancement, and the Morro Bay National Estuary Program provided valuable input related to data collection and location of available resources. Efforts were also made to involve the local municipalities and regulatory agencies, not only to gain insights on data available at the community scale, but to gain support and input for Phase 2 of the project.

Each snapshot can be found in Appendix C and on the web at www.slowatershedproject.org along with an interactive map and resource library.

FIGURE 3. WATERSHED AREAS BY SUB-REGION

Watershed Name
North Coast Sub-Region
1. Big Creek – San Carpoforo Watersheds
2. San Simeon-Arroyo de la Cruz Watersheds
3. Santa Rosa Creek Watershed
4. Cayucos Creek- Whale Rock Area Watersheds
5. Morro Bay Watershed
South County Sub-Region
6. Irish Hills Coastal Watersheds
7. San Luis Obispo Creek Watershed
8. Pismo Creek Watershed
9. Arroyo Grande Creek Watershed
10. Santa Maria River Watershed
11. Nipomo-Suey Creeks Watersheds
12. Huasna River Watershed
13. Alamo Creek Watershed
14. Cuyama River Watershed
North County Sub-Region
15. Black Sulphur Spring Watershed
16. Soda Lake Watershed
17. Upper San Juan Creek Watershed
18. Lower San Juan Creek Watershed
19. Upper Salinas-Santa Margarita Area Watersheds
20. Mid Salinas- Atascadero Area Watersheds
21. Lower Salinas-Paso Robles Creek Area Watersheds
22. Huer Huero Creek Watershed
23. Estrella River Watershed
24. Cholame Creek Watershed
25. Nacimiento River Watershed

3.3 Data Limitations and Disclaimers

The purpose of this report is to compile existing data related to individual watersheds throughout the County. No new data was collected and no new analysis was completed for the snapshots with the exception of data collected through the concurrent Instream Flow Assessment. The snapshots represent a collection and compilation of existing data. While data was found for a majority of the fields contained in the snapshots, some of the data has limited applicability and efficacy due to its age, the methodologies used, or the scale at which spatial data was collected. Other data is not readily accessible or does not exist at this time. While every effort was taken to ensure that the information used was as current as possible, many data sources likely exist that were not discovered as part of this exercise. While this compilation is not exhaustive, the watershed snapshots provide a singular location for a variety of information and all sources are cited for reference. The snapshots should continue to be updated with current information as it becomes available to provide for a collaborative and holistic framework for future planning and resource management efforts.

In addition, climate change impacts throughout the central coast region are forecasted to include extended drought cycles and periods of hyper-concentrated precipitation (California Natural Resource Agency, resources.ca.gov). These impacts will require a shift in resource management strategies and updated analysis of watershed conditions and functions accounting for the evolving climactic condition. As we are in the transition to this new climactic paradigm, much of the data compiled for this project was obtained throughout periods of traditional climate modeling. This changing climate regime creates the need to establish new baseline data if future analyses are to provide successful resource management strategies. The RCDs have identified data gaps which take into account a changing climate model and recognize the need for updated information to assist policy planners and resource managers in responding to these new environmental conditions.

4. Data Gap Assessment

In compiling Watershed Snapshots, it was observed that many data gaps exist in each SLO County watershed. Identifying data gaps is an important step toward completing our collective understanding of watershed functions and management opportunities. The data gap analysis also provided a preliminary list of research needs for Phase 2 – Plan Development.

4.1 Data Gap Methodology

Data deficiencies were evaluated through a simple method of reviewing data in each cell of the watershed snapshots and categorizing each as follows: 1) completely missing; 2) partial, outdated or extrapolated data; and 3) if the data set was complete. Data sets were color coded in each snapshot to reflect the appropriate category with complete data represented by a green color, partial data by yellow, and missing data by red. Where data was identified as a partial data set, reasons for such categorization were listed in the data cell. Through this effort, a consolidated chart was created that lists, by watershed, if data was missing, partially available, or complete. Refer to section 4.3 below for results of this base analysis.

4.2 Data Gap Summary of Findings

Through the compilation and basic evaluation of data gaps by category, county-wide and sub-region findings and trends were identified. Key data gap findings are summarized below.

4.2.1 Watershed Management Plans

Watershed management plans provide a community-directed and vetted plan that addresses issues beyond any one agency and empowers individuals to understand their watershed more fully and find solutions. Seventeen (17) out of twenty-five (25) watershed areas do not have a watershed management plan or other broad-scale planning document that describes existing conditions, critical issues, recommended projects and an implementation approach (Figures 4, 5 & 6). There are also 2 watersheds with waterway management plans which tend to focus on flooding issues (San Luis Obispo Creek and Arroyo Grande Creek). In some watersheds there are numerous other studies and plans which describe specific components of the watershed, yet are neither comprehensive in nature nor have adequate community input.

FIGURE 4. MAP OF WATERSHEDS WITH MANAGEMENT PLANS

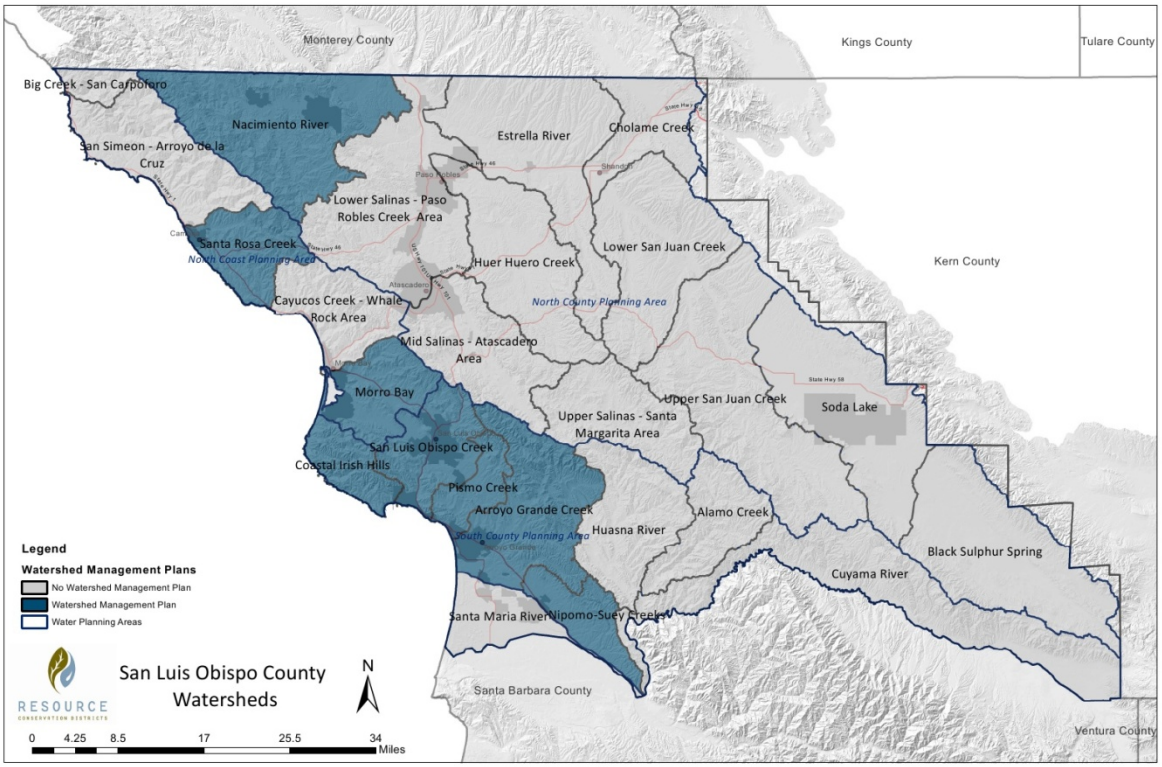


FIGURE 5. WATERSHEDS BY SUB-REGION WITH A WATERSHED MANAGEMENT PLAN

Watershed Name
North Coast Sub-Region
3. Santa Rosa Creek Area Watershed
5. Morro Bay Watershed
South County Sub-Region
6. Irish Hills Coastal Watersheds
7. San Luis Obispo Creek Watershed
8. Pismo Creek Watershed
9. Arroyo Grande Creek Watershed
11. Nipomo Creek Watershed
North County Sub-Region
25. Nacimiento River Watershed

FIGURE 6. WATERSHEDS BY SUB-REGION WITHOUT A WATERSHED MANAGEMENT PLAN

Watershed Name
North Coast Sub-Region
1. Big Creek – San Carpoforo Area Watershed
2. San Simeon - Arroyo de la Cruz Watershed
3. Cayucos Creek – Whale Rock Area Watershed
South County Sub-Region
10. Santa Maria River Valley Watershed
12. Huasna River Watershed
13. Alamo Creek Watershed
14. Cuyama River Watershed
North County Sub-Region
15. Black Sulphur Spring Watershed
16. Soda Lake Watershed
17. Upper San Juan Creek Watershed
18. Lower San Juan Creek Watershed
19. Upper Salinas - Santa Margarita Area Watershed
20. Mid Salinas- Atascadero Area Watershed
21. Lower Salinas – Paso Robles Creek Area
22. Huer Huero Creek Watershed
23. Estrella River Watershed
24. Cholame Creek Watershed

There was a range of content for each of the existing Watershed Management Plans that stemmed from community input, the funding source and the author. For example, many of the watershed management plans in the South County sub-region are steelhead trout focused with funding from the California Department of Fish and Wildlife. The North Coast (Santa Rita Creek) watershed plan, also funded by the California Department of Fish and Wildlife (CDFW), focused on steelhead Trout as well. The North County (Nacimiento River) watershed plan was funded by the Regional Water Quality Control Board and had a greater focus toward water quality and eliminating stressors that degraded water quality.

To strengthen the understanding of local watersheds and provide a consistent base level of information, a minimum set of topics would ideally be vetted and included in all future watershed management plans and plan updates. For example, the County Conservation and Open Space Element lists components to include in watershed management plans. Many State natural resource agencies do not have standards for watershed management plans, allowing their content to be determined by the primary issues facing the watershed and the community.

4.2.2 Overview of Available Data

The County, as a whole, is data rich in geology, land use, demographics, water sources and transportation systems. In some cases, although there was data, the audience for which the data was written was not always for the non-specialist. In these instances, due to staffing limitations, the RCDs did not have the ability to interpret the detailed information in these data sets.

In other cases, although data was present, it was not always available in the form needed for watershed management planning. Some data sets may have been robust and reputable, but insufficient for covering the complexities or diversity within SLO County watersheds. For example, vegetation data collected for different purposes takes different forms. Descriptive and narrative data are useful to identify general types of vegetation present in one watershed versus another, and can provide acknowledgement of special stands that have limited distribution in the County, but cannot be easily used for modeling or quantitative comparison. Spatial data are more objective and quantitative, but one single shapefile is unlikely to be sufficient to answer all questions related to vegetation. In addition, not all areas of the County are covered at the same level of detail in existing datasets.

Overall, the County is data poor in the health of water resources and watershed services. The functions of watersheds are not well captured, limiting the communities understanding of natural resources and their value. For example, if floodplains are identified as an area for limited development due to flood risk, the importance of floodplain function for water cleansing, flood attenuation, groundwater recharge, and wildlife habitat benefits could be provided to the community to increase understanding and knowledge of the multi-benefits of a single watershed attribute.

At the sub-region scale, there are dramatic differences in the level of data tied to locally specific needs, challenges, endangered species, and population sizes. In general, the North County has the least data, the South County has the most data, and the North Coast falls in between. The North County's predominant land use is in large-scale agricultural production, resulting in a vastness of vegetated land and migratory habitat for threatened and endangered species such as Fairy Shrimp, California San Joaquin Kitfox, Giant Kangaroo Rat, Red Legged Frog, Burrowing Owl, and steelhead trout. In contrast to other parts of SLO County, the cities and towns within the North County continue to receive targeted population expansions, adding to greater strain on natural resources and management decisions. The North Coast remains largely undeveloped and provides habitat to a variety of threatened and endangered species, including steelhead trout, and attracts State and Federal funds for study and protection. The South County has a majority of the cities (population centers) in the County, including the City of San Luis Obispo and is the County seat. Similar to the North Coast, South County coastal watersheds provide habitat to a variety of threatened and endangered species, including steelhead trout, and attract State and Federal funds for study and protection similar to the North Coast region.

4.3 Links to Primary Resource Issues

To evaluate the data gaps that could be addressed immediately in or concurrent to Phase 2, a data gap summary chart was used to illustrate links to watershed specific resource issues with the data gaps identified in the individual watershed snapshots. This information will be vetted by the WWG and others in the future to more definitively decide on priorities and may evolve as additional information and studies become available. Each of the links identified represent an area that may affect the communities ability to adequately address resource issues and thus should be evaluated further in future phases.

It should be noted there is wide variability in the extent of resource issues identified and published at a watershed scale and, furthermore, at the County level. Ideally, the primary issues facing each watershed would be vetted through an individual watershed planning process. However, since limited data was collected and existing published information was compiled, the list of issues is likely incomplete, especially in watersheds without a watershed management plan. While this list is not exhaustive, issues were noted for each watershed and linking known data gaps with these issues provides preliminary direction for future efforts towards maintaining resource availability and ecosystem health at a regional and watershed scale.

Watersheds were grouped by County Water Planning Area (WPA) to determine regionally focused priorities. Each summary chart identifies priorities based on a tally of the number of gaps present linked to known watershed issues (Appendix D). Criteria were established to rank data sets from low to high. Due to the limitations of the compiled data, these charts are not meant to remain as a guiding analysis for future efforts beyond Phase 1 of this project unless they are vetted and updated by the community throughout future project phases.

4.3.2 Regional Prioritization Summary

In each sub-region, data sets were evaluated as follows, LOW priority data sets are defined as having less than 10 links to critical issues, MEDIUM having 10-19, and HIGH having 20 or more links to critical issues throughout the WPA (Figure 7).

FIGURE 7. DATA GAP RANKING BY LINKAGE TO SUB-REGIONAL PRIMARY ISSUES

Priority	Criteria
Low	<10
Medium	10-19
High	>20

In the North Coast sub-region, primary issues are linked to the following snapshot data gaps: stream gages, hydrology models, peak flow, base flow, vegetation cover identification, invasive species identification, special status species, stream habitat inventory, land use patterns correlated with vegetation loss, key groundwater percolation areas, water budgets, climate change impacts, tributary health, surface water quality, and groundwater basin health. Data gap priorities in this sub-region could focus on climate change impacts, tributary health, and water quality which are linked to the listed issues in a majority of the watersheds.

In the North County sub-region, primary issues are linked to the following snapshot data gaps: microclimate data, stream gages, hydrology models, peak flow, base flow, flood risk identification, invasive species identification, special status species, key groundwater percolation areas, water budgets, climate change impacts, tributary health, surface water quality, and groundwater basin health. Data gap priorities in this sub-region could focus on climate change impacts, tributary health, and groundwater basin health which are linked to the listed issues in a majority of the watersheds.

In the South County sub-region, primary issues are linked to the following snapshot data gaps: stream gages, peak flow, base flow, flood risk identification, vegetation cover identification, invasive species identification, special status species, stream habitat inventory, potential growth areas, water management entities, water sources, key groundwater percolation areas, water budgets, watershed history, climate change impacts, tributary health, surface water quality, and groundwater basin health. Data gap priorities in this sub-region could focus on base flows, tributary health and surface water quality which are linked to the listed issues in a majority of the watersheds.

4.3.3 Countywide Prioritization Summary

The same data gaps were then rated on a county-wide scale and given a priority ranking based on the number of times they were linked to community vetted primary issues. High priority data gaps linked 40 or more times to issues, medium priority data gaps linked between 20 – 39 times, and low priority data gaps linked less than 20 times (Figure 8). Data gap links to primary issues common across the entire County include stream gages, peak flow, base flow, invasive species identification, special status species, key groundwater percolation areas, water budgets, climate change impacts, tributary health, surface water quality, and groundwater basin health. Figure 9 illustrates these priorities for the entire County.

FIGURE 8. DATA GAPS RANKING BY LINKAGE TO COUNTY-WIDE PRIMARY ISSUES

Priority	Criteria
Low	<20
Medium	20-39
High	>40

At the County scale, links between primary issues and data gaps were most frequent for the following data gaps: base flow, groundwater percolation areas, climate change, tributary health, surface water quality and groundwater basin health (Figure 9).

FIGURE 9. LEVEL OF PRIORITY FOR COUNTYWIDE DATA GAPS TO FILL IN NEAR TERM

Data Gap	**High**	Medium	Low
Watershed Management Plan			X
Microclimate Data			X
Geology			X
Stream Gage		X	
Hydrology Models			X
Peak Flow		X	
Base Flow	**X**		
Flood Risk Identification and Assessment			X
Vegetation Cover Identification		X	
Invasive Species Identification and Assessment			X
Special Status Wildlife / Steelhead Trout Habitat Analysis		X	
Stream Habitat Inventory			X
Fish Passage Barriers			X
Land Use			X
Potential Growth Areas			X
Other needed land use information			X
Demographic Data			X
Water Management Entities			X
Water Sources			X
Key Groundwater Percolation Areas	**X**		
Water Budget		X	
Beneficial Water Uses			X
Watershed History/Major Changes			X
Climate Change Impact Analysis	**X**		
Tributary Health Analysis	**X**		
Surface Water Quality	**X**		
Groundwater Basin Health Analysis	**X**		

If a primary issue was not identified by the team or the community, it did not show up in the snapshots or the list above. This creates limitations to the prioritization approach for closing data gaps. In an effort to improve on this, the project team considered urgent county-wide natural resource issues that would have extensive impacts on the quality of life to County residents. With this in mind, water quantity arose as the top data gap priority for attention prior or concurrently to Phase 2 – Plan Development. The

availability of water not only has direct impacts on the County's population but has further impacts associated with water quality, ecosystem vigor, climate resiliency, and economic vitality through implications to agricultural viability and county-wide tourist draw. Related data gaps might include key groundwater percolation areas, climate change impacts, tributary health analysis, hydrology modeling, stream gage information, and enhanced water budget analyses depending on unique localized characteristics. Focusing on a complete integrated analysis will heighten the ability to enact policies and management strategies that directly improve water availability. Depending on localized conditions, low and/or medium data gaps may relate to and strengthen top priority goals and thus, future efforts should take into account correlations between priority data gaps and moderate or low priority data gaps.

Resource specialists with whom the RCDs consulted with have identified a secondary priority as protecting and enhancing the natural resources important to the community and quality of life. Improving our natural resources not only enhances the environmental health of the watershed but has further implications in advanced watershed services such as water quality and water availability. Data gaps associated with this goal would include improving the understanding of the biological communities within a watershed and the impacts imposed due to changes in land use policy or resource management strategies. In addition, increased knowledge and understanding about resource impacts related to climate change scenarios would provide guidance for future management strategies and forecasted watershed health conditions aimed at increasing resiliency to water quality and levels throughout each region. This could lead to a more accurate depiction of the condition or health of our watersheds and allow for implementation of policies and projects directly related to maintaining valued watershed resources. Lower priority data gaps include vegetation and wildlife assessments which can provide key indicators of overall watershed health and are correlated with other water resources including water quality and water quantity.

4.5 Findings

The following items highlight the trends and patterns- discussed above and as expressed in the watershed snapshots. While many conclusions and connections can be drawn from the data gap assessment, the RCDs have focused on the following as guidance for Phase 2 – Plan Development and future watershed efforts.

- Access to natural resource information is very time consuming and requires collecting information from numerous entities.
- Lack of information on the status or health of watersheds and watershed services

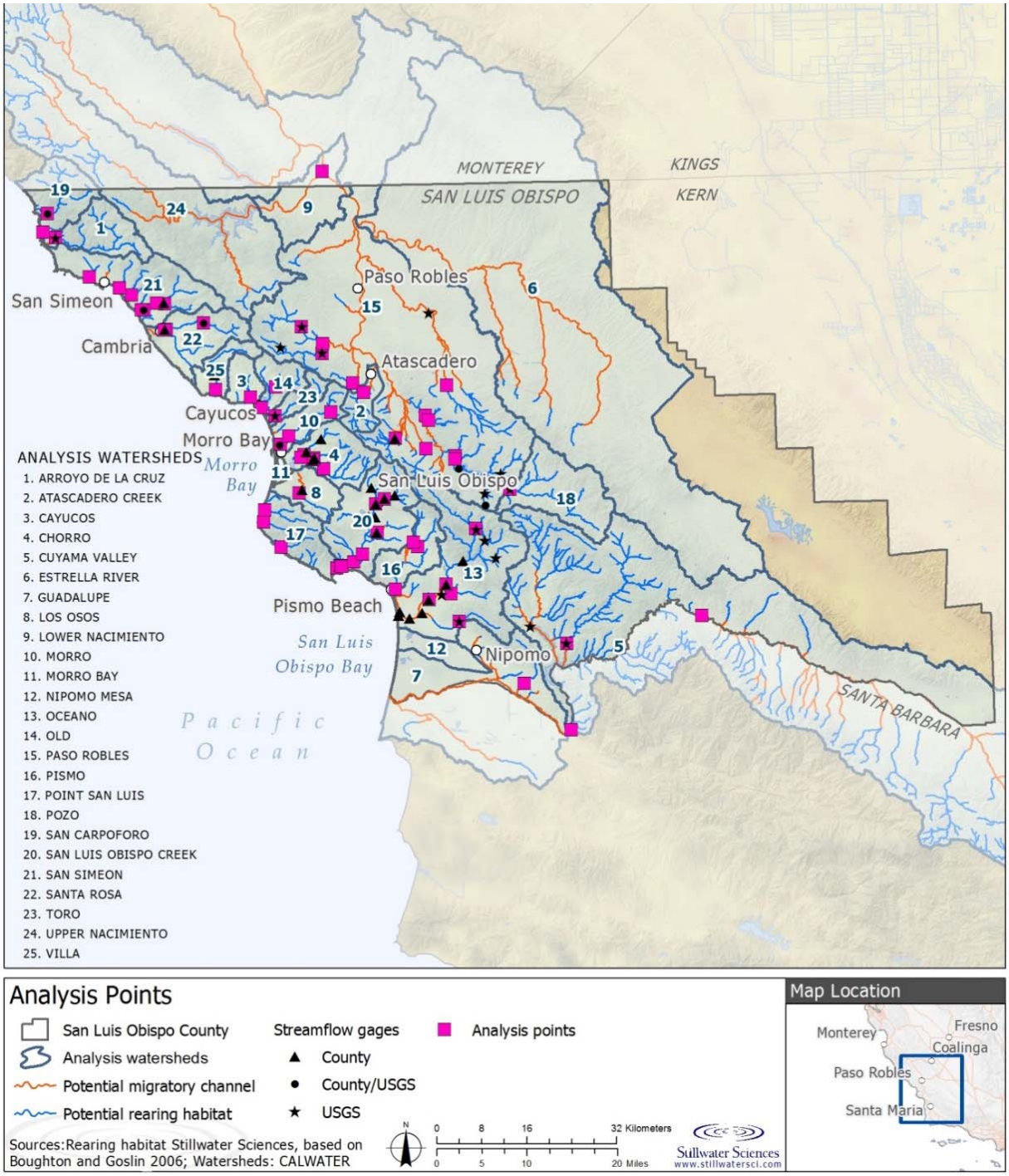
- Coastal watersheds with higher populations tended to have the most information while inland areas and those with lower populations had less information.
- Existing data often does not account for changes in future climate.
- County-wide vegetation data is limited due to a lack of detailed spatial data for many areas. Future support to alliance level mapping would improve planning data related to both rare and common wildlife habitat. Up to date, field-verified maps of riparian canopy and wetland habitats at an appropriate level of detail for all watersheds would assist in planning management actions that affect or are affected by condition of riparian and aquatic vegetation.
- Groundwater infiltration area data is limited and groundwater basins can span multiple watersheds requiring a broad perspective to influence groundwater recharge.
- Consultants should be actively engaged in data collection efforts as they can have more information than the County or other municipalities in specific subject areas.
- Survey information garnered throughout this project indicate that a future county-wide watershed plan be designed by sub-region to better address regional watershed issues.
- Priority data gaps for inclusion in Phase 2 include stream gages, peak flow, base flow, invasive species identification, special status species, key groundwater percolation areas, water budgets, climate change impacts, tributary health, surface water quality, and groundwater basin health.

4.6 Studies to Fill Data Gaps

4.6.1 San Luis Obispo County Instream Flow Assessment

Stillwater Sciences was hired as part of this project to complete a countywide insteam flow study to provide an estimate of the magnitude and timing of instream flows at Analysis Points that would support steelhead trout in San Luis Obispo County creeks (Figure 10). The report was undertaken to address the environmental water demand recommendation in the San Luis Obispo County Master Water Report and is provide in Appendix E. Due to the large number of locations for which Environmental Water Demand is estimated throughout the County, an interactive web-based map was developed, and is available at: http://geo.stillwatersci.com/maps/slo_rifa/instreamflowassessment.html

FIGURE 10. MAP OF INSTREAM FLOW ANALYSIS POINTS AND STREAM FLOW GAGES



The Instream Flow Assessment recommended the following based on the completed analysis:

- Broaden the definition of EWD to consider additional natural resources, especially in the County's 26 coastal lagoons where tidewater goby occur.
- Analyze current streamflow conditions compared with historical streamflow conditions, with consideration for water year type (i.e., wet, normal, or dry) and EWD. This would include the compilation and maintenance of daily mean discharge data for current County stream gaging stations.
- Monitor streamflows in all 25 Analysis Watersheds during spring and summer to determine which streams are exceeding EWD estimates and which are not. Monitoring could include establishment of additional gages, or periodic direct measurements of streamflow during spring and summer.
- Determine if Analysis Watersheds not achieving predicted EWD are mischaracterized in the NOAA analysis as having a high potential to support rearing steelhead, or if other factors are causing flow reductions. Results could be used by resource managers to inform the prioritization of streams for protection, habitat restoration, and/or streamflow enhancement.
- Conduct intensive and more accurate estimates of Steelhead habitat relationships with instream flows within those watersheds with high steelhead rearing potential and water management implications.

4.6.2 Groundwater Basin Percolation Areas for the Paso Robles and Edna Valley Basins

Stillwater Science is expected to complete a review of two priority groundwater basins, Paso Robles and Edna Valley, and provide priority percolation area to target future infiltration efforts. The report will be added to this document as Appendix F.

5. Conclusion

Watersheds define communities through resources, values, aesthetics, and more. Development of a watershed plan is an iterative process involving chemical, physical, biological, and societal issues. Watershed planning is an ongoing exercise in making connections towards healthier and more resilient communities. The process and conclusions described in this report represent the first in many steps towards a SLO County Watersheds Management Program. Through the compilation of data at a County-wide scale, resource professionals, community members and local agencies will better understand the relationship between the natural environment and anthropogenic impacts, allowing for more informed land and resource management decisions. In addition, compiling data at a watershed scale starts to inform trends and correlations throughout county regions that, in time, may provide a basis for further focused analysis and implementation of management strategies unique to the environments they serve.

The following sections provide an outline of next steps proposed to build on these foundational efforts.

5.1 Next Steps – Building Resilient Watersheds

Returning to the vision of the WWG and TAC, moving forward SLO County and the RCDs are working to engage the community to steward watershed resources for present and future generations. Stewardship relates to a responsibility or duty to safeguard valuable resources shared by the larger community and assumes an understanding of the resources to be protected as well as the implications of decisions related to such resources.

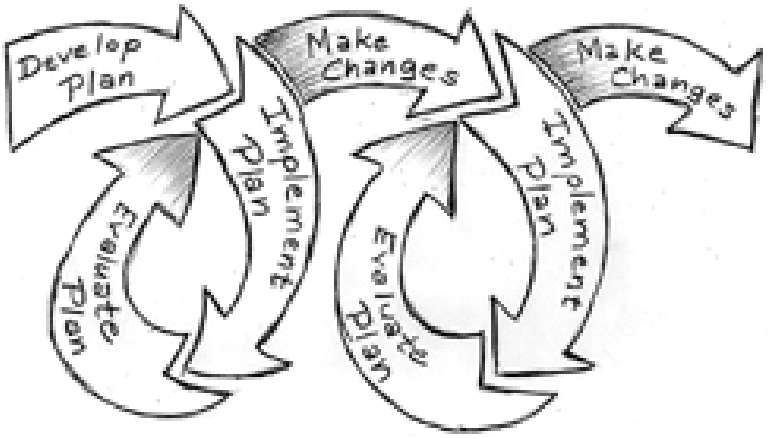
At the State level, the California Water Plan recognizes the importance of a watershed approach to land and resource management, identifying a number of policy and strategic practice recommendations. Policy recommendations focus on improving tracking, reporting, assessing, and sharing in relation to watershed changes and conditions. Strategic practice recommendations focus on improving the integration of watershed functions into project and program planning. Maintaining consistency with the California Water Plan will further support additional funds directed toward this effort.

One of the key findings of this project was a lack of information on watershed functions and their status or health. Healthy grassland, woodland, and wetland systems provide a host of watershed services, including water purification, ground water and surface flow regulation, erosion control, and streambank stabilization. The importance of these watershed services will only increase as water becomes an ever more critical issue. By working toward a healthy, resilient watershed ecosystem, we are ensuring the

availability of valued resources including water quality, water quantity, agricultural viability, and an environment rich in scenic and recreational opportunities. The financial value of these services becomes particularly apparent when the costs of protecting an ecosystem for improved water quality or quantity are compared with investments in new or improved infrastructure, such as purification plants and flood control structures. In many cases it is often cheaper and more efficient to invest in ecosystem management and protection than rely on external support of those resources. The U.S. Forest Service has several publications on this subject available at:
http://www.fs.fed.us/ecosystemservices/watershed.shtml

These services should be kept in the forefront of the minds of land and water managers. To encourage these considerations, it is important to be conscious of how natural resources are described, the connections made between cause and effect, the challenges, and the resources immortalized in maps and planning documents. The natural environment presents an ever changing resource and thus, any process focused on maintaining and enhancing watershed services should be iterative in nature as described in Figure 11 below.

FIGURE 11. ITERATIVE PLAN PROCESS



Source: EPA http://water.epa.gov/polwaste/nps/images/process.jpg

5.1.1 Plan Approach

The SLO County Watershed Management Plan will provide indicators of watershed health and risk that can be used by the community to collaboratively develop action steps and priorities related to watershed restoration and climate adaption efforts. The Plan will also increase knowledge and value of ecosystem services and watersheds in the community, strengthen the competitiveness of watershed restoration projects when competing at the County level for funding, and prepare our communities for climate change impacts. Figure 14 outlines steps in the process.

The proposed approach takes into consideration that water supply issues throughout the County are a high priority, that the largest community support would be gained by improving the understanding of threats to natural resources, and that a successful long-term strategy will need to be iterative in nature. Outcomes of Phase 2 could include active community engagement, metric and indicator identification, and detailed assessments in focus watersheds or resources.

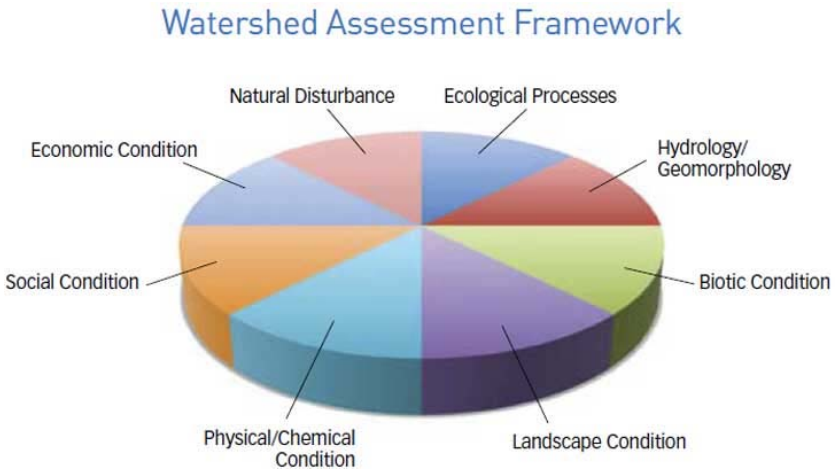
Based on the data gap assessment and compilation of known watershed information, goals for Phase 2 are to answer the following questions:

1. What is the condition or health of each of our watersheds?
2. Which natural resources are threatened?
3. What are the community defined action items based on watershed condition and potential risks?

The Watershed Snapshots provided an “apples to apples” characterization of our watersheds without fully describing their health or placing a value on their functions or services. One of the underlying goals of any watershed management plan is to assess watershed conditions, preferably at the smallest management unit. The results of the assessment are then addressed by management activities tailored to different categories or conditions. Indicators can be used to illustrate status and trends for a variety of attributes of different systems. They help further the understanding of system condition and can inform decisions affecting management and restoration of valued attributes and processes. To be effective, indicators are usually organized into structures that help users clearly understand their meaning. For example, water characteristics such as temperature, dissolved oxygen (DO), pH, and concentrations of suspended sediments are not necessarily intuitively-understood by a non-technical audience but can be combined into a more user-friendly index of water quality to help regulators and the public understand water quality status and trends and whether there might be a need for particular regulations or investments in infrastructure. (Sacramento River Watershed Program, viewed 01-2014). One example of a system to organize indicators is called the Watershed Assessment Framework (WAF) Figure 12, which was adopted in 2007, by the state of California as part of a strategy to inform and guide watershed management. WAF is based upon the US Environmental Protection Agency’s (USEPA) Science Advisory Board’s (SAB) approach (SAB, Young and Sanzone, 2002). Indicators and metrics were

used in most of the plans reviewed in Phase 1; however, the detail varied widely. The two key features of metric selection are data availability and representativeness.

FIGURE 12. CA WATERSHED ASSESSMENT FRAMEWORK SHOWING ESSENTIAL WATERSHED ATTRIBUTES



Source: Sacramento River Watershed Program, http://www.sacriver.org/files/images/reportcard/section1_3_framework_724.jpg

Indicators and metrics will be reviewed at the sub-region scale to ensure these criteria are met. "Indicator" is the term used to show what conditions are. "Metric" is the term used to measure the influence of a factor in the conditions of a watershed.

Possible indicators and metrics will be vetted through a sub-regional stakeholder process and may include:

- Vulnerability to Development
- Acres of Wetlands
- Groundwater Recharge Rates
- Water Quality
- Source Water Protection
- Wildlife Habitat Conditions

5.1.2 Focus Areas

Information and conditions for some watershed functions like groundwater recharge is very limited. During Phase 2, the RCDs, in conjunction with the Watershed Working Group and Technical Advisory Committee, will identify focus areas for which established metrics and pilot studies will be tested. This

will allow for increased effectiveness in the process and ease in expanding the analysis to similar regional watersheds.

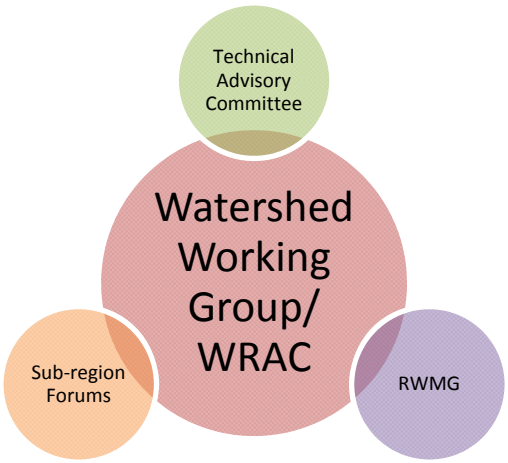
Focus areas will be chosen by the Watershed Working Group to garner community support for these efforts. Over time, every effort will result in one watershed or resource of interest from each sub-region to allow similarities and differences to be highlighted throughout the process and will ultimately provide for greater county-wide consistency by aligning processes and strategies where similarities exist.

Techniques for increasing the understanding of watershed conditions will depend on the final set of focus areas. Example techniques that could be replicated across the County include green infrastructure mapping, climate resiliency and adaption scenarios/plans, alliance level vegetation mapping, water budget development, Nature Serve Vista demonstration project, and others. To some degree, funding will affect which techniques are feasible.

5.1.3 Community Engagement

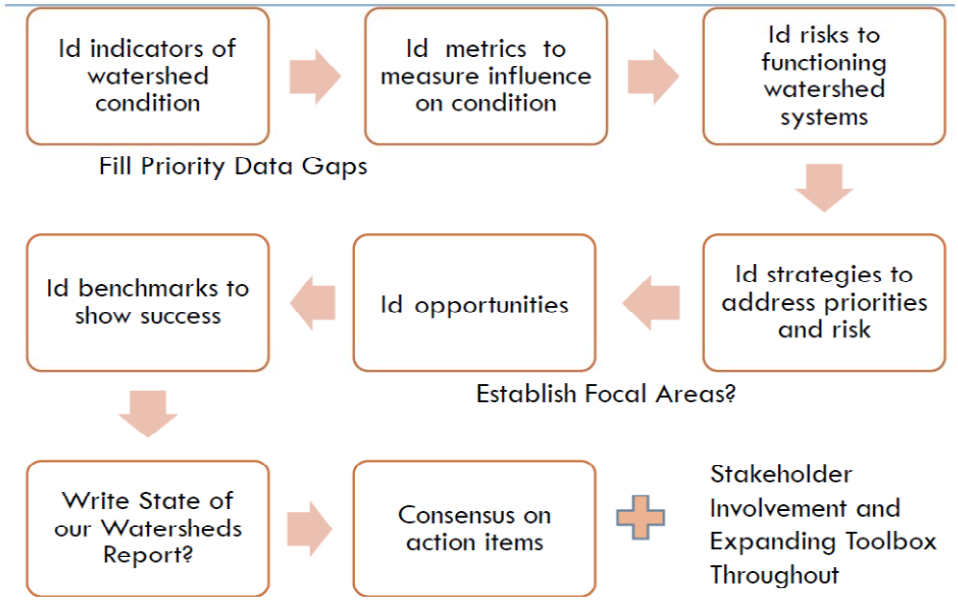
The County has three sub-regions that are used for IRWMP planning and are strongly supported by the community as a tailored approach to issue definition and solution identification. The proposed method continues to use the Watershed Working Group as the primary stakeholder guide to Phase 2, but would also emphasize sub-regional groups that would communicate unique needs and visions with the overarching Watershed Working Group (Figure 13). This approach to stakeholder involvement would encourage connectivity throughout the County where appropriate and open communication on differences between sub-regions. It would also ensure movement as a community rather than as individuals.

FIGURE 13. PUBLIC PARTICIPATION FRAMEWORK



In addition to this stakeholder structure, the RCDs will host a series of watershed forums to increase public awareness and participation with potential solutions. These forums will facilitate cooperation between local government, non-profit and citizen groups, and business helping each group play effective roles in watershed management and become stewards of their local environments. The forums will enable groups to develop common goals by giving them a knowledge base to help understand each others' points of view and communicate more effectively.

FIGURE 14. STEPS TO FINAL PLAN DEVELOPMENT

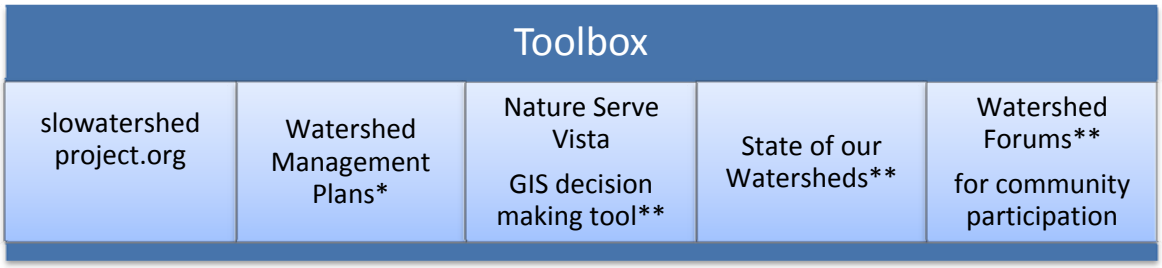


This stakeholder driven process will result in a baseline description of watershed health across the County in a State of the Watersheds Report. The Report would describe findings in a way that would support community discussion, decision making, and potentially lead to prioritized county-wide efforts.

Some organizations in California have translated watershed conditions into regional watershed-scale report cards based on the WAF include: SRWP; Los Angeles San Gabriel Rivers Watershed Council; Napa County; Sierra Nevada Alliance; UC Davis; Sonoma Ecology Center; Napa County Resource Conservation District; University of California, Los Angeles; University of Southern California; San Francisco Estuary Project; San Francisco Estuary Institute; The Bay Institute; and the California Department of Water Resources (DWR). (Sacramento River Watershed Program, viewed 01-2014) A watershed report card approach should only be used if it is heavily vetted by the community.

Watershed management relies on many different tools to address community goals. Figure 15 shows a possible toolbox for our County that will be expanded over time.

FIGURE 15. WATERSHED TOOLBOX.



* Tool is only available in portions of the County.

** Tools are not available at this time

5.1.3 Future Funding

Funding the next steps of the planning process will take several years. Federal and state funding sources tend to favor on-the-ground implementation projects over planning and monitoring. With this in mind, the County Watershed Management Plan, Phase 2 and its components may need to be split up or re-packaged in order to result in a forward momentum. Additional time will be dedicated to refine a scope of work and budget that may be transferable and scalable.

Several means of funding will be considered including federal and state grants, private foundations, partnership development and local government.

Some examples of planning grants include:

- Integrated Regional Water Management Plan, Round 3, if funds are remaining after the 2014 Drought solicitation (Department of Water Resources)
- Climate Ready Program, if new planning funds become available after 2014 (State Coastal Conservancy)
- Sustainable Communities Planning Grant and Incentives Program, if new funding become available after 2014 (Strategic Growth Council)

Each year grant programs may change the project types, eligibility requirements or a number of other components necessary for strong project planning. For example, the planning grants listed above are unlikely candidates for future planning funding in 2014, however a year ago the grant programs looked very promising, and next year funding may become available again. There are also numerous implementation grant programs. These grants are often competitive and require a close nexus between the grant program and the proposed project.

Some examples of private foundations include:

- San Luis Obispo Community Foundation
- Lindberg Foundation
- Packard Foundation
- Kresge Foundation

Other funding strategies could include strengthening partnerships between organizations with shared goals and needs, and partnering with research driven programs like those through the Environmental Protection Agency (EPA) and U.S. Geologic Survey (USGS) to produce science driven research on local issues.

The identification of feasible indicators of watershed health is a critical step that would guide future data collection, data gap closure and setting priorities. Without identifying watershed indicators, we will be no closer to prioritizing important natural resource and climate adaption projects, and therefore it is recommended that local funding be secured, perhaps from the Board of Supervisors, to identify feasible indicators of watershed health. Partnerships, grants and foundations should be pursued primarily to close data gaps that will support strengthening indicators and implementing projects prioritized by the community.

References

Boughton, DA, and M.Goslin. Potential steelhead over-summering habitat in the south-central / southern California coast recovery domain: maps based on the envelope method. 2006

California Natural Resource Agency. www.resources.ca.gov. Accessed January 2014

Environmental Protection Agency. Water: What is a Watershed. Available at: http://water.epa.gov/type/watersheds/. 2014

Sacramento River Watershed Program. www.sacriver.org. Accessed January 2014.

Young, Terry and Stephanie Sanzone. A Framework for Assessing and Reporting on Ecological Condition: An SAB Report. EPA Science Advisory Board. June 2002.

* *Individual snapshot resources are listed after each snapshot section*