San Luis Obispo County Stormwater Resource Plan

Item 4.8 Public Draft

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Contents

CHAPTER 1. EXISTING CONDITIONS IN SAN LUIS OBISPO COUNTY

1.1 INTRODUCTION

The main goals of this San Luis Obispo County Functionally Equivalent Stormwater Resource Plan (henceforth in this document, the "SWRP") are to identify and prioritize stormwater and dry weather runoff capture projects in the County through detailed analyses of watershed conditions and processes, surface and groundwater resources, and the multiple benefits that can be achieved through stormwater-related capital projects and other programmatic actions. The form and content of this SWRP are guided by the State Water Board Guidelines for Storm Water Resource Plans (California State Water Board 2015; henceforth, the "*Guidelines*"), which in turn were developed to implement Senate Bill 985 (SB-985) with respect to stormwater resource planning. These requirements went into effect January 1, 2015, and requires a city, County, or special district to develop a stormwater resource plan as a precondition of receiving voter-approved bond funds for stormwater and dry-weather runoff capture projects. This SWRP is designed to meet those requirements on behalf of the cities and other public agencies and their partners within the County, while also providing a concise body of information on the County's watersheds and water resources that should serve a variety of additional purposes in the years ahead.

1.1.1 Purpose and Scope

The overarching purpose of this SWRP is to develop strategies to best manage the potential risks and opportunities presented by stormwater runoff within San Luis Obispo County. The County is over 3,600 square miles in area, and (with minor adjustments described below) the descriptions and analyses of the contributing watershed areas and receiving waters are comprehensively addressed throughout this area. A major focus of this SWRP, as with most others that have been prepared to date, is on those resources most directly affected by urban stormwater runoff, and on those areas where capital projects or other programmatic measures are most likely to reduce the impacts, and enhance the benefits, of urban runoff. However, most of the receiving waters of the County lie upstream of, or are otherwise wholly unaffected by, stormwater discharges from urban areas. Thus, the scope of this SWRP includes those areas and conditions that deliver water into urban areas that is then incorporated into the storm drain system, and so becomes part of the volume of stormwater that must be managed. The scope also includes those areas where new approaches for managing surface runoff from any and all land uses can provide opportunities for enhancing surface and subsurface water resources, including the aquatic ecosystems that depend upon them, throughout the County

In the spirit of the *Guidelines*, the approach being used for this Resource Plan affirms that "The watershed approach is essential to integrate stormwater management with other basic aspects of aquatic resource protection and overall water management including flood control, water supply, and habitat conservation" (*Guidelines*, p. 13). Thus, this SWRP considers conditions and processes in the region from a watershed perspective.

But what does it mean to develop a "watershed-based stormwater management plan," particularly where most of the watershed is not, in fact, "urban"? For this plan, it means recognizing that the entire aquatic system downstream (and, for groundwater, downgradient) of the urban area, regardless of how far beyond the jurisdictional boundaries it extends, is influenced by flows and pollutants generated from the urban areas. It means that urban areas and their stormwater systems receive runoff, and whatever sediment and pollutants it may be carrying, from areas upstream—commonly beyond jurisdictional boundaries but influential and potentially problematic nonetheless. And it means that "management" of these diverse influences must acknowledge and address these watershed-scale factors, albeit through actions and facilities limited to only a small fraction of the watershed as a whole.

1.1.2 Elements of the SWRP

This SWRP is organized to follow the sequence of presentation followed by prior such plans, and as reflected in the G*uidelines*:

Chapter 1. Existing Conditions in San Luis Obispo County (this chapter): introduces the purpose and scope of the SWRP, and presents descriptions of the watershed and receiving waters of the County, organized into 9 "Watershed Groups" separated by surface-water drainage divides.

Chapter 2. Coordination and Collaboration in Plan Development: describes the agency and other stakeholder involvement in the development of this plan.

Chapter 3. Types and Locations of Priority Projects: describes the foundation for how this plan identifies the stormwater management needs of the County and the types of Stormwater Control Measures available to address them.

Chapter 4. Screening, Scoring, and Prioritizing of Stormwater Control Measures: summarizes the development and application of quantitative and non-quantified metrics to evaluate specific proposed projects, and to identify areas where future, as-yet unidentified projects could prove both valuable and feasible.

Chapter 5. Plan Implementation: describes the process(es) by which the recommendations of this plan will be implemented, reevaluated, and updated as new information is developed and new opportunities are identified.

1.1.3 Previous Studies and Plans

Given a long history of prior study of the watershed, prior sources have been widely utilized in the preparation of this SWRP. A list of the primary references and data sources is provided as Appendix 1-A to this plan. The reports are organized by geographical scope, from most broad to most site-specific; the data by its primary "Benefit Type" (as defined by the *Guidelines*). One such report, the 2014 San Luis Obispo Integrated Regional Water Management Plan (henceforth, the "SLO IRWMP"), has proven to be particularly useful in compiling basic information about the water resources of San Luis Obispo County, and so much of that information is summarized and/or referenced in the following section ("Planning Area") without modification.

1.2 PLANNING AREA

1.2.1 Watershed Setting and Boundaries

San Luis Obispo County lies in the middle of California's Central Coast, with natural physiographic boundaries along all but its northern edge. The Pacific Ocean and the Santa Maria River form its western and southern boundaries, respectively; to the east, the low mountains of the Temblor Range separate the coastal-draining watersheds of the County from those flowing into the Central Valley, a boundary that is closely (but not perfectly) followed by the County line. Only the straight northern east–west boundary with Monterey County truncates the topography, resulting in some local disparities with the natural flow of water.

The area of data compilation and analysis for this SWRP encompasses the near-entirety of the County, with only a few minor divergences. Our "area of analysis" (AOA) follows the natural drainage divide along the eastern edge of the County, where the stair-step boundary with adjacent Kern County only approximates the natural watershed divide, and so it locally falls a few miles inside or outside of that boundary. The AOA includes some additional tributary area into Cholame Creek, the Estrella River, and the Salinas River from neighboring Monterey County to the north, where the tributary area is more logically included in the more southerly watershed area contributing to these rivers.

Prior water-related planning efforts in the County have developed a range of watershed-area groupings. At the most granular level, the County has identified 25 watershed areas through the SLO County Watershed Project (http://slowatershedproject.org/watersheds/), which range in size from 20 square miles (Big Creek - San Carpoforo, at the extreme northwest corner of the County) to more than 250 square miles (Upper San Juan Creek, in the east-central part of the County). All boundaries are based on natural watershed divides, with sizes that correspond to either the "Super Planning Watershed" or "Hydrologic Sub-Area" under the CalWater methodology (see the *Guidelines*, p. 18).

The SLO IRWMP (San Luis Obispo County 2014) consolidated a number of the 25 Watershed Project "watersheds" and subdivided several others, yielding a final total of 16 areas that they termed "Water Planning Areas" and were defined with an explicit focus on water demand and water supply needs. The IRWMP noted that the boundaries of these two alternative delineations do not necessarily coincide, reflecting the political and geographic locations used in defining the Water Planning Areas versus the strict hydrogeologic boundaries of the watersheds.

As part of the development of this SWRP, stakeholders were engaged to develop a consistent spatial framework in which to conduct the description and analyses of the plan. The final delineation identified nine watershed-based areas, originally termed "Technical Advisory Committee [TAC] Areas for Stormwater Resource Planning Efforts." For conciseness, these will be termed "Watershed Groups" (or "WGs") in this SWRP. They each include one to five of the 25 Watershed Project watersheds, and the resulting WGs range in size from 83 square miles (San Luis Obispo Creek) to 823 square miles (Salinas River). Over two-thirds of the County's population, and four of its six NPDES Phase II municipal permittees, are found in the 5 coastal WGs that collectively cover about one-quarter of the County's land area.

The boundaries of the WGs were selected to (1) follow strict hydrologic boundaries, (2) align with previously identified watershed areas in County planning documents, and (3) group areas of similar physiographic and land-use characteristics. Obviously, there is no true homogeneity over even small areas in a landscape as diverse as that of the Central Coast, but these groupings have proven useful in organizing stakeholder input through the TAC, and they also offer a manageable framework for describing the watersheds of the County. Note that because the IRWMP Water Planning Areas did not fully align with the County's originally defined 25 watersheds, they also do not fully align with these nine WGs.

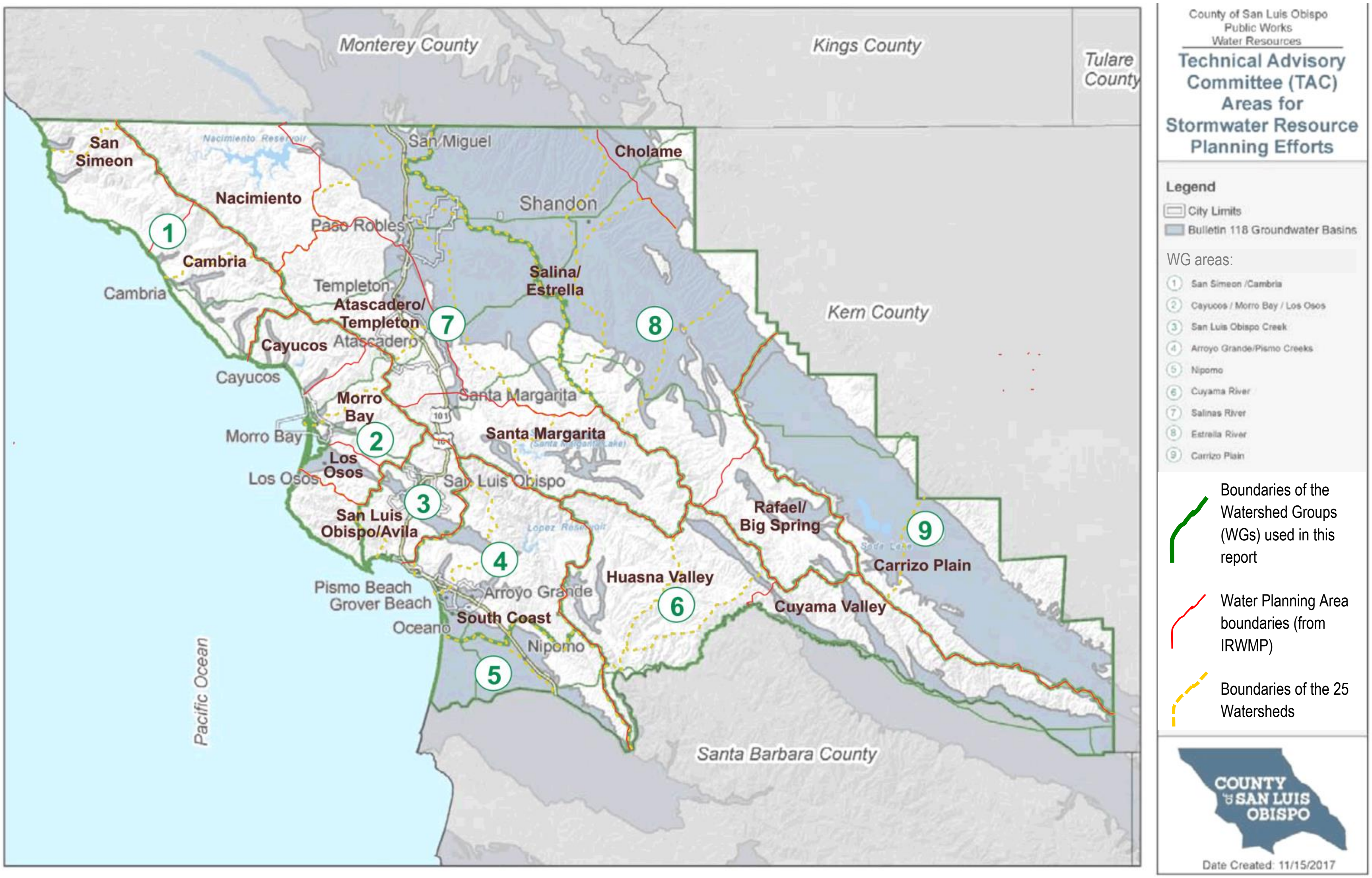


Figure 1-1. Map of San Luis Obispo County, showing the spatial relationships between watersheds (as defined by the SLO County Watershed Project), WGs used in this plan, and IRWMP Water Planning Areas. Base map from San Luis Obispo County.

Table 1-1. List of watersheds (from the SLO County Watershed Project), Watershed Groups used in this plan, and IRWMP Water Planning Areas.

Watershed Name[1]	Planning Area	Area (sq mi)	Watershed Group (WG)		IRWMP Water Planning Area		URL (all addresses preceded by http://slowatershedproject.org)
Big Creek - San Carpoforo	North Coast	20.3	1	San Simeon/Cambria	1	San Simeon	/watersheds/big-creek/
San Simeon - Arroyo de la Cruz	North Coast	128.8	1	San Simeon/Cambria	1 & 2	San Simeon & Cambria	/watersheds/san-simeon-arroyo-de-la-cruz/
Santa Rosa Creek	North Coast	73.4	1	San Simeon/Cambria	2	Cambria	/watersheds/santa-rosa-creek/
Cayucos Creek - Whale Rock Area	North Coast	85.9	2	Cayucos/Los Osos	3 & 4	Cayucos and Morro Bay	/watersheds/cayucos-creek/
Morro Bay	North Coast	75.6	2	Cayucos/Los Osos	4 & 5	Morro Bay and Los Osos	/watersheds/morro-bay/
Coastal Irish Hills	South County	46.0	2	Cayucos/Los Osos	6	SLO/Avila	/watersheds/coastal-irish-hills/
San Luis Obispo Creek	South County	83.0	3	San Luis Obispo Creek	6	SLO/Avila	/watersheds/san-luis-obispo-creek/
Arroyo Grande Creek	South County	151.8	4	Arroyo Grande/Pismo	7	South Coast	/watersheds/arroyo-grande-creek/
Pismo Creek	South County	40.3	4	Arroyo Grande/Pismo	7	South Coast	/watersheds/pismo-creek/
Santa Maria River	South County	58.2	5	Nipomo	7	South Coast	/watersheds/santa-maria-river/
Nipomo-Suey Creeks	South County	54.0	5	Nipomo	7	South Coast	/watersheds/nipomo-suey-creeks/
Alamo Creek	South County	84.2	6	Cuyama River	8	Huasna Valley	/watersheds/alamo-creek/
Huasna River	South County	118.4	6	Cuyama River	8	Huasna Valley	/watersheds/huasna-river/
Cuyama River	South County	223.7	6	Cuyama River	8 & 9	Huasna Valley & Cuyama Valley	/watersheds/cuyama-river/
South Salinas River - Santa Margarita Area	North County	112.1	7	Salinas River	12	Santa Margarita	/watersheds/santa-margarita-lake-south-salinas-river/
Mid Salinas River - Atascadero Area	North County	127.6	7	Salinas River	12 & 13 & 14	Santa Margarita & Atascadero & Salinas	/watersheds/atascadero-creek-mid-salinas-river/
North Salinas River - Paso Robles Area	North County	210.6	7	Salinas River	13 & 14	Atascadero & Salinas/Estrella	/watersheds/paso-robles-creek-north-salinas-river/
Huer Huero Creek	North County	160.6	7	Salinas River	14	Salinas/Estrella	/watersheds/huer-huero-creek/
Nacimiento River	North County	211.9	7	Salinas River	14 & 16	Salinas/Estrella & Nacimiento	/watersheds/nacimiento-river/
Upper San Juan Creek	North County	258.1	8	Estrella River	11 & 14	Rafael/Big Spring & Salinas/Estrella	/watersheds/upper-san-juan-creek/
Lower San Juan Creek	North County	176.1	8	Estrella River	14	Salinas/Estrella	/watersheds/lower-san-juan-creek/
Estrella River	North County	209.4	8	Estrella River	14	Salinas/Estrella	/watersheds/estrella-river/
Cholame Creek	North County	81.4	8	Estrella River	14 & 15	Salinas/Estrella & Cholame Creek	/watersheds/cholame-creek/
Soda Lake	North County	211.5	9	Carrizo Plain	10	Carrizo Plain	/watersheds/soda-lake/
Black Sulphur Spring	North County	213.4	9	Carrizo Plain	10	Carrizo Plain	/watersheds/black-sulphur-spring/

[1]Source: http://slowatershedproject.org/watersheds/

1.2.2 Watershed Topography and Geology

The topography of San Luis Obispo County, and indeed of the entire Central Coast of California, is ultimately a product of the tectonic processes that have shaped the West Coast of North America. Even though the San Andreas Fault, the active boundary between the Pacific and North American plates, barely skims the eastern edge of the County, its influence on the topography (and thus, ultimately, the flow of surface water and much groundwater) is profound throughout the region.

Three prominent sets of SE-NW trending mountain ranges, paralleling the trace of the San Andres Fault, define discrete physiographic regions of the County (Figure 1-2):

1. *The coastal watersheds (WGs 1, 2, 3, 4 and most of 5)* drain out of the Santa Lucia Range into the Pacific Ocean. Most of the channels here are relatively short and flow to the west and southwest. In the most southerly part of this coastal region, a relatively broad coastal plain has developed from deposition of the ancestral Santa Maria River, now occupied by the communities of Shell Beach, Pismo Beach, Arroyo Grande, Grover Beach, Oceano, and Nipomo. Moving north, ancient sedimentary and metamorphic rocks of the Irish Hills limit the extent of coastal development until Los Osos Valley breaches the rangefront and reaches the coastline, and where the communities of Los Osos and Morro Bay are built upon the now-drowned estuary of Los Osos Creek and Chorro Creek. Even farther north, the same metamorphic rocks again encroach upon the coast without respite, leaving room only for the scattered communities of San Simeon, Cambria, and Cayucos on uplifted marine terraces only a few hundred thousand years old, plastered onto the side of the steeply descending Santa Lucia Range.

2. *The majority of the County between the Santa Lucia and Temblor ranges (WGs 7 and 8)* drains north into the Salinas and Estrella rivers. These rivers meet just upstream (south) of the Monterey County line and continue north as the Salinas River to enter the Pacific Ocean in Monterey Bay. Their headwaters lie far to the south—the Salinas River emerges from Santa Margarita Lake, the Estrella River from San Juan Creek, with the two separated by the northwest-trending spur of the La Panza Range. This topography not only has guided the overall drainage patterns of the central County, but also has limited the opportunities for transportation corridors to reach into this central region. Thus, the population centers in this region (Atascadero, Templeton, Paso Robles, San Miguel) are limited to the river valley below its headwaters.

3. *The southeast corner of the County (WGs 6 and 9, and small portion of 5)* drains either south, into the Cuyama River, or into the closed depression of the Carrizo Plain between the southern extent of the Temblor Range and the Caliente Range. There are no significant urban areas within this region, and only short, limited drainage courses down the mountain slopes into either the Cuyama River or the alluvial plain surrounding Soda Lake.

Across these three physiographic regions, the underlying geology (Figure 1-3) is well-reflected in the topography. Most of the mountainous uplands, particularly in the western and central parts of the County, are underlain by old metamorphic rocks with limited capacity for infiltration and almost no overlap with mapped groundwater basins. The intervening valleys are filled with a variety of mainly waterlain sediment of Quaternary age (about the last 2 million years, and commonly much younger than that), which generally results in deposits of sufficient permeability and pore space to support infiltration and groundwater storage. These areas of potential (and actual) groundwater recharge also host most of the urban development in the County, because they provide favorable low-gradient topography for buildings and infrastructure.

An additional area of important groundwater storage is present beneath the broad, dissected plain of Huerhuero between the Salinas River and the Estrella River, extending northeast into Cholame Valley to underlie most of the northern half of WG 8 (see Appendix 1-B). It is underlain by older sediments of the Paso Robles Formation, still young enough (<5 million years) and unconsolidated enough to support extensive groundwater resources. Other mapped groundwater basins are far less extensive, typically occupying shallow troughs of unconsolidated sediment overlying far less permeable bedrock. Their distribution, properties, and relevance to stormwater management are discussed later in this plan, but their dependence on (and reflection of) the underlying geology of the region is fundamental to understanding their location, capacity, and potential opportunities for stormwater management.

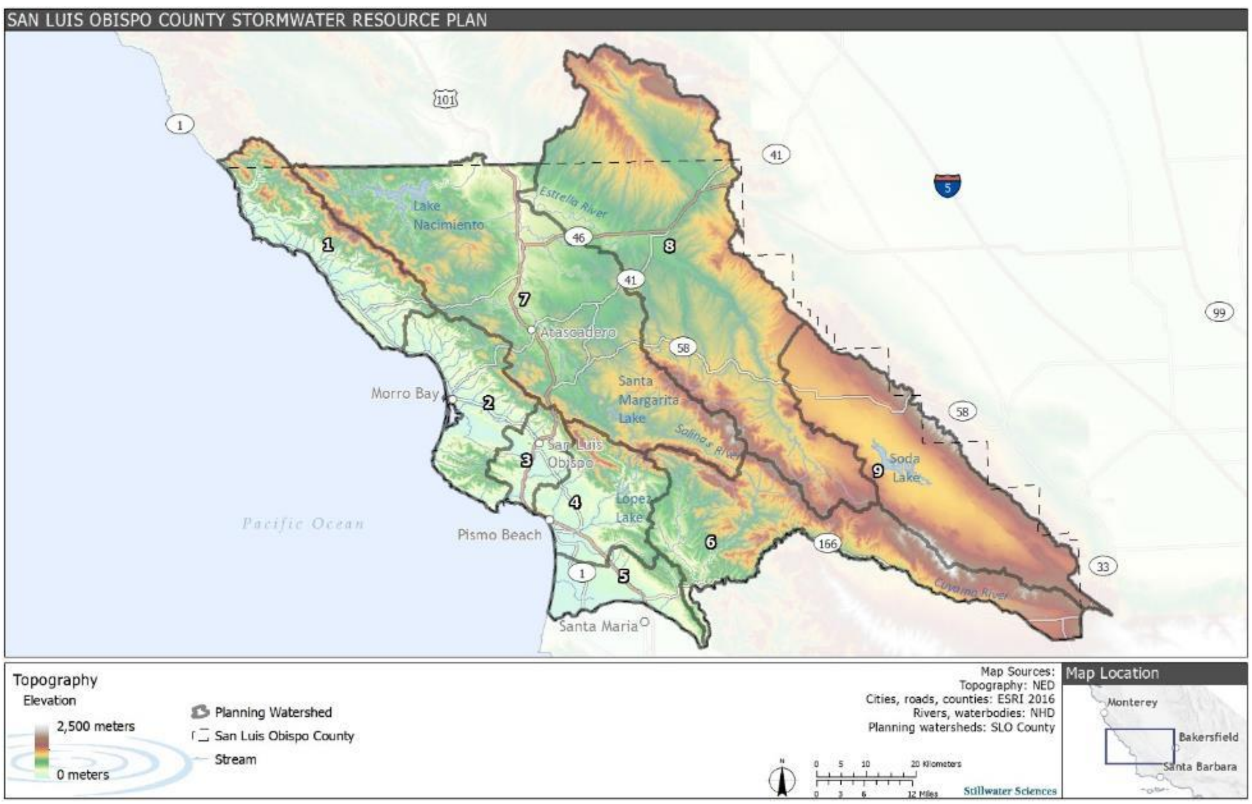


Figure 1-2. Physiography of this study's "Area of Analysis" (San Luis Obispo County [dashed outline] and adjacent tributary areas [solid outline]), which encompasses essentially all of San Luis Obispo County and a few adjacent areas that drain into it. White shadowed numbers identify the Watershed Groups (WGs) of this SWRP; white ovals identify state highway numbers.

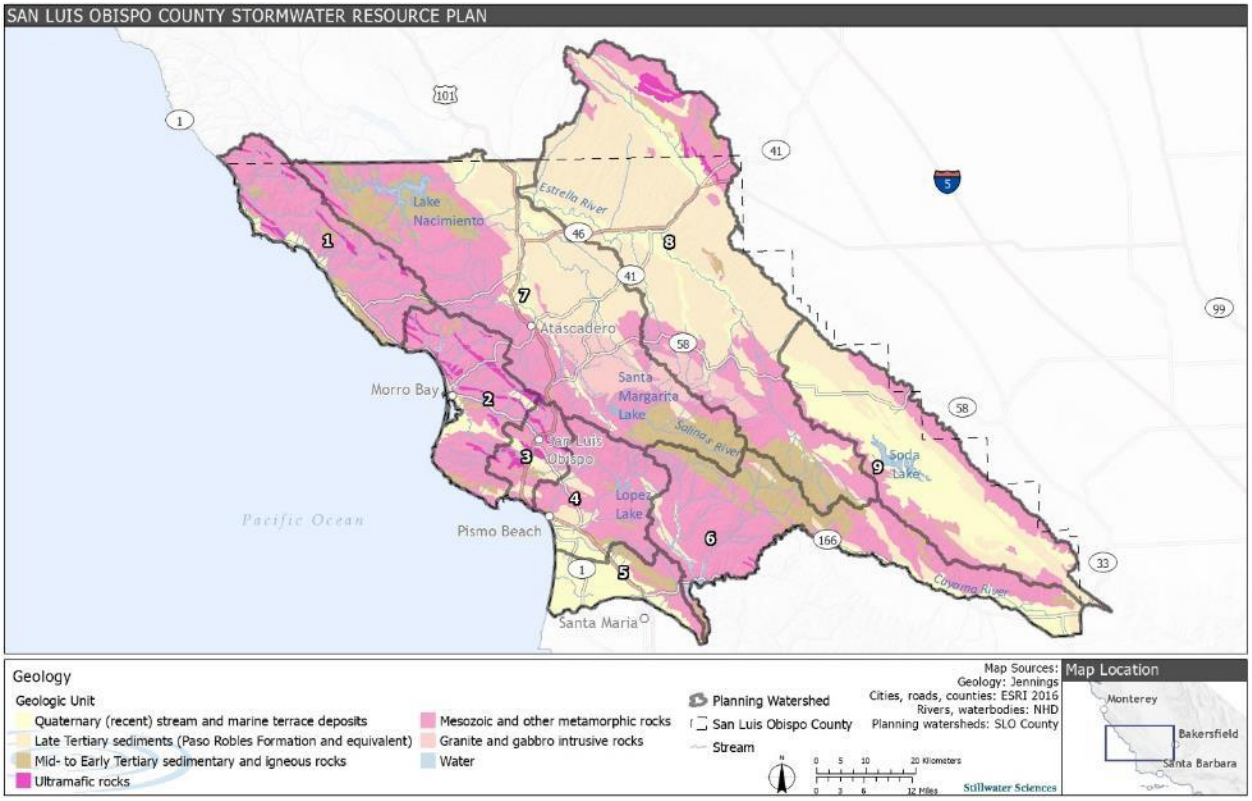


Figure 1-3. Generalized geology of the Area of Analysis. Numbers identify the Watershed Groups (WGs) of this plan.

1.2.3 Stream Channels and Surface-Water Hydrography

The surface-water channel system primarily reflects the interplay of rainfall, topography, and geology. Across the County, annual rainfall varies by more than four-fold (Figure 1-4). The highest totals are found along the coastal ridgelines of the Santa Lucia Range in the northwest part of the County, and the lowest totals in the extreme southeast corner where intervening mountains have limited the penetration of Pacific Ocean moisture. The importance of these differences is well-illustrated by comparing the mean annual flow of the two largest rivers in the County, the Salinas River and the Estrella River. At their two lowest gages in the County (USGS 11147500 in Paso Robles for the Salinas River, USGS 11148500 about 5 miles north of Paso Robles for the Estrella River), the mean annual discharges over their respective periods of record are 93.7 cfs (Salinas) and 25.1 cfs (Estrella). This disparity exists despite the more than two-fold difference in drainage areas, with that of the Salinas River being 390 mi^2 and that of the Estrella River more than twice as large (922 mi^2). Although a variety of factors contribute to this order-of-magnitude difference in unit-area discharge (i.e., the average annual water yield in cfs per square mile of drainage area), average precipitation over the two watersheds is undoubtedly a major contributor, differing by nearly a factor of two: 25” for Salinas, 14” for Estrella (data from https://streamstats.usgs.gov).

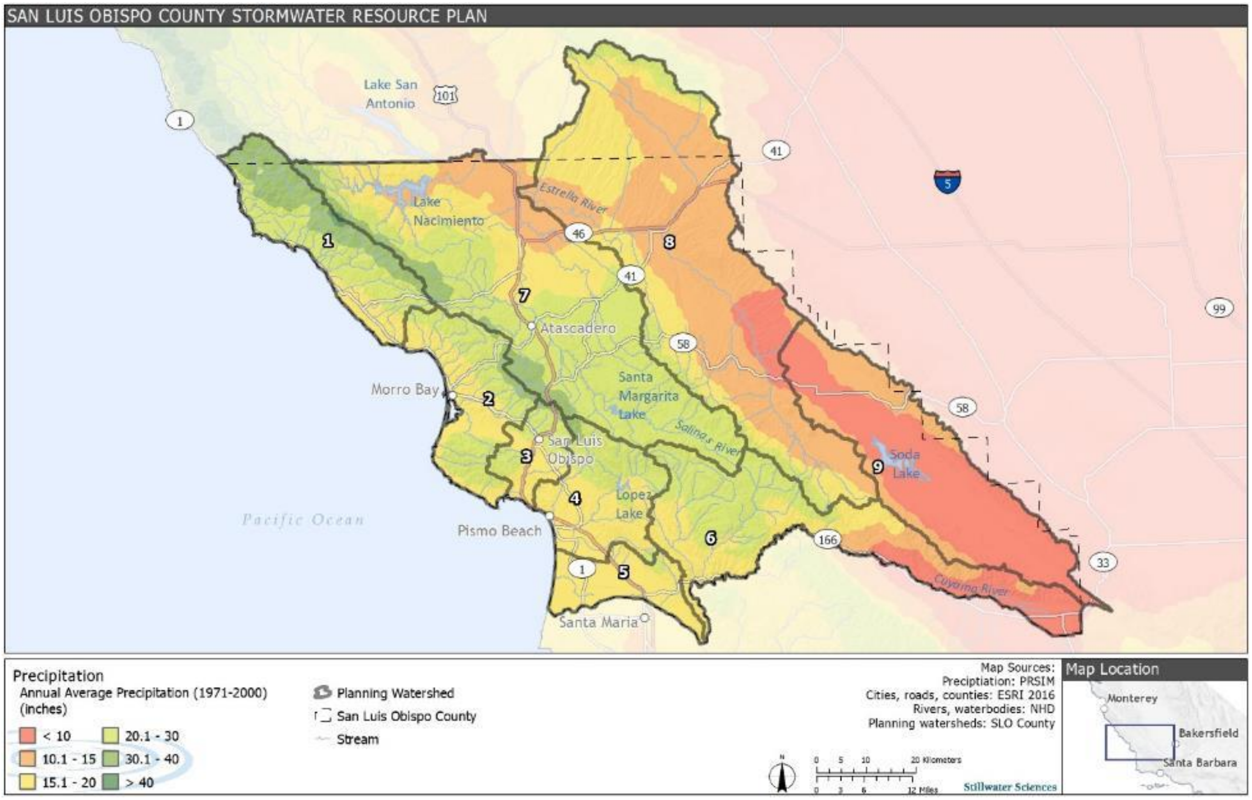


Figure 1-4. Average annual precipitation over the Area of Analysis. WGs outlined and numbered. Note the strong west-to-east gradient in total precipitation, reflecting the progressive loss of moisture from the Pacific Ocean. From www.prism.oregonstate.edu.

Topography is a significant determinant of how the watersheds of the County are organized. The Santa Lucia Range, closely paralleling the Pacific Ocean coastline, gives rise to numerous short, almost parallel drainages (WGs 1, 2, 3, 4) that have relatively small catchment areas and limited capacity in the underlying bedrock for groundwater support of summertime perennial flow, particularly where channels emerge from the mountains and cross more permeable alluvial sediments of the lowlands. A good example of this pattern is displayed by Morro Creek, which despite draining some of the wettest ridgelines of the County experiences long, sometimes multi-year periods of no flow in its lower reaches (Figure 1-5). Despite this broad-scale pattern, watersheds in these WGs do support critical refuge for the threatened South-Central California steelhead (*Oncorhynchus mykiss*). For example, even during the recent (and perhaps still on-going) exceptional multi-year drought, upper Morro Creek has maintained perennial flows (CCSE 2017), highlighting the importance of preserving groundwater-fed perennial reaches in these watersheds and maintaining at least seasonal migratory access to them.

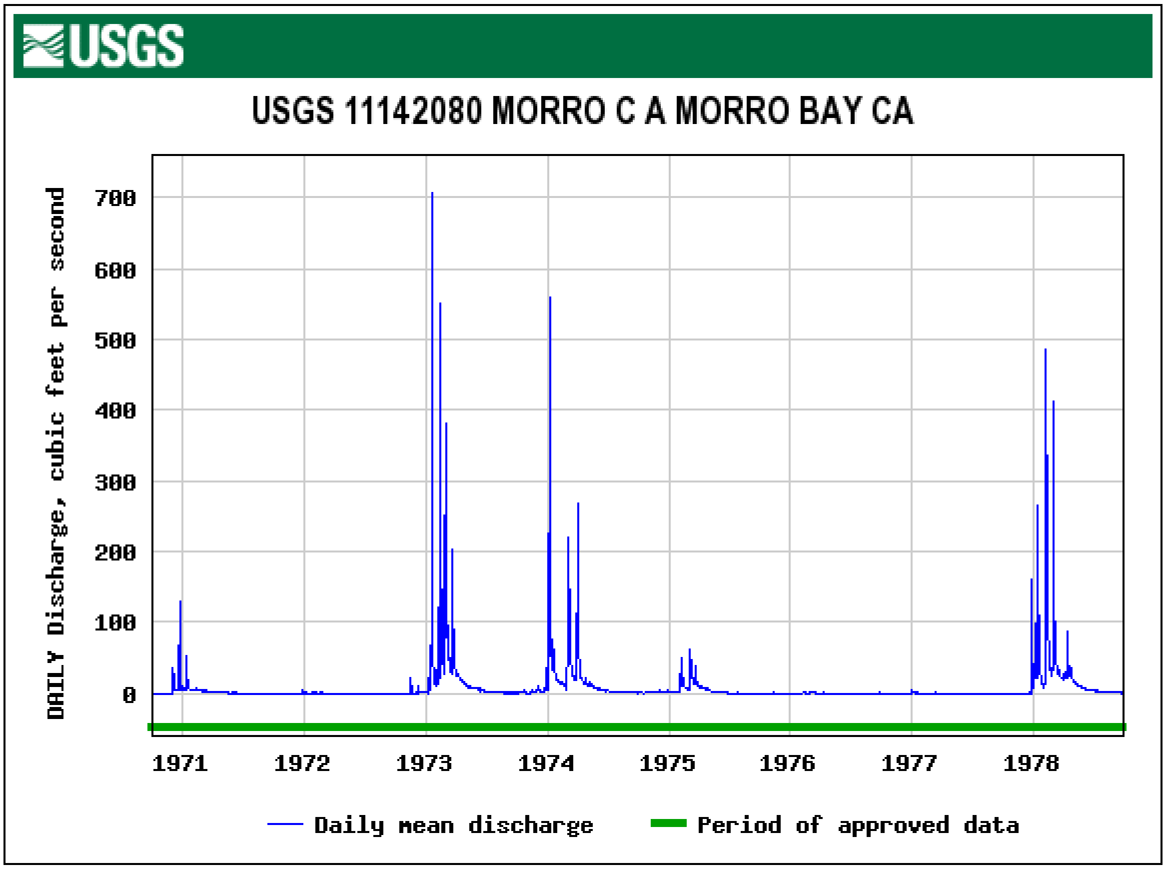


Figure 1-5. Nine-year record of discharge for Morro Creek (24 mi^2 drainage area), located along Highway 1 just north of Morro Bay. Even following wet winters there is little storage capacity in this steep watershed to support summertime flow; and in low-rainfall years there is no flow at all.

In the County's interior, major NW-trending ridges flank the broad lowland area that give rise to the Salinas River (WG 7) and Estrella River (WG 8). These two channels are separated by a shorter, less continuous ridge (the La Panza Range) the forms the boundary of the headwaters between these two watersheds. About one-half of the entire area of the County is included in these two WGs, which is also why these two rivers have the largest drainage areas in the County.

Along the eastern edge of the County, sediments shed westward off of the Temblor Range have pinched off the northern end of the Carrizo Plain, creating a closed depression that extends 50 miles to the south and covers more than 400 mi^2 (constituting WG 9). Runoff draining the surrounding uplands can recharge the (even more extensive) Carrizo Plain–Salinas Valley Basin, but it cannot escape as surface runoff to contribute to the channel network beyond the confines of the valley (Figure 1-6).

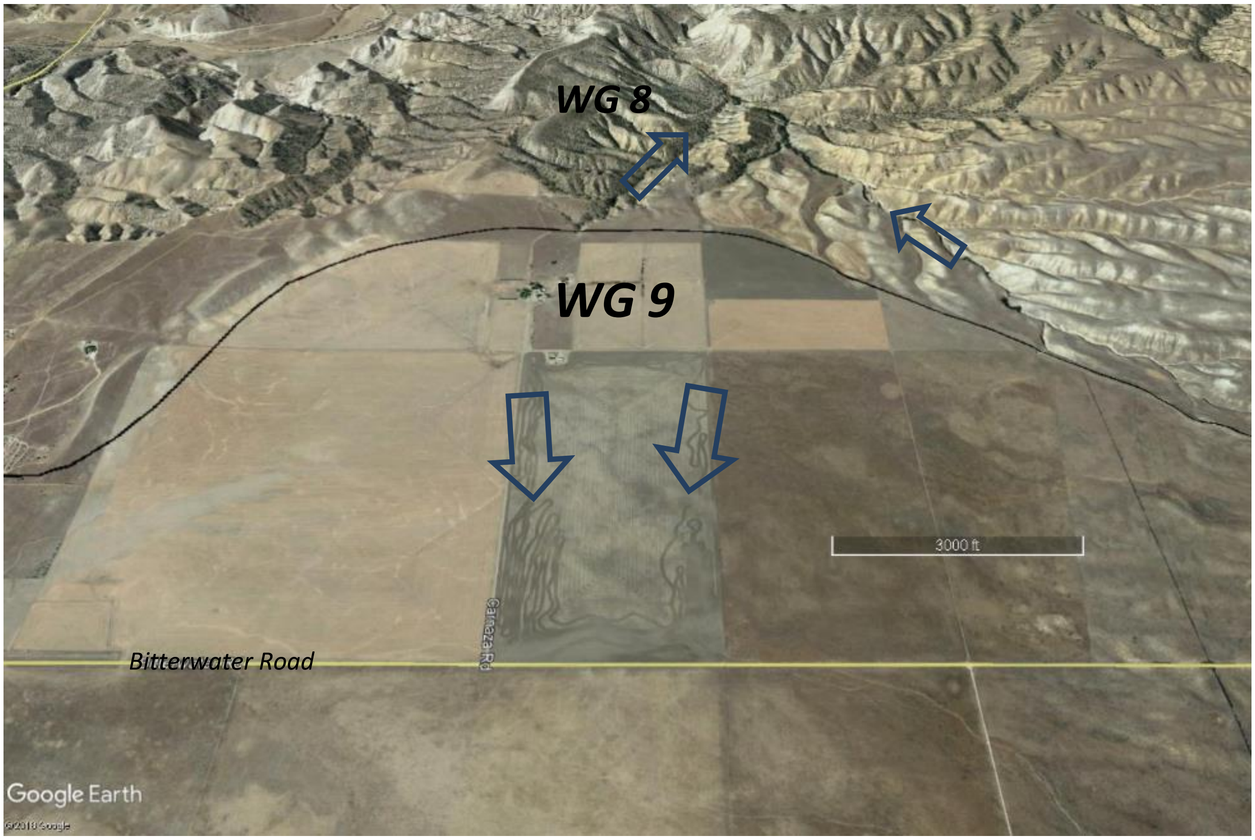


Figure 1-6. View looking west of the drainage divide between WG 9 (Carrizo Plain, foreground) and WG 8 (Estrella River, background), marked by the black line. The directions of surface flows are shown by the blue arrows. The difference in vertical elevation between Bitterwater Road in the foreground and the divide is only about 15 feet, but it is sufficient to block what could otherwise be a dramatic upstream expansion of the contributing watershed area into San Juan Creek (upper left corner), tributary to the Estrella River. Base image from Google Earth.

Along the southern edge of the County (WGs 5 and 6), the southwest flanks of the Santa Lucia Range also limit the extent of watersheds and result in mainly short, steep channels. The two exceptions are the Cuyama River, which flows west at the base of the range and acts as a "collector" of the steep tributary drainages; and Huasna Creek and its eastern neighbor, Alamo Creek, the major tributaries to the Cuyama River that all join just above (and, depending on water levels, *in*) Twitchell Reservoir.

The geology of the County is also influential in both the patterns expressed by the channel network, and in aspects of the overall flow regime. The competent bedrock of the uplands and mountainous regions support relatively short, steep channels that lie well above the areas of urban development and so primarily express the influences of rainfall, wildfire, grazing, and localized cultivation. The lowland valleys and coastal plains, all products of the geologically recent processes of river erosion, river deposition, and coastal erosion and subsequent uplift, support a variety of low-gradient channels. These streams have significant resource values but are also subject to a wide range of human disturbance, including urban and agricultural runoff, confinement from roads and bridges, and direct or indirect water withdrawals.

Seasonally dry streams and rivers show good spatial correspondence with alluvial plains, and the groundwater basins that they overlie, throughout the region. As examples, the Carrizo Plain (WG 9) is a closed depression with almost no surface channels across the center of the basin, despite an abundance of channels flowing off the uplands from the east and west. San Luis Obispo Creek (WG 3) runs dry every summer for the two-mile reach in the center of the watershed where it crosses sediments overlying a portion of the San Luis Obispo Valley Basin. However, these alluvial plains can also be zones of emergent groundwater, particularly where bedrock constrictions or less permeable layers limit the downgradient flux of groundwater and so forces it back to the surface. There, the overlying stream can be perennial, resulting in reaches that alternate between free-flowing and intermittent segments.

A geological terrain “transitional” between the bedrock uplands and alluvial valleys is also common across the County. This terrain is primarily composed of the several-million-year-old Paso Robles Formation, composed of sediment that washed off the bedrock uplands into the valleys below several million years ago. Unlike the small alluvial fans present across the modern landscape, however, this unit covers many hundreds of square miles throughout the region, particularly in WGs 7, 8, and 9 where it constitutes nearly half of their total area. The stream channels developed on this deposit are typically slightly sinuous and occupy relatively narrow catchments, with a tight dendritic pattern of sub-parallel tributaries that descend the slopes to the valleys below. Because the substrate is geologically young and poorly consolidated, the channels have carved steep channels, with the divides between adjacent channels standing as much as several hundred feet above the channels themselves. Although few of the urban areas in the County discharge onto or upstream of this deposit, several of those urban areas lie immediately downslope, and so the behavior of stream channels on this widespread sedimentary deposit is locally quite relevant to stormwater management and the facilities intended to convey their flow.

1.2.4 Water Supply

The recently prepared SLO IRWMP (2014) had as its primary purpose to present “a comprehensive water resources management approach to managing the region’s water resources, focusing on strategies to improve the sustainability of current and future needs of San Luis Obispo County” (p. A-1). As such, the 90 pages of that plan devoted to this topic provide a comprehensive review of the topic that does not merit repetition here. However, that plan is organized around its 16 “Water Planning Areas,” which do not fully align with the Watershed Groups used in this SWRP (see Table 1-1). Therefore, the purpose of the following section is to summarize the key findings and characterization of water supplies and water suppliers from the SLO IRWMP, and to organize that information into the watershed-based framework being used by this plan. This will facilitate the subsequent integration of potential multi-benefit stormwater projects with the water-supply needs of the County.

In the following summaries, estimates of the volume of potable water are given in parentheses for each urban water supplier and have been extracted from Tables D-14 through D-46 of the IRWMP. All values are in acre-feet per year (AFY).

WG 1 San Simeon/Cambria (IRWMP, pp. D-30–D-36). There are two urban water suppliers in this WG, the San Simeon Community Services District (San Simeon CSD) (108 AFY) and the Cambria Community Services District (Cambria CSD) (673 AFY). Both project significant increases in urban water demand over the next 20 years, albeit of very different magnitudes: San Simeon anticipates more than doubling of urban water demand, whereas Cambria anticipates an increase of less than 50%. In combination, the future (2035) demand in this WG is projected to be evenly split between urban and agricultural uses (the third category, rural water demand, is only about 10% of the total). Urban demand is satisfied exclusively by groundwater in San Simeon and Cambria. If anticipated new supplies are constructed then a net balance of supply and demand would be met by 2035, but owing to the linear topography of the planning area the transfer of water from the (relatively) water-rich southern part of the WG to the water-poor northern part may be challenging. And, as the IRWMP notes (p. D-34), "Absent the addition of new supplies or a groundwater basin management strategy to increase the perennial yield, the existing supplies are insufficient to accommodate the expected growth over the next 20 years as per the Cambria Community Plan."

Recent funding from Proposition 1 in this WG (from the Integrated Regional Water Management Disadvantaged Community Involvement Grant Program) is targeted to support an update of the Water Master Plan for the San Simeon CSD and the design of a project to expand the existing 150,000-gallon reservoir to provide regulatory, emergency and fire storage.

Watershed Name	Planning Area	Area (sq mi)	Watershed Group		IRWMP Water Planning Area	
Big Creek - San Carpoforo	North Coast	20.3	1	San Simeon/Cambria	1	San Simeon
San Simeon - Arroyo de la Cruz	North Coast	128.8	1	San Simeon/Cambria	1 & 2	San Simeon & Cambria
Santa Rosa Creek	North Coast	73.4	1	San Simeon/Cambria	2	Cambria

WG 2 Cayucos/Los Osos (IRWMP, pp. D-37–D-50). A total of 15 individual urban water suppliers operate in this WG, with only three (City of Morro Bay [1,255 AFY], California Men's Colony [1,135 AFY], and Golden State Water Company–Los Osos [998 AFY]) providing 1,000 ac-ft of water per year or more. Except for Los Osos, this planning area receives water from a near-even mix of groundwater and surface-water supplies, particularly the State Water Project, Whale Rock Reservoir, and the Nacimiento Water Project. The Los Osos Valley, however, is entirely reliant on groundwater and is judged to achieve future "balance" only by virtue of constraints on demand. The IRWMP notes that "no alternative source of supply has been identified to meet forecasted increases in demand," and so it assumes that no new growth will occur unless sufficient supplies can be identified. Within this planning area, augmentation of groundwater is an obvious priority.

Although this WG also includes part of IRWMP Water Planning Area 6, more than 90% of that area's water demand is sourced to the City of San Luis Obispo and California Polytechnic State University (CalPoly), and so it is included in the next discussion.

Watershed Name	Planning Area	Area (sq mi)	Watershed Group		IRWMP Water Planning Area	
Cayucos Creek - Whale Rock Area	North Coast	85.9	2	Cayucos/Los Osos	3 & 4	Cayucos and Morro Bay
Morro Bay	North Coast	75.6	2	Cayucos/Los Osos	4 & 5	Morro Bay and Los Osos
Coastal Irish Hills	South County	46.0	2	Cayucos/Los Osos	6	SLO/Avila

<u>WG 3 San Luis Obispo Creek (IRWMP, pp. D-46–D-50)</u>. Within this WG, the two urban water providers (City of San Luis Obispo [5,218 AFY] and CalPoly [1,040 AFY]) depend primarily on surface water from the Nacimiento Project, Salinas Reservoir, Whale Rock Reservoir, and the State Water Project (CalPoly only). Local groundwater supplies from the Avila Valley Subbasin and the San Luis Valley Subbasin provide the primary water supply for agriculture and rural users. Supplies are judged sufficient to meet projected water demands.

Recent funding from the Integrated Regional Water Management Disadvantaged Community Involvement Grant Program is targeted to support a value engineering study of an upgrade of the City's Water Resource Recovery Facility, scheduled to begin construction in 2018. The goal of this project is to help the City meet their water diversity and reliability needs by making use of recycled water to provide another source of water to the community.

Watershed Name	Planning Area	Area (sq mi)	Watershed Group		IRWMP Water Planning Area	
San Luis Obispo Creek	South County	83.0	3	San Luis Obispo Creek	6	SLO/Avila

<u>WG 4 Arroyo Grande/Pismo (IRWMP, pp. D-51–D-54)</u>. This WG includes the larger and more populous northern portion of IRWMP Water Planning Area 7, whose overall water-supply projections indicate a region in relative balance between supply and demand but with some significant local differences. Within this WG, the five urban water providers (delivering in total 7,770 AFY) derive nearly two-thirds of their total supply from groundwater, the balance being provided primarily by Lopez Lake (on upper Arroyo Grande Creek) and the State Water Project. A unified planning effort between Pismo Beach, Arroyo Grande, Grover Beach, the South San Luis Obispo County Sanitation District and the Oceano Community Services District to inject treated wastewater into the groundwater basin is currently on-going. It is expected to increase municipal groundwater supplies by 60 percent when constructed.

Urban water demand is projected to increase by about 20% over the next 20 years, driven largely by increases in the cities of Pismo Beach and Oceano (and, to a lesser extent, Arroyo Grande). These increases are more than balanced, however, by projected decreases in agricultural water demand, leaving this part of the IRWMP Water Planning Area with a projected surplus.

Recent funding from the Integrated Regional Water Management Disadvantaged Community Involvement Grant Program is targeted to support the Oceano Community Services District Water Resource Reliability Program. It includes a study of recycled water injection wells, application of Low Impact Development to improve water supply, and improved leak detection and management. Additional funding from this program will support an update to the Grover Beach Water Master Plan.

Watershed Name	Planning Area	Area (sq mi)	Watershed Group		IRWMP Water Planning Area	
Arroyo Grande Creek	South County	151.8	4	Arroyo Grande/Pismo	7	South Coast
Pismo Creek	South County	40.3	4	Arroyo Grande/Pismo	7	South Coast

WG 5 Nipomo (IRWMP, pp. D-51–D-54). This WG includes the southern part of IRWMP Water Planning Area 7, which is host to 5 urban water districts. Three of them (Golden State Water Company Nipomo [1,060 AFY], Nipomo CSD [2,367 AFY], and Woodland Mutual Water Company [850 AFY]) are projecting a near-doubling of future urban demand. About 60% of the current supply originates from groundwater, over the next 20 years, and significant deficits are already recognized in both groundwater quantity and quality, and in the overall supply-demand balance of this WG.

Watershed Name	Planning Area	Area (sq mi)	Watershed Group		IRWMP Water Planning Area	
Santa Maria River	South County	58.2	5	Nipomo	7	South Coast
Nipomo-Suey Creeks	South County	54.0	5	Nipomo	7	South Coast

WG 6 Cuyama River (IRWMP, pp. D-55–D-60). There are no large population centers in this WG, and no urban water districts. Agriculture creates by far the dominant water demand here, almost entirely provided by groundwater from the Santa Maria Valley, Huasna Valley, and Cuyama Valley groundwater basins.

Watershed Name	Planning Area	Area (sq mi)	Watershed Group		IRWMP Water Planning Area	
Alamo Creek	South County	84.2	6	Cuyama River	8	Huasna Valley
Huasna River	South County	118.4	6	Cuyama River	8	Huasna Valley
Cuyama River	South County	223.7	6	Cuyama River	8 & 9	Huasna Valley & Cuyama Valley

WG 7 Salinas River (IRWMP, pp. D-68–D-77, D-81–D-83). The boundaries of this WG show the greatest divergence with the Water Planning Areas of the IRWMP, with nearly half of the Salinas/Estrella area (IRWMP #14) in this WG and the remainder in the adjacent WG (#8, Estrella River). Within this WG, there are ten urban water suppliers, of which Atascadero Mutual Water Company (7,026 AFY) and the City of Paso Robles (10,389 AFY) are by far the largest. Paso Robles derives about 60% of its supply from the Paso Robles Basin and the balance from the Nacimiento Project; Atascadero has the same sources but is even more dependent on groundwater, with 80% of its supply from the Atascadero Subbasin. Although imposing limited demand, the urban areas around Santa Margarita appear to be exceeding the

perennial yield of the groundwater that are almost solely responsible for their supply. Twenty-five-year projections (2010–2035) show a three-fold increase in urban demand, suggesting that this shortfall is likely to worsen considerably without additional supplies. Elsewhere in the WG, projected urban water demand is somewhat more modest, although the City of Paso Robles anticipates a doubling of demand over this same period. Overall, projections for 2035 anticipate about 90% of water supplies being provided by groundwater, but with significant deficits only in the Santa Margarita area in the southwest part of the WG.

Recent funding from the Integrated Regional Water Management Disadvantaged Community Involvement Grant Program is targeted to support the San Miguel Community Services District (SMCSD) proposal to conduct studies to design a wastewater plant upgrade, and to determine the locations for future groundwater recharge basins and injection wells with the intent to provide supplemental water supplies that are economically affordable.

Watershed Name	Planning Area	Area (sq mi)	Watershed Group		IRWMP Water Planning Area	
South Salinas River - Santa Margarita Area	North County	112.1	7	Salinas River	12	Santa Margarita
Mid Salinas River - Atascadero Area	North County	127.6	7	Salinas River	12 & 13 & 14	Santa Margarita & Atascadero & Salinas
North Salinas River - Paso Robles Area	North County	210.6	7	Salinas River	13 & 14	Atascadero & Salinas/Estrella
Huerhuero Creek	North County	160.6	7	Salinas River	14	Salinas/Estrella
Nacimiento River	North County	211.9	7	Salinas River	14 & 16	Salinas/Estrella & Nacimiento

WG 8 Estrella River (IRWMP, pp. D-65–D-67, D-75–D-80). There is only one urban water supplier in this WG (San Luis Obispo County Service Area 16–Shandon [147 AFY]), serving the small community of Shandon in the north-central part of the WG where Cholame Creek meets San Juan Creek to form the Estrella River. Nearly all of the available water supply is from groundwater, but the available information on yields is limited to the central and western parts of the basin, which are largely projected to be adequate to meet the relatively moderate current and future demands, almost exclusively agricultural, in this area.

Watershed Name	Planning Area	Area (sq mi)	Watershed Group		IRWMP Water Planning Area	
Upper San Juan Creek	North County	258.1	8	Estrella River	11 & 14	Rafael/Big Spring & Salinas/Estrella
Lower San Juan Creek	North County	176.1	8	Estrella River	14	Salinas/Estrella
Estrella River	North County	209.4	8	Estrella River	14	Salinas/Estrella
Cholame Creek	North County	81.4	8	Estrella River	14 & 15	Salinas/Estrella & Cholame Creek

WG 9 Carrizo Plain (IRWMP, pp. D-62–D-84). There are no urban water suppliers in this WG, and only limited rural and agricultural demands. Although the number of zoned and platted rural residential lots here gives rise to a dramatic future increase in water demand, the IRWMP speculates that only a scant fraction of this development is likely to occur in the planning timeframe. Current water needs are

satisfied almost exclusively from the Carrizo Plain Basin, with some additional indeterminate volume of trucked-in supplies.

Watershed Name	Planning Area	Area (sq mi)	Watershed Group		IRWMP Water Planning Area	
Soda Lake	North County	211.5	9	Carrizo Plain	10	Carrizo Plain
Black Sulphur Spring	North County	213.4	9	Carrizo Plain	10	Carrizo Plain

Across the County as a whole, the IRWMP (p. D-85) states that "Urban water supply appears more balanced due to the use of multiple water supply sources. In addition to groundwater, urban water demand is met by surface water, State Water Project Water, and alternative sources such as recycled water." Despite this overall determination of current and future adequacy, some areas are already experiencing (or are projected to anticipate) significant shortfalls in water supply that will likely require reduced demand, additional supplies, or better use of stormwater as a conjunctive resource. The above summaries identify the following high-priority conditions strictly from the perspective of current and future urban water supply:

> **WG 1 San Simeon/Cambria:** existing supplies are insufficient to accommodate expected growth, particularly in the northern part of this WG (San Simeon area) and in areas covered by the Cambria Community Plan.
>
> **WG 2 Cayucos/Los Osos:** Los Osos Valley is entirely reliant on groundwater, and so any future growth is possible only through expansion of this resource.
>
> **WG 5 Nipomo:** this area projects a near-doubling of future urban demand, of which a majority is currently provided by groundwater supplies already showing significant deficits in both quantity and quality.
>
> **WG 7 Salinas River:** significant deficits are projected in the Santa Margarita area in the southwest part of the WG, although a doubling (or more) of urban populations centers over the next 20 years raises the prospect of further long-term deficits.

Although the County is experiencing local limitations in urban water supplies, agricultural land uses are the most widespread human activity and are placing the largest demand on water resources. This demand is largely supplied by groundwater. "Stormwater management projects," the primary focus of this SWRP, are unlikely to find much direct application in this land-use category, although any improvements in groundwater recharge from non-agricultural areas are likely to benefit agricultural water supply as well through the general improvement to the health of the groundwater basins. Thus, the emphasis in this plan is on a relatively minor component of the water-supply landscape of the County, urban areas. However, urban areas offer the widest range of opportunities for the active management of stormwater to provide both direct benefits (by augmenting urban water supplies and reducing urban water demand) and indirect benefits (by improving the overall health of the groundwater basins, and by providing more water to support environmental and community benefits within and downstream of the urban areas).

1.2.5 Groundwater

In San Luis Obispo County, numerous listed and unlisted groundwater basins provide water supply and support groundwater-dependent ecosystems (GDEs). The County includes part or all of 24 basins that have been identified under either CDWR's Bulletin 118 (CDWR 2003) or the SLO IRWMP (see map folio, Appendix 1-B). The purpose of the following section is to provide an overview of these 24 basins within the context of the watershed-based framework being used by this plan. These basins have been previously described in the SLO IRWMP (2014) (pp. C-12 to C-22). The following section summarizes not only the key findings of the SLO IRWMP but also additional findings and information that have been generated since publication of that plan. The purpose of this section, therefore, is not to simply duplicate previously published information but to facilitate integration of potential multi-benefit stormwater projects with the water-supply needs of the County. It focuses on basins that urban areas rely on for water supply or are downstream (or downgradient) of urban areas. This section draws heavily from the IRWMP (2014) and CDWR (2003), both of which also focus on groundwater basins from the perspective of human water-supply needs. An interactive map of groundwater basins throughout San Luis Obispo County is available at https://www.sloCountywater.org/site/Water%20Resources/SGMA/.

The condition of groundwater basins statewide has been evaluated in recent years through the California Statewide Groundwater Elevation Monitoring (CASGEM) Program. The CASGEM Groundwater Basin Prioritization is a statewide ranking of basin importance that incorporates groundwater reliance, focusing on basins producing greater than 90% of California's annual groundwater. The results are an assessment of priority on a statewide basis; therefore, these statewide findings do not diminish the local importance of the smaller size or lower-use basins. The basins are listed as high, medium, low, or very low priority. In San Luis Obispo County, the program has evaluated 22 groundwater basins, rating six as "high" or "medium" priority. Two of those basins (Los Osos and Paso Robles) are also listed as being in critical overdraft.

The 2015 Sustainable Groundwater Management Act (SGMA) requires the formation of locally-controlled groundwater sustainability agencies in the State's high and medium priority basins. SGMA also requires that these agencies develop and implement a groundwater sustainability plan to meet the sustainability goal of the basin or subbasin to ensure that it is operated within its sustainable yield, without causing undesirable results. These efforts are in progress as of the preparation of this SWRP, and so their findings and recommendations will be incorporated into this plan only insofar as feasible, given constraints of timing and schedules.

Although the availability and use of groundwater for human and agricultural consumption has been the near-exclusive focus of prior studies (e.g., IRWMP and Bulletin 118), groundwater-dependent ecosystems that overlie these basins are also important resources that must be included in any comprehensive, watershed-based plan for stormwater management. A challenge to any such regional analysis, however, is the fine spatial scale over which these basins and their overlying GDEs interact. Whereas the location and function of some GDEs (e.g., riparian zones) may rely on regional groundwater table elevations and trends, other GDEs (e.g., steelhead refuge habitat) commonly respond to much more localized conditions. This plan cannot capture all of these small-scale relationships, but where existing studies have documented their occurrence and importance the following sections of this plan acknowledge that understanding.

Many of the County's groundwater basins are situated in valleys filled with sediment deposits of sufficient permeability and pore space to support infiltration and groundwater storage. Many of these basins are also unconfined (i.e., with unimpeded hydraulic connection with surface flows), composed of sediment primarily recharged by surface water and underflow from drainage channels that overlie these basins. Although these basins rely on recharge from surface water, the converse is true as well—groundwater can resurface to support surface flows that are critical to the sustainable management of these ecosystems. In those localities, the groundwater can discharge into a natural channel to create a "gaining reach," commonly where the stream channel experiences an abrupt change in gradient, where bedrock outcrops (Figure 1-7), or where faults intersect the stream channel. To our knowledge, surface–groundwater interactions at this scale have not been previously quantified nor systematically mapped across the County's basins, and so their documentation in this plan is also not comprehensive.

Figure 1-7. Potential gaining reach along San Simeon Creek, where bedrock outcrops truncate the groundwater basin and so force the reemergence of subsurface water into the channel. Photograph by Central Coast Salmon Enhancement.

<u>WG 1 San Simeon/Cambria</u>. This WG contains six groundwater basins (San Carpoforo, Arroyo De La Cruz, Pico Creek Valley, San Simeon Valley, Santa Rosa Valley, and Villa Valley). All basins are presently considered low priority under SGMA (except for Pico Creek, which was not evaluated). Agricultural and other rural users operate wells in all the groundwater basins in this WG. The San Simeon CSD operates groundwater wells in the Pico Creek Valley Basin and the Cambria CSD operates wells in the San Simeon Valley Basin and the Santa Rosa Valley Basin; a majority of water supply for the Cambria CSD comes from San Simeon Valley. Although compiling information about agricultural and other rural users can be challenging, for riparian wells (which draw from the underflow of rivers and creeks) the water rights are recorded and both well location and usage are publicly available on the State's electronic Water Rights Information Management System database eWRIMS (https://www.waterboards.ca.gov/ewrims/).

In the San Simeon Valley, both surface water and groundwater flow west and drain into the estuary of San Simeon Creek and the Pacific Ocean. In this basin the groundwater is found in alluvium, which is primarily recharged via San Simeon Creek (CDWR 1958). Both surface water and underflow in San Simeon Creek contribute to this groundwater recharge. In the Santa Rosa Valley, both surface and groundwater flow generally west and drain into the Santa Rosa estuary and then the Pacific Ocean. In this basin the groundwater is also found in alluvium that is primarily recharged via San Santa Rosa Creek (CDWR 1958). Both surface water and underflow in San Rosa Creek contribute to groundwater recharge.

WG 2 Cayucos/Los Osos. This WG contains six groundwater basins (Cayucos Valley, Old Valley, Toro Valley, Morro Valley, Chorro Valley, Los Osos Valley). It includes a mix of agricultural, rural, and municipal groundwater users. The largest non-agricultural groundwater users in this WG (City of Morro Bay, California Men's Colony, and Golden State Water Company) operate groundwater wells in the Morro Valley, Chorro Valley, and Los Osos Valley Basins. All basins are considered low priority under SGMA, except for the Los Osos Valley Basin. The Los Osos Valley Basin is a high priority basin and considered to be in critical overdraft.

The eastern boundary of the Los Osos Valley Basin is a low topographic divide, just west of the City of San Luis Obispo, separating the overlying Los Osos Valley from the San Luis Valley. To the west of the divide both the surface and groundwater flows west and drains into the Morro Bay estuary. In this basin the groundwater is found in alluvium, dune sand and the Paso Robles Formation. Both the alluvium and dune sands are primarily recharged via stream channels, particularly Los Osos Creek (CDWR 1973). Both surface water and underflow in Los Osos Creek contribute to this recharge. Elsewhere in this basin, "groundwater in the Paso Robles Formation is replenished in areas where it is in hydraulic continuity with alluvium, dune sand, and along the basin margins at depths where it intercepts seepage from bedrock (CDWR 1973)" (CDWR 2003).

WG 3 San Luis Obispo Creek. This WG contains a single groundwater basin, the San Luis Valley Basin, which has two subbasins (the Avila Valley Subbasin and the Edna Valley Subbasin). Whereas the Avila Valley Subbasin is included in this WG, the Edna Valley Subbasin is included in WG 4 to align with the surface-water divide that separates them. The overall groundwater movement in the San Luis Valley flows is in the same general direction as surface water, flowing from the San Luis Valley into the Avila Valley and ultimately into the San Luis Obispo Creek estuary and the Pacific Ocean. The primary groundwater users in this WG are rural and agricultural. The basin is considered medium priority under SGMA. Groundwater in this basin is found in alluvium and in the sand, silt, gravel, and clays of the somewhat older Paso Robles Formation (CDWR 1979). Recharge of the basin is from precipitation on the valley floor, irrigation, and surface and underflow from San Luis Obispo Creek and its tributaries, as well as Pismo Creek and its tributaries (Boyle 1991).

<u>WG 4 Arroyo Grande/Pismo</u>. This WG includes that portion of the Santa Maria Basin that underlies the Arroyo Grande watershed, including the Arroyo Grande Subbasin. The Santa Maria Basin extends south into WG 5. This WG also includes groundwater that underlies the Pismo Creek watershed, including the Edna Valley Subbasin (part of the San Luis Valley Basin) and the Pismo Creek Valley Subbasin (part of the Santa Maria Basin). WG 4 groundwater users include a mix of agricultural, oil production, rural, and municipal users. Collectively these users and their water purveyors operate groundwater wells in all of the basins and subbasins listed. The Santa Maria Basin is considered high priority under SGMA, and the Edna Valley Subbasin is considered medium priority.

In this WG, surface water drains southwest along Pismo Creek, Arroyo Grande Creek, and their respective tributaries. In the Arroyo Grande Subbasin, groundwater presumably follows this same general direction towards the Pacific Ocean; however, the groundwater underlying the Pismo Creek watershed is more complex due to the presence of the Edna fault, which creates a structural boundary between the Edna Subbasin and the Pismo Valley Subbasin. The presence of the fault contributes to groundwater in the Edna Valley Subbasin generally flowing northwest towards the San Luis Valley. However, this general flow direction does not preclude some groundwater from flowing out via Price Canyon towards the Pismo Valley Subbasin and presumably to the Pacific Ocean (SWRCB, 1958; GSI, 2018, their Figure 22). This connection between the two subbasins is critical in maintaining groundwater-dependent ecosystems in middle and lower Pismo Creek.

Throughout this WG, groundwater is found in alluvium and dune sands, and in the widespread, relatively young and poorly consolidated bedrock. Groundwater is naturally recharged via surface and underflow from both Pismo and Arroyo Grande Creeks, and by direct precipitation (CDWR 2002). Additional recharge to this basin is provided by Lopez Dam, in the headwaters of Arroyo Grande Creek, which is operated so as to optimize groundwater recharge for the Santa Maria Basin (CDWR 2002) by releasing flows when surface runoff is likely to infiltrate before reaching the Pacific Ocean. Incidental recharge also occurs from deep percolation of urban and agricultural return water, treated wastewater return and septic tank effluent (Bulletin 118).

<u>WG 5 Nipomo</u>. This WG includes the remaining portion of the Santa Maria Basin in the County and the Nipomo Valley Subbasin. WG 5 groundwater users include a mix of agricultural, rural, and municipal users. The basin is considered high priority under SGMA.

Similar to WG 4, groundwater is found in alluvium and dune sands, and relatively young bedrock. Groundwater is likely recharged via surface and underflow from Nipomo Creek, direct precipitation, and incidental recharge from urban stormwater and agricultural return water.

<u>WG 6 Cuyama River</u>. This WG contains the Cuyama Valley and Huasna Valley Basins. The Cuyama Valley Basin is listed as medium priority under SGMA. The primary groundwater users in this WG are rural and agricultural.

Groundwater is found in both alluvium and older terrestrial deposits, with recharge primarily from surface and underflow of the Cuyama River. Surface water in the Cuyama Valley drains generally west via the Cuyama River and its tributaries, ultimately into the Santa Maria River via Twitchell Reservoir. Groundwater in the Cuyama Valley also appears to flow west, but its path is impeded by uplifted bedrock where the valley (and the path of CA 166, which follows it) turns from west-southwest to southwest, descending steeply to Twitchell Reservoir about 16 miles farther downstream. Behind this bedrock obstruction, the river gradient flattens and groundwater is forced close to the surface, impounding a broad alluvial valley with abundant vegetative evidence of relatively abundant water despite limited direct precipitation (Figure 1-8).

The surface water in the Huasna Valley drains via the Huasna Creek and its tributaries, also entering Twitchell Reservoir (Jennings 1958). Groundwater is found primarily in alluvium and, like all other alluvial groundwater basins, it is likely recharged by surface and underflow from the overlying river.

Figure 1-8. Valley of the Cuyama River just upstream of its crossing of the South Cuyama Fault and descent through the bedrock valley of the Sierra Madre Mountains, about 16 miles upstream of Twitchell Reservoir. Shallowing bedrock brings groundwater in the alluvial basin close to the surface, supporting abundant vegetation in this otherwise rather low-rainfall region. Photograph by D. Booth, Stillwater Sciences.

<u>WG 7 Salinas River</u>. This WG contains the Pozo Valley, Rinconada Valley, and the Santa Margarita Valley Basins. These basins are listed as low priority under SGMA. This WG also contains the western portion of the Paso Robles Subbasin of the Salinas Valley Basin and the Atascadero Subbasin. These subbasins are listed as high priority under SGMA, and the Paso Robles Subbasin is considered to be in critical overdraft. The groundwater users in these basins include a mix of rural users, agricultural users, and urban water suppliers.

Surface water in the Salinas River drains north via the main stem of the Salinas River. Groundwater in the Paso Robles Subbasin is found in recent alluvium and the Pleistocene-age Paso Robles formation. Natural recharge in the subbasin is derived from infiltration of precipitation, seepage from surface flow and underflow of the Salinas River and its tributaries, and return flow from irrigation and other uses (CDWR 1958). The Rinconada fault zone forms a leaky barrier that restricts flow from the Atascadero portion of the subbasin into the main part of the Paso Robles Subbasin (Fugro West 2001). The San Andreas Fault, which bounds the basin on the northeast, also restricts subsurface flow (CDWR 2016).

<u>WG 8 Estrella River</u>. This WG contains the Big Spring Valley, Rafael Valley, and Cholame Valley Basins. These basins are listed as low priority under SGMA. This WG also contains the eastern portion of the Paso Robles Subbasin previously described in WG 7. The primary groundwater users in these basins are rural and agricultural.

<u>WG 9 Carrizo Plain</u>. This WG contains the Carrizo Plain Valley Basin, which is listed as low priority under SGMA. The primary water users are rural and agricultural, drawing from groundwater in recent alluvial deposits and in the Paso Robles and Morales Formations. The surface water in the Carrizo Plains drains internally towards Soda Lake, with recharge to the basin occurring by percolation of this stream flow and infiltration of the limited precipitation that falls on the valley floor (CDWR 1958).

1.2.6 Land Cover and Land Use

There are nine local governmental land-use agencies in the County. As organized geographically by this plan's WMAs, their areas of responsibility are listed in Table 1-2. Land cover across the Planning Area and the location of the major cities and other land-use entities are mapped in Appendix 1-B.

Table 1-2. Incorporated cities, unincorporated communities, and responsible land-use agency. Modified from the IRWMP Table C-4 (p. C-56).

Watershed Group	Unincorporated Communities and Cities	Land Use Agency
1 San Simeon/Cambria	San Simeon Cambria	SLO County
2 Cayucos/Los Osos	Cayucos Morro Bay Los Osos Baywood Park	Morro Bay
3 San Luis Obispo Creek	San Luis Obispo	San Luis Obispo

4 Arroyo Grande/Pismo	Avila Beach Los Ranchos/Edna Valley Lopez Lake Recreation Area	SLO County
	Pismo Beach	Pismo Beach
	Arroyo Grande	Arroyo Grande
	Grover Beach Oceano Halcyon	Grover Beach
5 Nipomo	Nipomo	SLO County
6 Cuyama River		SLO County
7 Salinas River	Paso Robles	Paso Robles
	Atascadero	Atascadero
	Garden Farms Santa Margarita Templeton San Miguel Nacimiento Heritage Ranch Oak Shores Adelaida Creston Linne Pozo	SLO County
	Los Padres National Forest	US Forest Service
8 Estrella River	Shandon Whitley Gardens Cholame	SLO County
	Los Padres National Forest	US Forest Service
9 Carrizo Plain	California Valley	SLO County

1.3 RECEIVING-WATER CONDITIONS

1.3.1 Approach

Characterizing the “condition” or “health” of a stream, lake, or wetland can take many forms. Virtually all studies have a particular impairment or endpoint in mind, be it an evaluation in the context of regulatory standards for water quality, the enhancement of one or more target species, or the identification of locations and types of prospective stream-improvement projects. Although these are all potential focus areas for stormwater resource planning, a more comprehensive organizing framework is useful to ensure that all the key aspects of watershed health are at least acknowledged, recognizing that data may be more abundant for some aspects than for others.

This report embraces the conceptual framework offered by Karr and Yoder (2004), which uses the biological condition of organisms as the indicator of overall stream or watershed “health” (Figure 1-9). This framework explicitly links the human actions collectively termed “urbanization” with the resulting biological condition, typically the primary end-point of concern and almost always its most sensitive. Urbanization alters the landscape, inflicting stresses on stream biota through a set of water resource features (habitat structure, flow regime, water quality, energy sources, and biotic interactions) that can each be assessed. Meaningful analyses of a disturbed watershed, and ultimately successful rehabilitation of the impacted receiving waters of that watershed, require understanding the many stressors and their interactions that link human actions to biotic changes (e.g., Grimm et al. 2000).

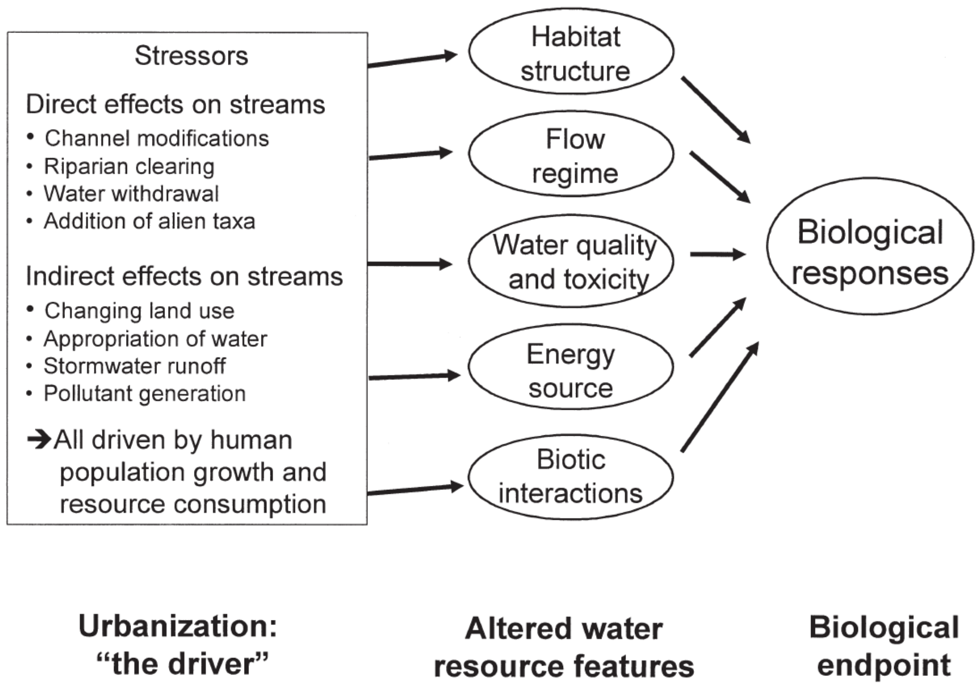


Figure 1-9. Conceptual model of the varied stressors resulting from human actions that alter stream biological condition (Figure 1 of Booth et al. 2004; modified from Karr and Yoder 2004).

This framework is applied to the receiving waters of San Luis Obispo County through this SWRP in several ways. As originally published, it emphasized "urbanization" as the primary stressor on receiving waters, and across many parts of San Luis Obispo County this is true as well. However, a true watershed-based plan must recognize the range of such stressors, and so for purposes of this characterization the plan also acknowledges the large portions of the County for which agriculture, rather than urbanization, is the primary determinant of downstream conditions. This perspective is applied to each of the altered water resource features in this SWRP as follows:

- **Habitat structure** is only indirectly affected by most of the elements addressed by this plan. Barriers to migration of South-Central California steelhead (*Oncorhynchus mykiss*), however, pose critical challenges to improving overall watershed health, and so they are included in the data sets compiled and presented here.
- **Flow regime** has been a particular focus of prior studies, with substantial prior information to draw upon here. Because instream flow is a key response variable to multiple aspects of this plan (including water supply, groundwater conditions, and stormwater runoff management), it is emphasized in the discussions that follow.
- **Water quality** is strongly affected by runoff from both urban and agricultural land uses. Although stormwater runoff management is most commonly focused on the acute impairments generated from urban areas, TMDLs in the County apply to pollutants generated from a variety

of human disturbances and so are included in the following summaries regardless of their likely source(s).

- Although **energy sources and biotic interactions** are influenced by the interaction of human populations with the stream and its riparian zone, they are only acknowledged here in the interest of completeness but without the expecting them to be significant drivers of stormwater management for resource enhancement.

For purposes of the following characterizations, the most integrative indicators of overall receiving-water health are judged to be those that reflect the condition of in-stream biota, particularly benthic macroinvertebrates that spend most of their life history in intimate connection with the flow regime, water chemistry, and physical substrate of the channel. Two such measures, the Southern California Index of Biotic Integrity (SC IBI) and the California Stream Condition Index (CSCI), have been variously reported over the last 23 years at sites throughout the County. As described in Rehn et al. (2015, p. 3), "The California Stream Condition Index (CSCI) is a new statewide biological scoring tool that translates complex data about benthic macroinvertebrates (BMIs) found living in a stream into an overall measure of stream health...The CSCI combines two separate types of indices, each of which provides unique information about the biological condition at a stream: a multi-metric index (MMI) that measures ecological structure and function, and an observed-to-expected (O/E) index that measures taxonomic completeness."

Two approaches have been taken to characterize water quality. County-wide, basic water-quality parameter values from the Central Coast Ambient Monitoring Project have been accessed, using the web-based interface at www.ccamp.org, to gain rapid site-by-site inspection of archived monitoring data. At a finer scale, baseline runoff and particulate pollutant loading were estimated for each of the MS4 permit holders (City of San Luis Obispo, Paso Robles, Atascadero, Morro Bay, Arroyo Grande, Pismo Beach, and San Luis Obispo County) using the Tool to Estimate Load Reductions (TELR). Mapping of urban catchment drainages and integration of local spatial datasets was completed by City and County Staff with assistance from 2NDNATURE. Outputs are available to each permit holder online (www.swterl.com) and provided as maps in this SWRP (see Appendix 1-C).

TELR is a spatially distributed hydrologic model, with landscape characteristics and processes represented explicitly throughout a network of urban catchments or regional watersheds to provide average annual runoff and pollutant loading estimates (2NDNATURE 2017). The model has been developed as part of a web-based stormwater tools platform to provide spatially explicit outputs to satisfy MS4 permit reporting requirements and track stormwater mitigation progress over time to reduce reporting compliance effort on the part of permittees (see www.2nform.com). TELR employs the USDA Curve Number technique (USDA-SCS 1986); hydrologic computations combine a set of metrics that describe a 30-year rainfall distribution with spatial drainage characteristics, including impervious cover from the National Land Cover Dataset (NLCD), land use from local parcel assessor layers, soils from the Natural Resource Conservation Service (NRCS), and hydrography from the USGS National Hydrography Data Set (NHD) or local stormwater infrastructure and drainage mapping. Total Suspended Solids (TSS) estimates are used as proxy for other hydrophobic particulate pollutants with a tendency to adsorb to soil participles (e.g. total nitrogen, total phosphorus, bacteria, metals, pesticides/herbicides) via land-use based characteristic runoff concentrations (CRCs). Runoff is expressed in units of ft/yr (i.e., the annual volume of runoff normalized by the catchment area); particulate pollutant loads are expressed in units of tons per acre per year. Model results have been validated against high-resolution monitoring data and continuous simulation models (Beck et al. 2017; see also SWRCB 2017).

Another important basis for evaluating the condition of stream resources in the County is the habitat they provide for steelhead (anadromous *O. mykiss*). In San Luis Obispo County, these fish belong to the federally threatened South-Central California Coast Distinct Population Segment (DPS), which includes most streams in Monterey, San Benito, Santa Clara, Santa Cruz, and San Luis Obispo counties between the Pajaro River and the Santa Maria River (NMFS 1997, 2006). One critical recovery action listed by the National Marine Fisheries Service is ensuring sufficient streamflow to support for essential steelhead habitat functions (NMFS 2012), which includes both implementing adequate operational criteria for dam releases and maintaining adequate instream flows during critical times of year.

The timing and extent of flow in stream channels throughout the Central Coast, including San Luis Obispo County, necessary to support the migration and rearing of *O. mykiss* were recently studied (Stillwater Sciences 2014a). For that study, only sites with a high potential for steelhead rearing based on intrinsic watershed characteristics (including historical perennial flows) were selected (NOAA, 2006). The evaluation determined: (1) what minimum level(s) of flow are needed in spring and summer to support critical life stages of South-Central California steelhead; and (2) which streams are meeting these levels? These findings, together with dry-season flow data collected in years following the original study (CCSE 2017) and the stream reaches with the potential to host these fish, are presented in an interactive map at http://geo.stillwatersci.com/maps/slo_rifa/instreamflowassessment.html and have been integrated into this SWRP. County-wide dry-season flow data for 2015 and 2016 can be viewed by clicking on each site. Data for the 2017 and 2018 dry season will be available in future online iterations of the map.

In the preparation of Stillwater Sciences (2014a), sufficient data were available to generate a robust relationship between watershed area and necessary instream flows. This is a reasonable relationship to explore, insofar as the minimum flow for providing suitable aquatic habitat should vary with channel size (i.e., larger channels require more water to remain “wet”), and channel size generally scales with watershed area:

For steelhead spring (April and May) flow requirements,

$$Q = 0.049\ A_{dr} + 0.31;$$

and for steelhead summer flow requirements,

$$Q = 0.012\ A_{dr} + 0.20,$$

where A_{dr} is drainage area in square miles and Q is the estimated minimum flow requirement.

As examples, the minimum flows for the perennial reach of San Luis Obispo Creek where it enters the lower canyon (43.5 mi^2) are predicted by these equations to be 2.4 and 0.7 cubic feet per second (cfs) in spring and summer, respectively; where the channel passes through downtown (13.2 mi^2) the predicted values are 1.0 cfs (spring) and 0.4 cfs (summer).

Minimum predicted values to support steelhead life-history requirements are commonly met or exceeded in many of the gaged reaches of the County's streams, at least during wet or normal water years. However, they are not met everywhere and obviously not at all where and when the channel goes dry. These locations are noted below as available. A comprehensive dry-season flow monitoring program of approximately 65 sites across the County was started in 2015. The existing flow data span a wide range of water year types based on precipitation including very dry, average, and very wet years. Although the information is presently insufficient to develop comprehensive County-wide recommendations for where improvement of instream flow would be most valuable, the most promising stream segments can be identified as those immediately adjacent to perennial reaches of the channel, and thus where relatively modest improvements could result in significant extension of the wetted channel network. In general, these include:

- Perennial reaches in upper to middle portions of watersheds that are fed by groundwater, springs, and seeps through the dry season;
- Perennial reaches in any portion of the channel network (upper, middle, or lower reaches) that are maintained by groundwater discharges resulting from shallow bedrock, valley constrictions, confluence of channels, or rapid change in stream or groundwater gradient;
- Perennial reaches that are maintained or enhanced by dedicated, permanent human flow releases.

In addition to simply extending the length of perennial reaches or increasing flow within existing perennial reaches, reaches targeted for instream flow enhancement will be most beneficial where other the other water resource features (water quality, physical habitat, etc.) are good and so where correction of flow limitations could yield direct resource benefits. These principles will inform later sections of the SWRP.

1.3.2 Receiving-Water Conditions

Owing to the literally hundreds of water bodies in San Luis Obispo County (see maps, Appendix 1-B), the following descriptions are somewhat selective in their emphasis. Receiving waters that are directly influenced by, or themselves directly influence, urban areas are topics of particular focus in this SWRP, together with those that either support high environmental resource values or have suffered significant resource degradation. Of the variety of receiving waters, lotic (stream) systems garner the most attention in this plan because they are the most pervasive receiving waters across the County, characterization data are most abundant, and their conditions are most sensitive to both local and watershed-scale impacts. The availability of such data in part has guided the choice of and depth of the following descriptions, supplemented by abundant local experience and prior studies conducted by agencies represented by the Project Management Team, the Technical Advisory Committee, the Regional Water Quality Control Board, and their various staff and consultants.

<u>WG 1 San Simeon/Cambria (Figure 1-10)</u>. From north to south, the primary streams in this coastal WG are San Carpoforo Creek, Arroyo de la Cruz, San Simeon Creek, and Santa Rosa Creek. These channels, and many of the smaller drainages, provide good potential migration and rearing habitat throughout this WG.

Figure 1-10. Views of receiving waters in WG 1. Top left, Santa Rosa Creek above Cambria. Top right, Burton Road crossing of Santa Rosa Creek adjacent to town center. Bottom left, nearshore south of San Simeon Bay. Bottom right, hillside gully in recent sediments downslope of Arroyo de la Cruz. (photos by D. Booth).

The steep, largely undeveloped watershed of San Carpoforo Creek has only one CCAMP site (310SCP) with relatively limited data. A single SC IBI measurement in 2009 reported “fair” conditions, although all water quality parameters were “good” to “excellent” across multiple sampling events 2002-2015. The Pacific Ocean outfall of San Carpoforo Creek is designated as State Marine Conservation Area and State Marine Reserve within the Monterey Bay National Marine Sanctuary; the IRWMP identified the creek as the route of the historic Portola Expedition and also an area of high ecological significance, according to the US Forest Service.

Along San Simeon Creek, two CCAMP sites are present—one at the State Park foot bridge near the mouth of the creek (310SSC), and the other about two miles upstream at the San Simeon Road crossing (310SSU). The lower station reports generally good to excellent water quality conditions for ammonia, TSS, and temperature, but only fair to poor (and worsening) conditions for nitrate, phosphorus, and DO. All water-quality analytes are good to excellent at the upper site, suggesting that the intervening land use is adding a significant nutrient load to the creek. These findings are mirrored by the SC IBI, which reported uniformly "good" scores (2002 and 2009) at the upper site, but a mix of good (2001-2005) to poor (2009) scores at the lower site. The estuary of San Simeon Creek supports a range of biotic communities and estuarine habitats. Based on spot flow measurement collected recently in a very dry, average, and very wet years (2015-2017), lower San Simeon Creek dries out consistently in the summer, whereas upper San Simeon Creek generally remains flowing throughout the year summer (CCSE 2017 and unpublished data).

Santa Rosa Creek has been the focus of several studies. The CCAMP program has two sampling sites, with much of the town of Cambria between them. The upper site at Ferassi Road (310SRU) shows good to excellent conditions for virtually all water quality constituents (except temperature, which is "fair"); the lower site at Moonstone Drive (310SRO) is also generally good but with declines reported over the period 2001-2015 in nitrogen species, turbidity, and temperature (i.e., T increasing). These trends are mirrored by the California Stream Condition Index, with a "good" rating for the upper site and "fair" for the lower site (similar findings were reported by Stillwater Sciences [2012a] for sampling in 2010). First flush samples low in the watershed, also collected and reported by Stillwater Sciences (2012a), exceeded Regional Board "attention levels" for total dissolved solids and metals.

The Santa Rosa Creek Watershed Management Plan (Stillwater Sciences 2012a) provided a comprehensive view of the watershed and channel network. Flow is perennial over much of the channel network, with seasonal flow only the uppermost headwaters and in a one-mile reach just below the confluences with Curti Creek. Land-use impacts to the creek have transitioned from mining and logging in the early 20th century to a greater density of human population, particularly between about 1960 through the mid-1990s as Cambria experienced a steady increase in population, growth that had largely ceased as of 2000. Increasing population also resulted in an expansion of groundwater pumping and stream diversions to irrigate crops and to provide drinking water to Cambria, which has reduced base flows in Santa Rosa Creek, and potentially within Perry and Green Valley creeks as well.

The primary recommendation of the Santa Rosa Creek Watershed Management Plan was to increase summer and fall instream flows through a combination of water conservation and reuse, construction of off-stream storage, and reductions in groundwater pumping for municipal use. Other actions were recommended to restore the riparian corridor, reduce fine sediment delivery to the creek, conserve open spaces, and remove fish barriers. Prior reports in this watershed, which echo some of these same themes, include the *Santa Rosa Creek Watershed Conservation Plan* (TLCSLOC 2010) and the *Lower Santa Rosa Creek Enhancement Plan* (Prunuske Chatham Inc. 1993). These recommendations are supported by more recent studies including Stillwater Sciences (2014a), which noted that summertime flow in lower Santa Rosa Creek fell below even the modest environmental water demand (EWD) of 0.4

cfs for this channel, and recent spot flow measurements (2015-2017) that demonstrated that EWD on lower Santa Rosa Creek was only met in a very wet year (CCSE 2017 and unpublished data). On the other hand, upper Santa Rosa Creek met summertime EWD in both average and very wet years.

In this WG, lower Arroyo de la Cruz also failed to meet its summertime demand based on USGS data in the 1970s (Stillwater Sciences, 2014a). This is consistent with spot flow measurements from lower San Carpoforo Creek and lower Arroyo de La Cruz from more recent years (2015-2017), which show that summertime EWD is not met except in very wet years (CCSE, 2017 and unpublished data).

One TMDL has been issued in this WG, for indicator bacteria on Arroyo de la Cruz Creek. However, the Regional Water Quality Control Board reports that "the nature of the impairment appears to be quite moderate and exceedances of *E. coli* water quality criteria are not routine." Sources appear to be associated with rangeland grazing activity in the contributing watershed. An additional TMDL in this WG, one that would address nitrate, sodium, chloride, and total phosphorus, has been under consideration since 2014. The conclusion of the draft report (available at https://www.waterboards.ca.gov/centralcoast/water_issues/programs/tmdl/docs/san_simeon_nitrate/index.shtml) is that "the contribution of pollutants from the Cambria CSD [treated wastewater] discharge appear to be the sole source impacting water quality in the lower watershed."

WG 2 Cayucos/Los Osos (Figure 1-11). From north to south, the primary waterbodies in this WG are Cayucos Creek, Whale Rock Reservoir, Morro Creek, Chorro Creek, Los Osos Creek, and Coon Creek. All these channels, particularly the extensive network of tributaries to (and including) Chorro Creek, provide good potential steelhead rearing habitat throughout this WG.

Figure 1-11. Views of receiving waters in WG 2. Left, Morro Creek just upstream of the mouth in the town of Morro Bay. Right, Morro Creek–Chorro Creek estuary at the head of Morro Bay (photos by D. Booth).

Cayucos Creek has one CCAMP station (310CAY) just upstream of the town of Cayucos, and which shows fair to poor conditions for nutrients, DO, and temperature, presumably reflecting the agricultural and grazing activities farther upstream, and a general absence of an extensively vegetated riparian zone. Cayucos Creek supports a core steelhead population and contains some highly suitable steelhead habitat. Existing flow data is not sufficient to determine if environmental water demand is being achieved (Stillwater Sciences 2014a). Based on limited spot flow measurements, Lower Cayucos Creek was dry in the summer of all water year types (CCSE 2017 and unpublished data).

Chorro Creek, draining into the north side of Morro Bay, is one of the most densely sampled streams in the entire County. Fourteen sample sites cover the mainstem and its two major tributaries, Pennington Creek and Dairy Creek. Only two of these sites rate better than "fair" for the SC IBI (Pennington Creek, 310PEN; and Dairy Creek, 310DAL), with the other fair, poor, or very poor. Only four, relatively closely spaced sites along mainstem Chorro Creek reported California Stream Condition Index scores; curiously, these show virtually no correlation with the SC IBI scores for the same dates and locations. Water quality is generally good, particularly in the more upstream sites, but with consistently poor or declining conditions for most nitrogen species and DO farther downstream. Based on limited spot flow measurements, middle Chorro Creek met summertime EWD in all water year types, but lower Chorro Creek only met summertime EWD in a very wet year (CCSE 2017 and unpublished data).

On Los Osos Creek, the most extensive sampling reported by CCAMP has been for benthic macroinvertebrates at two sites. The lower site, just upstream of the community of Los Osos at the crossing with Los Osos Valley Road (310LVR) showed a substantial decline in SC IBI from excellent to fair between 1995 and 2005. Three miles upstream (at 310CLK), a similar but less dramatic decline is recorded over this same period. Twenty-five years (1977–2002) of stream gaging also showed a significant shortfall in summertime environmental water demand (Stillwater Sciences 2014a). Based on limited spot measurements, lower Los Osos Creek was dry in the summer of all water year types (CCSE 2017 and unpublished data).

A single site on Coon Creek (310COO) shows consistently "good" quality for both the CSCI and the SC IBI over a sampling period spanning 1997-2010. But for orthophosphate, multiple samples throughout this period affirm generally good to excellent water quality draining this largely undisturbed watershed. Based on limited spot measurements, lower Coon Creek remained flowing in all water year types but failed to meet summertime EWD in very dry and average water year types (CCSE 2017 and unpublished data).

Five TMDLs have been issued by the Regional Board for this WG—they include pathogens and sediment in Morro Bay, nutrients for wetlands of Los Osos Creek and for Chorro Creek, and dissolved oxygen for Dairy Creek and Chorro Creek. Sediment sources into the bay are predominately from rangeland and brushland, and their control through land-surface treatments is important but outside of the scope of this SWRP. *E. coli* in the bay was found (Kitts et al. 2002) to derive from four sources: bird (22%), human (17%), bovine (14%) or dog (9%). That study found that much of the *E. coli* from birds enters the bay through direct pathways, whereas that from livestock enters via creeks and those from the other sources via all pathways somewhat equally.

The TMDLs addressing nutrients identify distinct causes. For Los Osos Creek and its associated wetlands, the nutrient sources are predominately cropland. For Chorro Creek, the California Men's Colony (CMC) wastewater facility was identified in 2006 as a likely cause; with upgrades to the facility, compliance was anticipated by 2016 (although no corroborating data has been identified). Increase nutrients commonly lead to decreases in dissolved oxygen, which are included in TMDLs for Dairy Creek and Chorro Creek. Nutrients from the CMC wastewater are implicated as the ultimate cause for low oxygen demand in Chorro Creek; grazing practices are highlighted for Dairy Creek.

WG 3 San Luis Obispo Creek (Figure 1-12). A draft of a stand-alone Stormwater Management Plan was completed for the San Luis Obispo Creek watershed in summer 2017 (Stillwater Sciences 2017a), and so abundant data on receiving-water conditions are available for this WG. A summary from that report is provided here; interested readers are directed to the full report. San Luis Obispo Creek provides good potential migration and rearing habitat for steelhead throughout this WG, but with degraded conditions particularly within and just upstream of the central city. Stillwater Sciences (2017a) reported that actual rearing habitat in good condition is limited, however, which constrains available locations for instream summertime occupation by steelhead. Seasonally dry reaches largely coincide with geologic conditions conducive to infiltration and thus to water-losing stream segments, reminding us that intrinsic watershed properties can strongly influence habitat conditions. Yet seasonally dry channels are almost certainly influenced by local groundwater conditions, which in turn are influenced by human uses. Based on limited flow measurements, both upper and low San Luis Obispo Creek remained flowing in the summer of all water year types and generally met EWD as well (with a single exception in upper SLO Creek in a very dry water year type) (CCSE 2017 and unpublished data).

Figure 1-12. Views of San Luis Obispo Creek, from its headwaters downstream through the town of San Luis Obispo (Figure 1-12 of Stillwater Sciences 2017b). Top two photos, upper San Luis Obispo Creek upstream of urban areas but with significant watershed grazing. Lower left, San Luis Obispo Creek through the center of town. Lower right, San Luis Obispo Creek below most urbanization; the Pacific Ocean is an additional ~6 miles downstream (photos by D. Booth).

The Regional Board has issued two Total Maximum Daily Load (TMDL) designations for San Luis Obispo Creek: one for nutrients (specifically, nitrogen and pathogens). For nutrients, monitoring results throughout the watershed have demonstrated that the pollutant as originating from the water reclamation plant and agricultural sources entering the creek primarily downstream of the City. It also shows some improvements over the decade of monitoring, although further actions will still be needed to meet the target. For pathogens, the spatial pattern suggests a much stronger contribution from the urban parts of the watershed, and with a trend over time that is not yet suggesting that corrective measures have been effective in the face of continued urbanization (Figure 1-13).

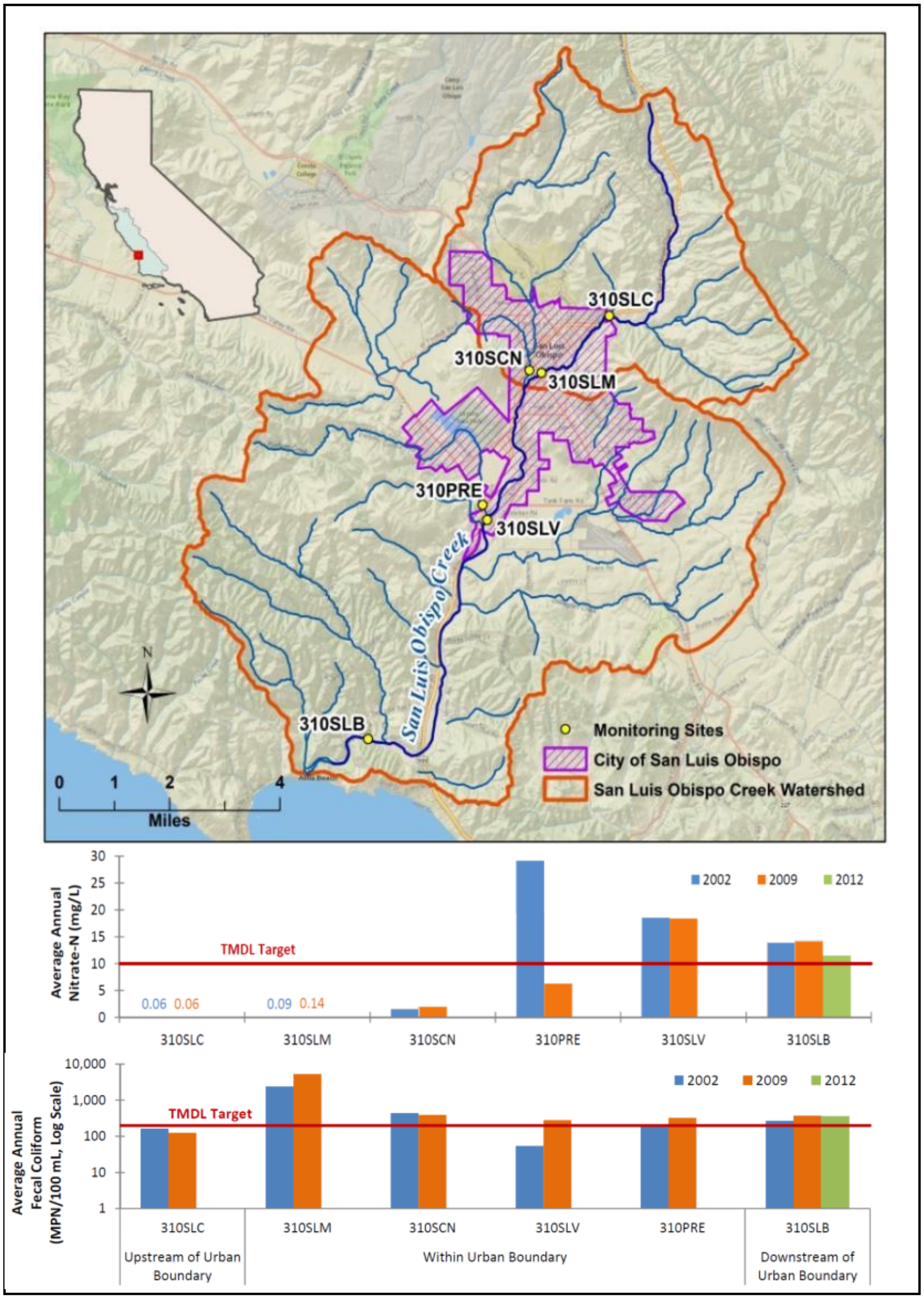


Figure 1-13. Water quality monitoring results for N-nitrogen (top graph) and pathogens (bottom graph) (reproduced from http://www.waterboards.ca.gov/centralcoast/water_issues/programs/tmdl/docs/san_luis_obsipo/nutrient/slo_nut_tmdl_prog_rpt2013.pdf and http://www.waterboards.ca.gov/centralcoast/water_issues/programs/tmdl/docs/san_luis_obsipo/pathogen/slo_path_prog_report_2013.pdf). Yellow circles on the map show the location of sampling sites.

Using the CSCI, multiple locations within the San Luis Obispo Creek watershed paint a consistent picture of overall aquatic health. Sampling in 2003 show a progressive downstream degradation in conditions (Figure 1-14), with the stream reaches of greatest change coinciding with the urban areas of the City of San Luis Obispo.

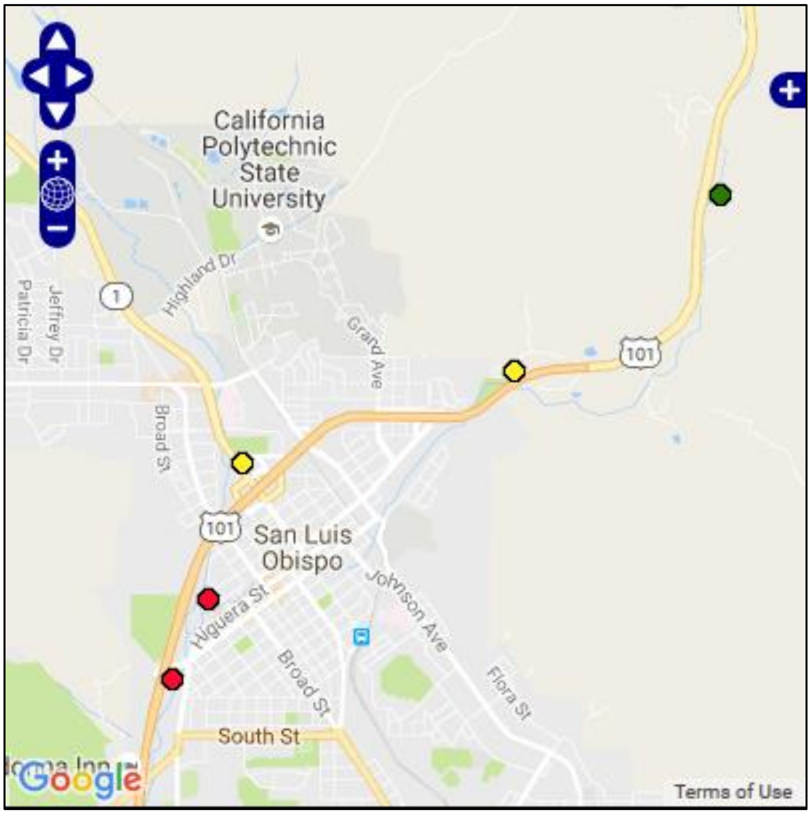


Figure 1-14. Results from 2003 benthic macroinvertebrate sampling by the Central Coast Ambient Monitoring Program (data plotted and downloaded from www.ccamp.org), displaying the likely effects of the urban center on degrading stream conditions. From upstream (upper right corner of the map) to downstream (lower left of map), the station identifiers and their California Steam Conditions Index (CSCI) scores are as follows:

- 310CAW192 (SLO Creek above Reservoir Canyon Creek), 1.031 (“Excellent”)
- 310SLC (San Luis Obispo Creek at Cuesta Park), 0.829 (“Fair”)
- 310CE0276 (Stenner Creek), 0.796 (“Fair”)
- 310CE0724 (SLO Creek above Marsh Street), 0.763 (“Poor”)
- 310CE0308 (SLO Creek below Marsh Street), 0.695 (“Poor”)

<u>WG 4 Arroyo Grande/Pismo (Figure 1-15).</u> The major streams in this WG are Arroyo Grande Creek and Pismo Creek, which together drain the entirety of this watershed area (Figure 1-16). Lopez Lake divides the Arroyo Grande watershed nearly in half, with the upper tributaries draining the forested slopes of the Santa Lucia Range and Garcia Mountain. Tar Spring Creek, one of the largest tributaries to Arroyo Grande Creek downstream of the lake, likely extended even farther to the north and east, reaching to the crest of Garcia Mountain as what are now the headwaters of Huasna Creek (in WG 5)—uplift of the rocks forming Tar Spring Ridge, immediately north of upper Tar Spring Creek, appear to have separated the two drainages at some time in the geologically recent past, creating a dramatic rearrangement of the drainage network in this part of the County.

Figure 1-15. Views of receiving waters in WG 4. Top left, Arroyo Grande Creek upstream of the town of Arroyo Grande at Strother Park. Top right, Arroyo Grande Creek at Bridge Street adjacent to the center of town. Bottom left, levee confining the left bank of Arroyo Grande Creek just upstream of CA 1. Bottom right, lower Pismo Creek just upstream of US 101 (photos by D. Booth).

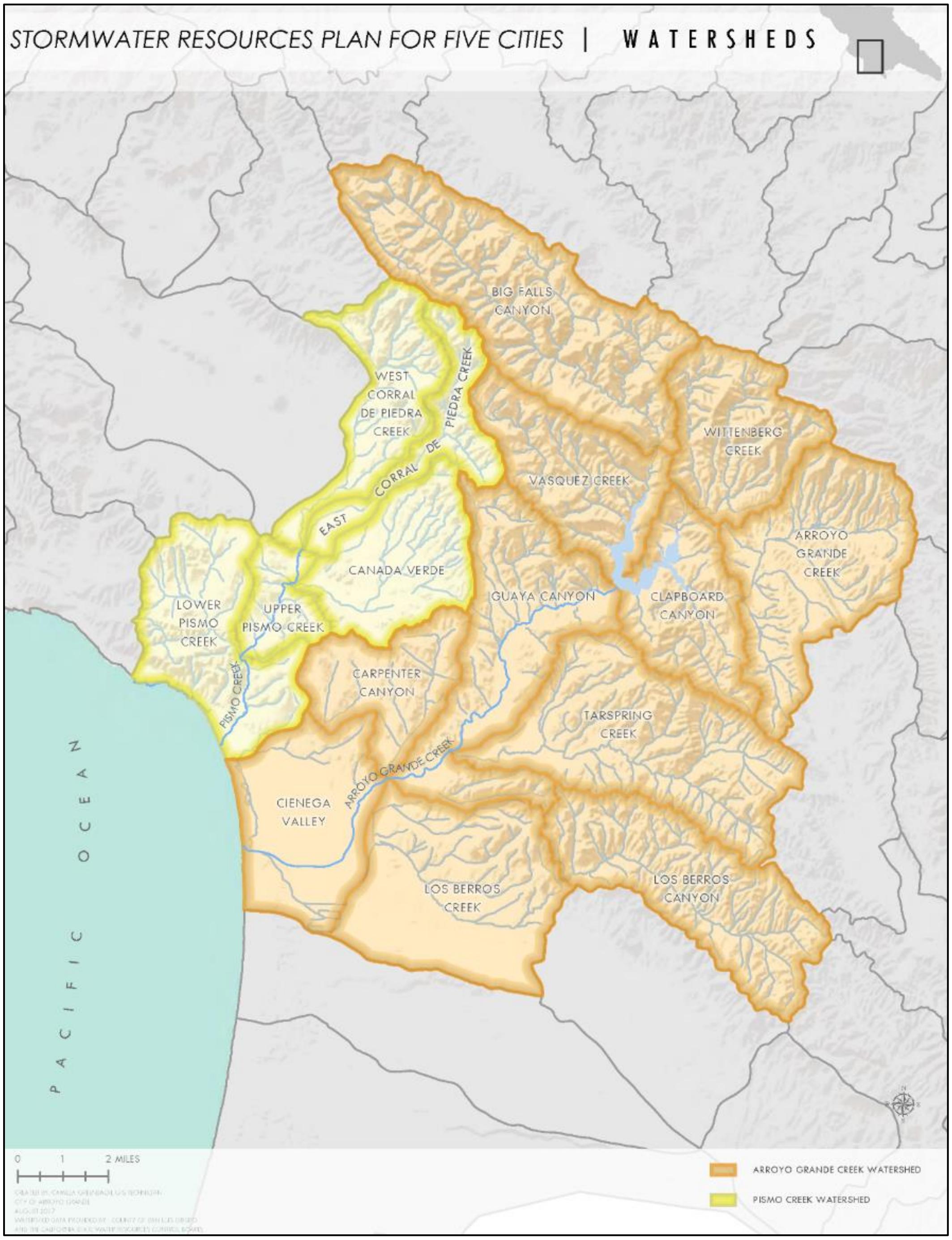


Figure 1-16. Stream subwatersheds of Arroyo Grande Creek (orange) and Pismo Creek (yellow). Map from City of Arroyo Grande.

Arroyo Grande Creek is the major creek system, with a total drainage area of 103 mi^2 (of which 68 mi^2 is above Lopez Dam). The Storm Water Management Plan (Arroyo Grande 2010) reported relatively good water quality conditions in Arroyo Grande Creek: "Water samples (grab samples) were taken from four locations in 1999 to provide reconnaissance-level baseline information on water quality constituents within Arroyo Grande Creek (one upstream, one within and two samples downstream of the City limits)… Water quality analyses indicated most constituents were below analytical detection limits. No consistent pattern was observed in water quality constituents between up- and downstream locations. These reconnaissance-level baseline surveys indicate that water quality conditions within Arroyo Grande Creek provide suitable habitat for steelhead, red-legged frogs, and other aquatic resources."

Four sites along Arroyo Grande Creek below Lopez Lake (2 upstream of the city of Arroyo Grande [310AGB & 310AGS], one inside the city [310AGF], and one just downstream [310ARG]) were sampled annually for benthic macroinvertebrates from 2001–2005. They paint a picture of consistently poor to very poor suite of integrative biological conditions. As with the City's prior monitoring, water quality is generally good but for high concentrations of nitrate and orthophosphate, and marginal temperatures in the lowermost reaches. Similar conditions (but with better nitrate and poorer coliform bacteria) were reported at the one sampling site along Pismo Creek, near the mouth of the channel just upstream of US 101 (310PIS).

Middle to lower Arroyo Grande Creek was identified in Stillwater Sciences (2014a) as one the County streams showing the greatest historical shortfall in environmental water demand. However, flows in the creek are strongly dependent on releases from Lopez Lake, and field visits in 2013 suggested that altered dam operations since the mid-1980s have improved flow conditions in this stream, which now is "likely providing a disproportionate amount of the suitable steelhead rearing habitat in the County, and thus are potentially high priority areas for protection and habitat enhancement" (p. 35). Physical habitat through this reach, however, is rather homogenous and is undoubtedly providing only limited suitable rearing for steelhead (see Figure 1-15, top right).

In this same watershed, this study identified two tributaries to Arroyo Grande Creek with divergent behavior: Los Berros Creek showed a summertime shortfall, whereas Tar Spring Creek exceeded both its spring and summer environmental water demand in the lowest reach. However, spot flow measurements in the middle of watershed suggest the channel is consistently dry across a range of water year types (CCSE, 2017 and unpublished data).

Pismo Creek was the focus of a resource-based evaluation by Stillwater Sciences (2012b), who reported that from "…a combination of influences related to land use and development, aquatic habitat availability and suitability is currently limited in the majority of the Pismo Creek watershed, particularly with respect to water quality and quantity." That study reported significant water-quality problems in the estuary, particularly fecal indicator bacteria (i.e. total coliforms, E. coli, and Enterococcus) derived from both ocean and upstream animal sources (i.e., cattle, dog, bird, and human) that exceeded public health limits for most of the samples taken. The study's highest priority action was to increase dry-season flows in Pismo Creek, a problem ascribed to upstream water extraction and land use modifications. Based on limited spot flow measurements, lower Pismo Creek remained flowing in the summertime of all water year types but met summertime EWD only in a very wet year (CCSE 2017 and unpublished data).

The one TMDL in this WG is for nitrate in Los Berros Creek. The analysis of this pollutant (CRWQCB 2012) concluded that most originates from cropland runoff, with pumped groundwater being the second most important source (but with most of *its* load originating from croplands as well). Urban areas account for about 2% of the total load.

<u>WG 5 Nipomo (Figure 1-17)</u>. Nipomo Creek and Suey Creek are the two significant drainages in this WG, flowing southwest out of the high ground of Temettate Ridge and Huasna Peak to join the Santa Maria River below its confluence with the outflow of Twitchell Reservoir and the Cuyama River. The upland tributaries of Nipomo Creek each turn abruptly southeast at the base of Nipomo Mesa, a deposit of wind-blown sand that stands up to 100 feet above the Nipomo Valley and separates it from the Santa Maria River. The creek flows for several miles perched above the Santa Maria River valley until it turns south to breach the sand body and join with the mainstem river (Dibblee and Minch 2006).

Figure 1-17. Views of receiving waters in WG 5. Top left, headwater channels and hillslopes of Nipomo Creek. Top right, Nipomo Creek tributary flowing across Nipomo Valley. Bottom left, Nipomo Creek beneath W Tefft Street downstream of the town center. Bottom right, gully cutting through sediments of Nipomo Mesa to the Santa Maria Valley (photos by D. Booth).

Significant residential development has occurred in the last 20 years, primarily on the Nipomo Mesa between CA 1 and US 101. Direct drainage from this area into Nipomo Creek, however, is likely limited from this area, given the irregular topography that drains both northeast (to Nipomo Creek) and southwest (directly to the Santa Maria River) and the overall permeability of the underlying geologic material. The original town center of Nipomo lies adjacent to Nipomo Creek and straddles several of its tributaries, which flow through the residential neighborhoods here along backyard property lines.

Suey Creek emerges from a mixed forest-and-grassland canyon west of Huasna Peak and then turns southwest to join the Santa Maria River at the northeast corner of the City of Santa Maria, breaching the same wind-blown sand deposit to reach this confluence in a narrow canyon as does Nipomo Creek farther downstream (Dibblee 1994). As it leaves the rangefront, Suey Creek flows under a thin, discontinuous riparian canopy in a valley surrounded by grazed grassland and some crops in its lowermost reaches.

No water-quality or benthic macroinvertebrate data are available in this WG.

WG 6 Cuyama River (Figure 1-18). The Cuyama River, the primary watercourse in this WG, drains out of the landward side of the Sierra Madre Mountains, from a watershed with only limited population and rainfall. The mainstem river is a braided, sand-bedded channel over much of its length, changing character only after it turns southwest through the Sierra Madre Mountains and descends more steeply to enter Twitchell Reservoir. Within the area of the reservoir, the river is joined by Huasna Creek and Alamo Creek, entering from the northwest and north, with substantially smaller drainage areas. The combined discharges of these channels are controlled by operations of Twitchell Dam, which holds back flows during times of abundant downstream discharge along the Santa Maria River. This water is later released when flow in the Santa Maria River is low, with the goal of achieving full infiltration of the combined discharges of the Santa Maria River and Cuyama River without loss of surface water to the Pacific Ocean. This optimizes the recharge of the underlying groundwater basin but represents a significant alternation of the flow regime in the mainstem Santa Maria River below the confluence of the two channels (Booth et al. 2014). Twitchell Dam is not fish-passable, and so in-stream resources at present are of only localized management concern.

Figure 1-18. Views of receiving waters in WG 6. Top left, upper Cuyama River looking south; channel at the base of the eroded face in the middle distance. Top right, Cuyama River in the lower canyon above Twitchell Reservoir. Bottom left, Twitchell Reservoir; the rear face of Twitchell Dam is visible in the middle distance. Bottom right, Huasna River upstream of Twitchell Reservoir (photos by D. Booth).

Besides Twitchell Dam, human activity in this WG is limited. A single state highway (CA 166) traverses its length, and irrigated agriculture is present only in the upper end of the watershed, where the river first enters San Luis Obispo County and about 16 miles of valley bottom is under cultivation.

Unlike the other WGs addressed in this plan, that of the Cuyama River is incomplete because the river itself forms the boundary between San Luis Obispo County and Santa Barbara County. Thus, approximately half of the contributing watershed to this channel is not directly addressed by this plan (although any influence of that “missing” watershed area of the river is nonetheless felt). This shortcoming, however, is not judged to be problematic, insofar as the vast majority of the watershed has only limited human disturbance and is entirely non-urban.

In this WG, two sampling sites on Alamo Creek (312ALA and 312CAW052) report generally good water quality (except for high temperatures) but poor CSCI scores. This pattern is similar along the Cuyama

River, with one station above (312CAW031) and one below (312CUT) Twitchell Reservoir. At the latter site, however, turbidity and TSS were also found to be problematic.

Alamo Creek was noted by the instream flow study (Stillwater Sciences 2014a) as falling short in its summertime environmental water demand (1.2 cfs, based on drainage area).

<u>WG 7 Salinas River (Figure 1-19)</u>. At 823 mi^2, this WG is the largest in the entire planning area and constitutes one-quarter of its total size. From south to north (i.e., upstream to downstream), major streams and tributaries to the Salinas River are Santa Margarita Creek, Atascadero Creek, Paso Robles Creek, Huerhuero Creek, the Nacimiento River, and the Estrella River (this last covered in the next section).

Figure 1-19. Views of receiving waters in WG 7. Top left, East Branch Huerhuero Creek. Top right, lower Huerhuero Creek. Bottom left, Atascadero Creek above US 101. Bottom right, Salinas River approaching Paso Robles; Niblick Road bridge visible looking downstream (photos by D. Booth).

The headwaters of the Salinas River watershed lie in the La Panza Range in the Los Padres National Forest, about 40 miles southeast of the City of Paso Robles. Its multiple upper tributaries collect in Santa

Margarita Lake, at about River Mile (RM) 155, and they flow northwest for the next 15 miles as the Salinas River in a narrow, bedrock-bounded valley. A broad valley immediately west, occupied by the grossly undersized Trout Creek, gives testament to a dynamic tectonic history of this region that likely shifted this segment of the Salinas River a mile or more to the east many millennia in the past. The river emerges from the rangefront into the broad, alluvial valley and flows for 15 miles before reaching the City of Paso Robles. The river continues to flow in this valley to the Pacific Ocean, some 140 miles downstream.

The morphology and behavior of the Salinas River over most of this WG, from Santa Margarita Lake downstream to its confluence with the Estrella River, is discussed in some detail in Stillwater Sciences (2017b). It reported that the channel varies between a single-thread and intensely braided form, with good correlation between channel pattern and three watershed and riparian factors: valley confinement, vegetation density, and urbanization. These factors are positively correlated with one another, and also with the presence of an unbraided, single-thread channel. Although the independent influence of each factor cannot be identified with certainty (for example, cities and towns tend to develop in areas with a confined channel and thus a limited area prone to flooding), the presence/growth of riparian vegetation is not only a *consequence* of external factors beyond direct control (e.g., valley confinement, elevated nutrients from stormwater runoff and treated wastewater discharges) but also a *provider* of the same river characteristics that are typically valued for urban development (namely, channel stability and a limited width of the active zone).

Stillwater Sciences (2017b) also noted that these upper reaches of the Salinas River, spanning about 30 miles in total, are the only reaches of the river below Santa Margarita Dam that express, at least locally, a dynamic form that likely reflects something of its behavior prior to extensive human occupation of the Salinas valley. For the remaining 100+ miles of the river's course, downstream of this WG and so outside of the study area altogether, a combination of valley confinement, encroaching land uses, and increased riparian vegetation imposes a stable, single-thread planform for the remainder of the river's course to the Pacific Ocean.

The CCAMP database reports two stations on the mainstem Salinas River. The upper site (309SAT, near the city of Atascadero), reported a single "poor" CSCI score and a "fair" SC IBI scope in 2000. Over a longer period (1999-2016), water-quality parameters have been largely good to fair, with nitrogen species and temperature being the constituents of greatest concern. Atascadero Creek, sampled downstream of US 101 and the center of town (309ATS), had similar water-quality conditions (but with better nitrogen and somewhat poorer orthophosphate). This channel also lacks sufficient summertime environmental water flows (Stillwater Sciences 2014a).

Downstream as the river passes through Paso Robles (309PSO), two benthic macroinvertebrate samples in 1999 and 2000 yielded "fair" scores for both the CSCI and SC IBI. Water quality conditions were as seen farther upstream, except that temperature was particularly high during parts of three sampling periods (summer 1999, summer 2006, and winter/spring 2012), with most measurements in summer 2006 above 20^{o}C and one exceeding 30^{o}C.

Stillwater Sciences (2014a) noted insufficient summertime environmental water flows in both Jack Creek and Santa Rita Creek, major tributaries to Paso Robles Creek. In Jack Creek, this determination was based on 30 years of USGS gage records through 1978. Although some cultivated agriculture has been present in this watershed for at least the past two decades, the reason for this apparent shortfall is unknown. In Santa Rita Creek, 33 years of gaging through 1994 documented equivalent conditions in a similarly low-development, agricultural drainage area. All other tributaries in the Salinas River watershed where spot flow measurements were recently collected (2015-2017) (Upper Salinas River, Pilitas Creek, Upper Santa Margarita Creek, Moreno Creek, Middle Branch Huerhuero Creek, lower Atascadero Creek, upper Graves Creek) also show that these creeks are commonly dry in the summertime across a range of water year types (CCSE 2017 and unpublished data). Only the Nacimiento River consistently met EWD.

Although most of this SWRP is focused on areas downstream of major reservoirs, the one TMDL in this WG involves the loading of mercury into Nacimiento Reservoir. The primary source is from the Las Tablas Creek watershed, the largest south-side tributary into the reservoir, where the areas of historical mining in the headwaters now releases most of the mercury that ultimately enters the lake.

WG 8 Estrella River (Figure 1-20). This WG, the second-largest in the study area and nearly of equal size to WG 7, includes the Estrella River and its major tributaries—San Juan Creek and Cholame Creek. We have expended the area of this WG north of the Monterey County line to include the full tributary area of Cholame Creek, even though human activity here is sparse and largely limited to agriculture along the valley bottom.

Figure 20. Views of receiving waters in WG 8. Top left, upper San Juan Creek. Top right, lower San Juan Creek. Bottom left, Cholame Creek adjacent to CA 46. Bottom right, Estrella River at Airport Road (photos by D. Booth).

San Juan Creek and Cholame Creek meet in the community of Shandon, combining to form the Estrella River. These two tributaries have rather different characters—San Juan Creek is dynamic and actively braided over much of its length, becoming a confined, single-thread channel only in its upper headwaters and in its last mile entering Shandon. Cholame Creek, in contrast, in more uniformly single-thread with only a few zones of braiding. In part this reflects greater confinement, particularly from CA 46 along its lowermost six miles, and in part it may reflect a greater magnitude of sediment delivery into San Juan Creek from greater rainfall and higher topographic relief in the southwest part of the WG. Downstream of the confluence, the Estrella River is mainly single-thread with only limited zones of minor braiding. The Estrella and its tributaries contain highly suitable steelhead habitat. Portions of the channel network have low summer low flows, however, and do not achieve environmental water demand in at least some years (Stillwater Sciences 2014a).

The CCAMP database reports two sites on Cholame Creek, one on San Juan Creek, and two on the mainstem Estrella River. On Cholame Creek, both lie in the valley a few miles upstream of Shandon along CA 46 near the crossing with Bitterwater Road. Site 317CHO reported a single, extremely poor SC IBI score in 1999. Multiple water-quality samples from 1999-2012 show relative fair to good conditions, with some issues with nitrogen, orthophosphate, DO, and temperature.

On the Estrella River, site 313ESE (near the crossing with CA 46 in Whitley Gardens) reported generally "good" to "fair" water-quality conditions. Water temperatures in the summer of 2008 and 2012, however, were high and occasionally exceeded 25°C, a problematic level for aquatic life. Lower down along the channel, just a few miles upstream of the Salinas River (317EST), the greatest water-quality problems were found to be total nitrogen and turbidity, although only a limited number of samples were taken (6, overall) to adequately characterize conditions. No in-stream biological data are available, but the IRWMP reports (p. C-74) that the riparian forest and adjacent upland areas associated with the creeks' confluence near Shandon are important wildlife habitat for the San Joaquin kit fox, Western burrowing owl and other wildlife species.

There are two TMDLs in the WG, both associated with agricultural activities. That for pathogens on the Cholame Creek identifies rangeland practices as a primary source; that for boron on the Estrella River (including all of the Cholame drainage) concluded that "non-controllable natural sources contribute to or cause elevated levels of boron…The only controllable source that could plausibly contribute to elevated boron in waterbodies is irrigated agricultural operations. Based on the weight of evidence, natural non-controllable sources are the major source of boron to surface receiving waterbodies, and are likely causing the water quality impairment" (from https://www.waterboards.ca.gov/centralcoast/water_issues/programs/tmdl/docs/estrella_riv_boron/estrella_boron_tmdl_factsheet2_final.pdf).

WG 9 Carrizo Plain (Figure 21). This WG constitutes a closed depression, with no surface-water outflows. The primary receiving water is Soda Lake, whose inundated area fluctuates from year to year but appears to range between about 2000 and 3000 acres. A single CCAMP site, at the northwest end of Soda Lake (311SLN) showed generally poor conditions, at least as compared to standards set for typical free-flowing lotic systems. A single SC IBI score was very poor, and most water-quality parameters range from "fair" to "very poor." However, the Bureau of Land Management, the agency responsible for the Carrizo Plain National Monument that largely encompasses this WG, notes that Soda Lake is one of the largest undisturbed alkali wetlands in California, supporting a large seasonal population of shorebirds and fairy and brine shrimp.

Figure 21. Views of receiving waters in WG 9. Top left, channels coming off of the Caliente Range. Top right, gullies off the Panorama Hills (middle distance), with the Temblor Range rising behind them; the San Andreas Fault is mapped at the base of the Panorama Hills. Bottom left, gully development across the alluvial flats of Carrizo Plain downstream of County Road 285. Bottom right, Soda Lake (May 2011) (photos by D. Booth).

1.4 IMPLICATIONS FOR STORMWATER MANAGEMENT

The preceding sections offer snapshots of the physical attributes of the nine Watershed Groups, the conditions of their major receiving waters, and the interplay of water resources and human water use. Given the largely rural land uses over most of San Luis Obispo County, much of these characterizations are only peripherally relevant to a plan whose primary purpose is to identify strategies and projects for the active management of stormwater runoff. However, they set an important context for those more focused discussions that constitute later sections of this plan. They also remind us that an overly narrow focus on "stormwater management," as commonly construed, can ignore critical influences on water resources that lie beyond the reach of a stormwater project; it can also miss opportunities for broad improvements to the environmental resources of a region that would otherwise be ignored by a limited analysis of pollutant sources or identified stormwater problem sites. The intent of the following discussion is to summarize the highest priority needs and opportunities across the County, drawing on the preceding narratives and prior studies (particularly the 2014 SLO IRWMP).

1.4.1 Watershed Conditions and Pollution-Generating Activities

The major land uses of the watershed—agriculture, grazing, and urbanization—each impose potentially significant impacts on water resources. Although urban areas are not predominant in the planning area, their influence on downstream water quality can be substantial (see Stillwater Sciences [2017a] for San Luis Obispo Creek as a particularly well-documented example from the region). They also impose a locally significant demand on water supplies, contributing to groundwater depletion and necessitating the construction of habitat-blocking dams to satisfy that need. However, these urban areas also provide many feasible opportunities for active stormwater management—not only to improve the supply/demand balance for water supplies, but also to alleviate downstream impacts from excessive surface flows and/or pollutant loads. Not entirely coincidentally, nearly all the urban areas of the County are located in part or entirely on relatively flat, relatively infiltrative alluvial valley-bottom sediments. Thus, the major elements of most modern stormwater management strategies (retention and infiltration) will prove to be feasible here.

Agriculture and grazing, although widespread in the County and forming major land uses across most of the watersheds upstream (and, locally, downstream) of urban areas, are more challenging to address as sediment- and pollutant-generating activities in the context of a stormwater resource plan. However, some projects that focus on resource enhancement through treatment facilities or floodplain reconnection are credible considerations in a SWRP; and other conservation programs and actions outside the scope of this plan are nonetheless ongoing and have significant benefits to downstream resources.

1.4.2 Habitat of Receiving Waters (physical habitat, flow regime, and water quality)

WG 1 San Simeon/Cambria. Habitat conditions are generally good in this WG; the major impacts are associated with depleted instream flows. Lower San Simeon Creek appears to suffer from the input of wastewater and/or agricultural pollutants, and nearly all the major streams would benefit from flow enhancement and enhancement to their riparian zones in their lower reaches. San Simeon Creek and Santa Rosa Creek are high priorities for flow enhancements to benefit steelhead.

WG 2 Cayucos/Los Osos. Morro Bay, a regionally significant aquatic resource nearly surrounded on land by the urban development, is directly impacted by urban runoff. Although pollutant sources from undeveloped areas farther upstream are also significant, opportunities to reduce the loading of urban pollutants directly into the bay are undoubtedly present. Low summertime flows are locally problematic, particularly on Los Osos Creek, and water quality is variable with impairments largely affected by upstream agricultural activity. Los Osos Creek is a high priority for flow and water quality enhancements to benefit steelhead, as is Chorro Creek (particularly its tributaries) and Morro Creek.

WG 3 San Luis Obispo Creek. From the draft San Luis Obispo Creek Stormwater Management Plan (Stillwater Sciences 2017a), key habitat-related issues are associated with limited rearing habitat, particularly given the reach through the town center that does not maintain year-round flow. Water quality and overall stream health also decline monotonically between sites upstream of San Luis Obispo to those downstream, suggesting that implementing actions to reduce the flow and water-quality impacts of urban runoff will offer significant potential benefits to instream resources. San Luis Obispo Creek (particularly its tributaries and upper reaches) is a high priority for flow enhancements to benefit steelhead.

WG 4 Arroyo Grande/Pismo. The generally fair-to-good water quality conditions in Arroyo Grande Creek, combined with poor to very poor instream biological conditions, suggests that alteration of the flow regime and degraded riparian conditions along the channel are likely problematic. Although consideration of the flow-release framework from Lopez Dam are beyond the scope of this SWRP, improvements to the discharge of stormwater to the creek from adjacent urban areas would undoubtedly improve instream conditions and so benefit steelhead. Channel straightening and confinement throughout the lower four miles of the creek may also prove resistant to substantive improvement, but opportunities for such enhancement that fall beyond the scope of this plan would likely prove beneficial to instream resources. Pismo Creek is a high priority for flow enhancements to benefit steelhead--particularly in the lower reach, the migratory corridor through the Edna Valley, and along West Corral De Piedra downstream of Righetti Dam.

WG 5 Nipomo. No substantive data are available to characterize habitat conditions or problems in this WG, and so guidance for stormwater management can only be developed generically. Virtually none of the tributaries to Nipomo Creek have any significant vegetative riparian zone at all, and so temperature and overall water-quality conditions are likely compromised. In addition, some of those tributaries flow directly through urban areas, for which direct attention to runoff management and direct channel modifications would almost certainly yield benefits.

WG 6 Cuyama River. Given the lack of fish passage through Twitchell Dam and the paucity of urban areas in this WG, overall benefits to instream conditions and resources are unlikely to be achieved by stormwater management measures within the scope of this plan.

WG 7 Salinas River. Habitat concerns in this WG largely relate to direct channel modifications as they pass through the urban areas, impacts of upstream delivery of water and sediment into downstream constructed stormwater systems, and low flows during the summertime that do not meet minimal environmental demands. Although the gross percentage of urban areas in this WG is not large, most of those areas presently straddle the major watercourse (and many of the secondary ones), suggesting that improved stormwater management would have at least locally beneficial effects on both the mainstem Salinas River and its tributaries. Fortunately, much of the mainstem steelhead habitat within urban areas is migratory habitat, and so somewhat less sensitive to flow impairments than is rearing habitat.

WG 8 Estrella River. This WG is host to almost exclusively agricultural and grazing activities, with almost no urban development. Much of the river-valley bottoms throughout this WG, however, are fully utilized for cultivation, with only limited riparian zones remaining. This condition is particularly pronounced on Cholame Creek and would benefit from improvement; San Juan Creek is sufficiently dynamic, however, that it continues to maintain a fairly natural zone of active floodplain/channel as it cuts through its agricultural landscape.

<u>WG 9 Carrizo Plain</u>. The primary aquatic resource in this WG is the unusual habitats associated with Soda Lake, and for which the need to minimize the already limited impacts of stormwater runoff from developed areas should be paramount.

1.4.3 Groundwater

<u>WG 1 San Simeon/Cambria</u>. The IRWMP concluded that existing water supplies are insufficient to accommodate expected growth, particularly in the northern part of this WG (San Simeon area) and in areas covered by the Cambria Community Plan. Significant concerns include seawater intrusion and tidal influences affecting water quality, and limited groundwater basin yield because of a small recharge area. Most of the groundwater basins supplying this WG lie upgradient of the coastal communities, and so stormwater infiltration from urban areas may be of only limited use in addressing these issues, although potential reductions in seawater intrusion may be affected. Stormwater reuse to lower demand may prove to be a more effective strategy here.

<u>WG 2 Cayucos/Los Osos</u>. Los Osos Valley is entirely reliant on groundwater, and so any future growth is possible only through expansion of this resource. The IRWMP identified risks from drought impacts to groundwater supplies, seawater intrusion, and limited groundwater basin yield. The 2016 update to Bulletin 118 (CDWR 2016) listed the Los Osos Valley Basin as being in significant overdraft. Stormwater capture and recharge in the inland urban areas of the Los Osos Valley that overly the groundwater basins may be an effective strategy in this WG.

<u>WG 3 San Luis Obispo Creek</u>. The IRWMP identified limited supplies as the greatest groundwater-related issue in this WG. The San Luis Obispo Valley Basin was identified in the early 2000s as being in overdraft, a condition that has worsened over at least the following decade. Stormwater capture and recharge in the inland urban areas of the watershed that overly the groundwater basin may be an effective strategy in this WG.

<u>WG 4 Arroyo Grande/Pismo</u>. The IRWMP identified issues relating to groundwater as limited groundwater supply and to some extent groundwater quality. Urban areas in this WG extend sufficiently far inland that stormwater recharge is likely to have at least locally beneficial effects on conditions in the groundwater basin, indicating their potential value in these areas.

<u>WG 5 Nipomo</u>. This area projects a near-doubling of future urban demand, of which a majority is currently provided by groundwater supplies that are already showing significant deficits in both quantity and quality. Almost the entire WG overlies the groundwater basin, and so aggressive efforts to infiltrate stormwater runoff are likely to have direct beneficial effects on this resource.

<u>WG 6 Cuyama River</u>. The IRWMP identified primary issues in this WG of critical overdraft of the groundwater basin and degraded water quality. The Cuyama Valley Basin is listed as medium priority by the 2016 update to Bulletin 118 (CDWR 2016). Given the virtual absence of human disturbance beyond agricultural practices, addressing these issues will almost certainly require attention to the demand side of the supply/demand balance, and as such lies outside of the scope of this SWRP.

WG 7 Salinas River. The IRWMP identifies the fundamental concern in this WG as one of water supply reliability. Although groundwater is only one component of this supply, doubling (or more) of urban populations centers over the next 20 years raises the prospect of deficits from all sources. Two of the groundwater subbasins in this WG, Paso Robles and Atascadero, are listed as high priority by CDWR (2016), and the Paso Robles Subbasin is further listed as being in significant overdraft. Stormwater capture and recharge in both urban and non-urban areas that overly the groundwater basin may be an effective strategy in this WG.

WG 8 Estrella River. There is little available data on groundwater conditions, but also limited opportunities for this plan to affect those conditions.

WG 9 Carrizo Plain. The IRWMP identified water quality and limited supply as the primary groundwater-related issues. As with WG 8, however, there is limited opportunities for this plan to affect those conditions.

1.5 APPLICABLE PERMITS

The previous sections have identified impairments to beneficial uses of waters of the County, and some discussion of the activities that contribute to the pollution of stormwater and dry weather runoff relevant to these impairments. Several regulatory programs and permits address these impairments and apply to specific areas and receiving waters throughout the County.

1.5.1 NPDES Phase II stormwater (MS4) permit

Six municipalities and a number of unincorporated but "urbanized areas" of San Luis Obispo County are subject to the National Pollutant Discharge Elimination System (NPDES) Phase II Small MS4 General Permit (2013-0001-DWQ), with an issue date of February 5, 2013. The affected jurisdictions are:

- Atascadero
- Morro Bay
- Paso Robles
- Arroyo Grande
- Pismo Beach
- City of San Luis Obispo

The other urbanized areas of the County include Cayucos, Cambria, San Miguel, Lake Nacimiento, Templeton, Woodlands, Shandon, Baywood Los Osos, Santa Margarita, Oceano, Avila Beach, Black Lake, Callendar-Garrett, Los Berros, Los Ranchos, Palo Mesa, Edna Valley, San Luis Obispo fringe, Arroyo Grande fringe, Paso Robles fringe, and Atascadero fringe.

Section E.12.k of the Phase II permit requires permittees in these areas to meet post-construction stormwater management requirements through understanding and application of a watershed-process approach. As described more fully in Section 3 of this SWRP, the importance of key watershed processes can be inferred from physical attributes of the landscape, and the protection of those processes is achieved through measures that are tailored to those physical attributes. The distribution of these key processes across the landscape of the County is represented by "Watershed Management Zones" (WMZs; CCRWQCB 2013), which incorporate both the characteristics of the watershed and the nature of the receiving water(s) that lie down-gradient. This SWRP uses the prior mapping of WMZs (Booth et al. 2012, reproduced in Appendix 1-B), adopted by the Central Coast Regional Water Quality Control Board and extended as part of this SWRP to cover all of the County, as the foundation of its analyses and recommendations. The proposed actions in later sections of the SWRP are evaluated under that guidance and so should be fully supportive of NPDES permit requirements.

1.5.2 Total Maximum Daily Loads (TMDLs)

Within the County, the Central Coast Regional Water Quality Control Board has issued 12 TMDLs (with one in development as of early 2018), with nearly all of them associated with agricultural runoff or natural sources:

WG 1
Arroyo de la Cruz indicator bacteria TMDL, *approved May 17, 2011*
San Simeon Creek nutrients TMDL, in development

WG 2
Morro Bay (including Chorro and Los Osos Creeks)

- Pathogen TMDL, *approved May 16, 2003*
- Sediment TMDL, *approved May 16, 2003*

Chorro Creek nutrients and dissolved oxygen TMDL, *approved July 7, 2006*
Dairy Creek dissolved oxygen TMDL, *approved December 3, 2004*
Los Osos and Warden Creek and Warden Lake wetland nutrient TMDL, *approved December 3, 2004*

WG 3
San Luis Obispo Creek

- Nutrient TMDL, *approved September 9, 2005*
- Pathogen TMDL, *approved December 3, 2004*

WG 4
Los Berros Creek nitrate TMDL, *approved May 3, 2012*

WG 7
Las Tablas Creek and Lake Nacimiento mercury TMDL, *approved May 16, 2003*

WG 8
Cholame Creek indicator bacteria TMDL, *approved May 17, 2011*
Estrella River Basin boron TMDL, *approved December 5, 2013*

CHAPTER 2. COORDINATION AND COLLABORATION IN PLAN DEVELOPMENT

2.1 INTRODUCTION

Both the San Luis Obispo County Flood Control and Water Conservation District (District) and the City of Arroyo Grande received planning grant funds toward stormwater resource planning efforts for all of the watersheds in San Luis Obispo County. A stormwater resource plan (SWRP) is required as a condition of receiving State bond grant funds for any stormwater and dry weather capture project (Water Code §10563).

Community involvement is essential in the development and acceptance of a stormwater resource plan. The Project Management Team (PMT), Technical Advisory Committee (TAC), and team of consultants will conduct public meeting and outreach to community stakeholders, including local watershed groups, nonprofit organization, cities, and government agencies, and special districts to solicit community comments, feedback, and provide input on stormwater projects for San Luis Obispo County. A working list of contact information for stakeholders is in Appendix A.

The TAC will be established for the development of the county-wide SWRP and includes the State Water Resources Control Board (SWRCB), Central Coast Regional Water Quality Control Board (CCRWQCB), and interested parties such as municipalities, water suppliers, local agencies, non-governmental organizations, public utilities, and regulatory agencies.

This Stakeholder Outreach, Education, and Engagement Plan details the public engagement opportunities for stakeholders to provide feedback on process and priorities, and submit potential project ideas for stormwater projects that incorporate multiple benefits including water quality, water supply augmentation, flood control, habitat restoration, social involvement, and community enhancement, all which will be channeled into the development of the FE-SWRP.

2.2 PURPOSE

The State Water Resources Control Board (State Water Board) adopted Guidelines to provide baseline requirements for the development of watershed-based Stormwater Resource Plans. Key goals for public education and public participation, outlined in the Guidelines (Section F, page 33) and listed below, guide this Outreach Plan for the San Luis Obispo County's SWRP:

> *A stormwater resource plan shall...[p]rovide for community participation in plan development and implementation.* (Wat. Code, § 10562, subd. (b)(4).)
>
> To maximize community-based benefits, key stakeholders and the public should be involved in all appropriate implementation steps of the Stormwater Resource Plan. Public education and opportunities for public participation in actions, decisions, and projects implemented through watershed-based storm water management should be provided. The Plan should include or provide for public education and public participation goals addressing the following elements:

i. Public education and public participation opportunities to engage the public when considering major technical and policy issues related to the development and implementation of the Plan;
ii. Mechanisms, processes, and milestones that have been or will be used to facilitate public participation and communication during development and implementation of the Plan;
iii. Mechanisms to engage members of affected communities in project design and implementation;
iv. Identification and inclusion of specific audiences including local ratepayers, developers, locally regulated commercial and industrial stakeholders, nongovernmental organizations, nonprofit organizations, and the general public;
v. Strategies to engage disadvantaged and climate vulnerable communities within the Plan boundaries and ongoing facilitation and tracking of their involvement in the planning process;
vi. Efforts to identify and address specific, runoff-related environmental injustice issues within the watershed; and
vii. A schedule for initial public engagement and education.

To meet the goals listed above, stakeholder management includes the processes required to identify the people, groups and organizations that could affect or be affected by the project, to analyze stakeholder expectations and their impact on the project, and to develop appropriate strategies and tactics for effectively engaging stakeholders in a manner appropriate to the stakeholders' interest and involvement in the project. The Stakeholder Management Plan helps ensure that stakeholders are effectively involved in project decisions and execution (PMBOK 5th Edition) throughout the lifecycle of the project, to gain support for the project and anticipate resistance, conflict, or competing objectives among the project's stakeholders. The Stakeholder Management Plan includes several sections:

- **Identify Stakeholders** – identify by name and title the people, groups, and organizations that have significant influence on project direction and its success or who are significantly impacted by the project.

- **Plan Stakeholder Management** – identify the strategies and mechanisms that will be used to achieve the greatest support of stakeholders and minimize resistance.

- **Manage Stakeholder Engagement** – outlines the processes and steps that will be undertaken to carry out the planned strategies.

- **Control Stakeholder Engagement** – describes the methods used to monitor stakeholder engagement and alert the project team if problems are surfacing

2.3 STAKEHOLDER MANAGEMENT PROCESS ENGAGEMENT

2.3.1 Plan Stakeholder Management

Plan Stakeholder Management is the process of developing appropriate management strategies to effectively engage stakeholders throughout the lifecycle of the project and implementation of the Plan, based on the analysis of their needs, interests and potential impact on project success. The key benefit of this process is it provides a clear, actionable plan to interact with project stakeholders to support the project's interests.

It is recognized not all stakeholders will have the same degree of participation or interest. It will be up to the PMT and TAC to engage key stakeholders to be highly engaged in the early stages of the FE-SWRP development. As the FE-SWRP develops, ongoing outreach will allow for stakeholders to engage and contribute to the project prioritization process and project development. An online form will be broadcast to all stakeholders for submittal of previously identified projects at a varying range of development, from conceptual to designed. As the project progresses, the level of engagement will shift from key stakeholders to the broader project team and end-users.

2.3.2 Stakeholder Engagement Management

Stakeholder Engagement Management is the process of communicating and working with stakeholders to meet their needs and expectations, and to address issues as they occur. Stakeholder Engagement Management is the process to systematically foster appropriate stakeholder engagement in project activities throughout the life of the project and provide follow-up opportunities to engage during the implementation stage. The key benefit of this process is it allows the PMT to increase support and minimize resistance from stakeholders, significantly increasing the chances to achieve project success.

To effectively manage stakeholder engagement, the Outreach Plan Project will utilize the strategies identified above to communicate project related information to key stakeholders in a proactive and timely manner. Leveraging the information provided, the project will have the ability to increase support. Managing stakeholder engagement helps to increase the probability of project success by ensuring that stakeholders clearly understand the project goals, objectives, benefits, and risks.

In line with the analysis above, the PMT will also be actively listening and soliciting input and feedback to make sure communications are being received and understood, and also to capture important information to help make adjustments and to respond to problem areas.

2.3.3 Monitor Stakeholder Management

Monitor Stakeholder Engagement is the process of monitoring overall project stakeholder relationships and adjusting strategies and plans for engaging stakeholders. Monitor Stakeholder Engagement involves collecting data, assessing the level of engagement and using insights from the data collection to adjust strategies and tactics for engaging effectively with stakeholders.

The Outreach Plan will have mechanisms to receive ongoing direct feedback from key stakeholders, including meetings, online feedback, and comments for development of the FE-SWRP. Individual stakeholders will be encouraged to participate and to voice questions and concerns, with the most serious issues and concerns that are raised addressed in a formal, rigorous process.

The Outreach Plan will solicit broad participation in the collection and validation of requirements, which will uncover issues and concerns early on so they can be addressed.
Stakeholders are critical to the project's success. The PMT has planned for and will work to involve, engage and listen to all key stakeholders throughout the project lifecycle.

2.3.4 Stakeholder Plan Updates

Note that the Stakeholder Management Plan and associated documents are not static. The stakeholders identified and their information documented will be reviewed at least quarterly to ensure the plan is meeting project expectations and to make modifications if required.

2.3.5 Stakeholder Group Role

Stakeholders may:

- submit projects and programs for inclusion in the FE-SWRP,
- assist the TAC members with input and recommendations
- contribute information and data for the plan development,
- contribute existing data, maps, written reports,
- conduct outreach and education efforts,
- provide local insight, feedback, strategies, and existing examples or models for implementation strategies,
- provide reviews/comments on the draft and final plans

Stakeholders will participate broadly on a regional level (or within any number of TAC Areas) and/or may choose to selectively participate (e.g., during the mapping phase, project submittal phase, review process phase) in the plan development process including the project prioritization process

2.3.6 Stakeholder Engagement

Stakeholder outreach will be conducted in part by the TAC and include:

- Website announcements (including implementation funding information in 2019)
- Email correspondence both directly and via mailing list
- Phone calls both directly and via conference call
- Through existing stormwater and watershed related meetings such as the Central Coast Partners for Water Quality, Regional Water Management Group (RWMG), Water Resource Advisory Committee (WRAC), Arroyo Grande Creek MOU group, Central Coast Water Conservancy
- A minimum of three (3) press releases will support stakeholder outreach efforts

The list of stakeholders, the Kick-off Meeting agenda, summary, and other stakeholder materials will be submitted to the Grant Manager. Darla Elswick, a member of the Consultant Team will utilize her relationships with local agencies, organizations and individuals, in outreach/education and stakeholder engagement.

An in depth list of potential stakeholders has been compiled and the identified individuals and organizations will be solicited for a letter of intent to participate in the SWRP process (Appendix A. State Water Resources Control Board (SWRCB) requires an outreach process that includes disadvantaged communities (DAC) outreach. As such, FE-SWRP planning will incorporate input and priorities of DACs in this region into project prioritization.

2.3.7 Stakeholder Involvement

The Stakeholder Plan will lay a solid foundation for the involvement of county-wide and sub-regional involvement by interested individuals and organizations, and provide a strategy that maximizes participation and input into the plan. It will also set forth a framework and provide guidance for implementing projects and carrying on the goals of the FE-SWRP throughout future years. It is the expressed aim to have a long-term strategy to engage organizations and individuals who are motivated and equipped to meet the formidable challenges involved in planning for increased water quality, groundwater recharge, flood management, environmental enhancements while providing community benefits.

2.3.8 Meetings and Outreach/Education

Stakeholder meetings will occur by TAC Area. Meeting agenda and materials will be posted at: http://www.slocounty.ca.gov/pw/swrp

Kick-off meetings are scheduled to start in February. Meeting agenda and other meeting materials will be developed by the PMT for the Kick-off meeting.

Additional stakeholder meetings will be held following the Kick-off meeting. The proposed meetings are shown in the table below:

Date	Goal
February 26-28 2018	**Kick-off meetings**: Introductory meeting to educate stakeholders about the SWRP purpose, planning and input process, and determination of stakeholder participation
June 2018	**Additional Stakeholder meetings:** Discuss development of projects, project prioritization and Perspectives Analysis, Consultant Team presentations
August 2018	**Additional Disadvantaged Community meetings**
September 10 – October 10, 2018	30-day Comment Period for the Public Draft SWRP
September 20 2018	**Public Draft SWRP review meeting**: Obtain comments and answer questions from all stakeholders at one location in San Luis Obispo, Consultant Team presentations, present steps forward for implementation funding for identified projects

2.3.9 Communication Process

Informal communication will occur; emails, phone calls and doodle polls will assist with coordination and communication with stakeholders. The PMT will develop a master email list based on the stakeholder contact list in Appendix A to announce upcoming stakeholder engagement opportunities and keep stakeholders engaged in and informed. SLO County Public works will maintain a website for sharing and holding information (http://www.slocounty.ca.gov/Departments/Public-Works/Committees/Stormwater-Resource-Plan.aspx). Formal meetings to engage stakeholders will be held in a timeline proposed in Section IV. Consistent participation and communication is integral to the success of stakeholder engagement. Providing information and feedback in a timely manner is also important over this short time frame. Meeting agendas will be prepared and distributed before the meeting. Meetings will be coordinated by the TAC Lead and the PMT. All inquiries can be directed to the TAC Lead who can then contact PMT for further information and clarification.

2.4 PUBLIC EDUCATION AND PARTICPATION OPPORUNITIES: PLANNING AREAS

The PMT, along with TAC leads, will lead a targeted a local outreach effort to stakeholder groups in nine Watershed Planning units throughout the County. In order to outreach to local stakeholders, several meetings in each planning area will be held. The PMT and TAC leads have identified a stakeholder list. The stakeholder group will be comprised of representatives for local agencies, water suppliers, water management entities, school districts, universities, conservancies, public agencies with public lands and easements, private utilities, non-governmental organizations, Native American Tribes, disadvantaged and underrepresented communities, groups with agricultural, development and environmental interest, regulatory agencies, and other individuals. The list of stakeholders will be compiled by the Technical Advisory Committee (TAC) and the Project Management Team (PMT) to ensure inclusivity of all potential stakeholders.

2.4.1 Project Management Team (PMT) Members

The PMT is comprised of five (5) members responsible for ensuring the implementation of the project and grant agreements and incorporating input generated by TAC into the SWRP. The PMT will ensure development of the plan according to the two State grant agreements:

- State Water Resources Control Board (SWRCB) Proposition 1 Stormwater Grant Program (Agreement No. D1612607) – Grantee: City of Arroyo Grande
- Department of Water Resources (DWR) Proposition 1 IRWM Planning Grant (Agreement No. 46000011892) – Grantee: San Luis Obispo County Flood Control and Water Conservation District

The individual members of the PMT will also be represented on the TAC.

Role	Member Agency	Representative
SWRCB Grant Manager	City of Arroyo Grande	Patrick Holub, Community Development Department

DWR Grant Manager	San Luis Obispo County Flood Control and Water Conservation District	Mladen Bandov, Water Resources Engineer
Project Manager	Coastal San Luis Resource Conservation District (RCD)	Larissa Clarke, Conservation Programs Manager
Project Manager	Upper Salinas Las Tablas RCD	Devin Best, Executive Director
Stormwater Coordinator	County of San Luis Obispo	Ron Munds, Principal Environmental Specialist

2.4.2 Technical Advisory Committee (TAC)

The following representatives constitute the TAC for the region-wide stormwater resource planning efforts in San Luis Obispo County:

- SWRCB Representative(s)
- CCRWQCB Representative(s)
- Lead Advisors for each TAC Area
- Project Management Team (PMT) members

The roles and responsibilities for the TAC members are described as follows:

Roles	Basis of Participation	Responsibilities
SWRCB & CCRQWCB Representatives	Across the San Luis Obispo County region	TAC Member, plan development oversight, review
Project Management Team (PMT) Member	Across the San Luis Obispo County region	TAC Member, plan development, review, contributor, project management
Lead Advisor	Within each TAC Area	TAC Member, plan development, review, contributor
Advisor	Within each TAC Area	Contributor, review

Stakeholder	Within any number of TAC Areas or across the San Luis Obispo County region	General interest in plan development

2.4.3 Lead Advisor

Lead Advisors will be tasked with developing the list of Advisors and Stakeholders within their TAC Area and coordinating the meetings within each TAC Area.

The Lead Advisors will represent their TAC Area and coordinated among the Advisors and Stakeholders within that area. Lead Advisors will provide the contributing information, outreach input, and plan review from participating agencies and individuals from each TAC Area to facilitate SWRP development.

The SWRP for the TAC Area No. 3 *San Luis Obispo Creek* is complete and currently under review by the State. As a result, no representation for the regional-wide SWRP effort is needed for this TAC Area. However, the City of San Luis Obispo will be invited participate at the TAC meetings to better integrated the SLO Creek SWRP with the county-wide planning efforts.

The PMT recommends the following representatives as Lead Advisors:

No.	TAC Area	Agency	Representative
1	San Simeon/Cambria	Cambria CSD	George Kendall, USLTRCD
2	Cayucos/Morro Bay/Los Osos	City of Morro Bay	Damaris Hanson, Environmental Programs Manager
3	San Luis Obispo Creek	City of San Luis Obispo	Freddy Otte, Biologist
4	Arroyo Grande/Pismo Creeks	City of Arroyo Grande	Robin Dickerson, City Engineer
5	Nipomo	Nipomo CSD	Mario Iglesias, General Manager
6	Cuyama River*	County of San Luis Obispo	Ron Munds, County Public Works staff
7	Salinas River	City of Paso Robles	David LaCaro, Stormwater Program Manager
8	Estrella River	Shandon-San Juan Water District	Willy Cunha, Director Shandon San Juan Water District
9	Carrizo Plain*	County of San Luis Obispo	Ron Munds

* County of San Luis Obispo Public Works staff will represent TAC Areas No. 6 and 9 as the Lead Advisor for these areas, and the staff assignments may change throughout the plan development.

All Lead Advisors also represent Regional Water Management Group (RWMG) members and will comprise the RWMG Working Group for Stormwater Resource Planning efforts (as an ad-hoc sub-committee) for the San Luis Obispo County Integrated Regional Water Management (IRWM) program.

2.4.4 Advisors and Stakeholders

Any number of interested parties such as municipalities, water suppliers, local agencies, nonprofit organizations (including environmental justice and disadvantaged community organizations), public utilities, school districts, universities, conservancies, other public agencies that have public lands and easements, and regulatory agencies can participate in the development of the SWRP.

Interested participants including agencies, organizations, and individuals may submit projects and programs for inclusion in the SWRP, assist the Lead Advisor with recommendations to the TAC, contribute information and data for the plan development, provide local insight, feedback, strategies, and existing examples or models for implementation strategies, and provide reviews/comments on the draft and final plans. Contributions of existing data, maps, written reports, and conducting outreach efforts may also be provided by interested participants.

In general, Advisors and Stakeholders are similar and interested participants in the SWRP development process can choose either role. The key distinction is that Advisors will participate on a TAC Area basis and represent the interests for a specific watershed, while Stakeholders will participate more broadly on a regional level (or within any number of TAC Areas) and/or may choose to selectively participate (e.g., during the mapping phase, project submittal phase, review process phase) in the plan development process.

The key Advisors within each TAC Area are listed in the tables below. Additional agencies, organizations, groups, and individuals may be included in lists for each TAC Area as the SWRP is developed and especially during outreach to stakeholders within each watershed.

TAC Area No. 1 – San Simeon/Cambria	
Name	**Affiliation**
Bob Gresens (Lead Advisor)	Cambria Community Services District
Charles Grace	San Simeon Community Services District

TAC Area No. 2 – Cayucos/Morro Bay/Los Osos	
Name	**Affiliation**
Damaris Hanson (Lead Advisor)	City of Morro Bay
Renee Osborne	Los Osos Community Services District
Lexie Bell	Morro Bay National Estuary Program
Carolyn Geraghty	Morro Bay National Estuary Program
Stephnie Wald	Central Coast Salmon Enhancement

TAC Area No. 3 – San Luis Obispo Creek	
Name	**Affiliation**
Freddy Otte (Lead Advisor)	City of San Luis Obispo

TAC Area No. 3 – San Luis Obispo Creek	
Kim Porter	California Polytechnic State University
Wayne Peterson	Flood Control Zone 9

TAC Area No. 4 – Arroyo Grande/Pismo Creeks	
Name	**Affiliation**
Robin Dickerson (Lead Advisor)	City of Arroyo Grande
Greg Ray	City of Grover Beach
Ben Fine	City of Pismo Beach
Paavo Ogren	Oceano Community Services District
Stephnie Wald	Central Coast Salmon Enhancement

TAC Area No. 5 – Nipomo	
Name	**Affiliation**
Public Works staff (Lead Advisor)	County of San Luis Obispo

TAC Area No. 6 – Cuyama River	
Name	**Affiliation**
Public Works staff (Lead Advisor)	County of San Luis Obispo

TAC Area No. 7 – Salinas River	
Name	**Affiliation**
David LaCaro (Lead Advisor)	City of Paso Robles
Ryan Hayes	City of Atascadero
Jaime Lien Hendrickson	Atascadero Mutual Water Company
Tina Mayer	Templeton Community Services District
Scott Duffield	Heritage Ranch Community Services District
Kelly Dodds	San Miguel Community Services District

TAC Area No. 8 – Estrella River	
Name	**Affiliation**
Willy Cunha (Lead Advisor)	Shandon-San Juan Water District

TAC Area No. 9 – Carrizo Plain	
Name	**Affiliation**
Public Works staff (Lead Advisor)	County of San Luis Obispo

Stakeholder Agency/Organization	TAC Area(s)
Cambria Community Services District	1 San Simeon/Cambria
Landowner	1 San Simeon/Cambria
Cambria Greenspace	1 San Simeon/Cambria

Landowner	1 San Simeon/Cambria
Landowner	1 San Simeon/Cambria
Landowner	1 San Simeon/Cambria
Landowner	1 San Simeon/Cambria
Hearst Ranch	1 San Simeon/Cambria
Linn's Café	1 San Simeon/Cambria
Construction	1 San Simeon/Cambria
Quarry Operator	1 San Simeon/Cambria
Landowner	1 San Simeon/Cambria
Cambria Community Services District	1 San Simeon/Cambria
Cambria Chamber of Commerce	1 San Simeon/Cambria
San Simeon Chamber of Commerce	1 San Simeon/Cambria
Forest Committee	1 San Simeon/Cambria
Friends of Fiscalini Ranch	1 San Simeon/Cambria
Cambrians for Water	1 San Simeon/Cambria
San Simeon Community Services District	1 San Simeon/Cambria
CA State Parks	1 San Simeon/Cambria
Harmony Cellars	1 San Simeon/Cambria
City of Morro Bay	2 Cayucos/Morro Bay/Los Osos
CA State Parks	2 Cayucos/Morro Bay/Los Osos
Trout Unlimited	2 Cayucos/Morro Bay/Los Osos
CA Dept of Public Health	2 Cayucos/Morro Bay/Los Osos
Camp San Luis Obispo	2 Cayucos/Morro Bay/Los Osos
Cal Poly	2 Cayucos/Morro Bay/Los Osos
USFS	2 Cayucos/Morro Bay/Los Osos
Caltrans	2 Cayucos/Morro Bay/Los Osos
Los Osos Community Advisory Council	2 Cayucos/Morro Bay/Los Osos
Coast Keeper	2 Cayucos/Morro Bay/Los Osos
Morro Bay Yacht club	2 Cayucos/Morro Bay/Los Osos
Grassy Bar Oyster Company	2 Cayucos/Morro Bay/Los Osos
Morro Bay Oyster Company	2 Cayucos/Morro Bay/Los Osos
Cayucos Lioness	2 Cayucos/Morro Bay/Los Osos
CSA 10/10A (Cayucos)	2 Cayucos/Morro Bay/Los

	Osos
Golden State Water	2 Cayucos/Morro Bay/Los Osos
California Men's Colony (CMC)	2 Cayucos/Morro Bay/Los Osos
Cayucos Land Conservancy	2 Cayucos/Morro Bay/Los Osos
Cayucos Sanitary District	2 Cayucos/Morro Bay/Los Osos
Los Osos CSD	2 Cayucos/Morro Bay/Los Osos
S&T Mutual Water Company	2 Cayucos/Morro Bay/Los Osos
Dynergy	2 Cayucos/Morro Bay/Los Osos
Morro Bay in Bloom	2 Cayucos/Morro Bay/Los Osos
Cuesta College	2 Cayucos/Morro Bay/Los Osos
Central Coast Aquarium	2 Cayucos/Morro Bay/Los Osos
MB Open Space Alliance	2 Cayucos/Morro Bay/Los Osos
Morro Bay Chamber	2 Cayucos/Morro Bay/Los Osos
Morro Bay National Estuary Program	2 Cayucos/Morro Bay/Los Osos
City of San Luis Obispo	3 San Luis Obispo Creek
Cal Poly	3 San Luis Obispo Creek
City of Arroyo Grande	4 Arroyo Grande/Pismo Creeks
Central Coast Salmon Enhancement	4 Arroyo Grande/Pismo Creeks
SLOCFCWCD Zone 1/1A Advisory Committee	4 Arroyo Grande/Pismo Creeks
SLOCFCWCD Zone 3 Advisory Committee	4 Arroyo Grande/Pismo Creeks
Talley Vineyards	4 Arroyo Grande/Pismo Creeks
State Parks	4 Arroyo Grande/Pismo Creeks
Oceano CSD	4 Arroyo Grande/Pismo Creeks
City of Pismo Beach	4 Arroyo Grande/Pismo Creeks
City of Grover Beach	4 Arroyo Grande/Pismo Creeks
County of San Luis Obispo	4 Arroyo Grande/Pismo Creeks
Nipomo CSD	5 Nipomo

Woodlands Mutual Water Company	5 Nipomo
Golden State Water Company	5 Nipomo
agricultural interest	5 Nipomo
Cuyama Basin GSA	6 Cuyama
One Cool Earth	7 Salinas River
City of Paso Robles	7 Salinas River
City of Atascadero	7 Salinas River
San Miguel CSD	7 Salinas River
Atascadero Mutual Water Company	7 Salinas River
CSA 23 (Santa Margarita)	7 Salinas River
Templeton CSD	7 Salinas River
Heritage Ranch CSD	7 Salinas River
GSI	7 Salinas River, 8 Estrella River
Rancher	8 Estrella River
CSA 16 (Shandon)	8 Estrella River
Biodiversity First!	8 Estrella River
California Valley CSD	9 Carrizo
Cattleman's Association	Regional
NOAA, Restoration Center	Regional
NRCS	Regional
Central Coast Salmon Enhancement	Regional
Land Conservancy of SLO County	Regional
San Luis Obispo County Farm Bureau	Regional
California Conservation Corps	Regional
Sierra Water Progressive	Regional
yak tityu tityu- Northern Chumash Tribe	Regional
Northern Chumash Tribal Council	Regional
Salinan Tribe of Monterey, San Luis Obispo Counties	Regional
ECOSLO - Environmental Center of San Luis Obispo	Regional
CA Dept of Transporation	Regional
County of San Luis Obispo, Planning and Building Department	Regional
Central Coast Vineyard Team	Regional
CA Fish and Wildlife	Regional

CHAPTER 3. TYPES AND LOCATIONS OF PRIORITY PROJECTS

For projects to be appropriate for meeting the stated goals of the Stormwater Management Plan, identifying what needs to be addressed must be grounded in an understanding of the watershed processes (and their impairment) that are key to maintaining the condition and health of receiving waters. Different project "types" have differing abilities to address those impaired watershed processes, and they also have different criteria for their siting and their evaluation. This chapter introduces the process-based approach that forms the basis of our analysis, and also presents the subdivision of project types that will be applied in the subsequent identification and prioritization of future actions.

3.1 PROCESS-BASED WATERSHED MANAGEMENT

3.1.1 Watershed Processes

"Watershed processes" is the term adopted by the Central Coast Regional Water Quality Control Board to encompass the storage, movement, and delivery of water, chemical constituents, and/or sediment to receiving waters. Their protection or recovery across the urban and urbanizing landscape of the region is the fundamental goal of stormwater management, and this principle guides the analyses and recommendations of this SWRP. The association of watershed processes with particular attributes of the landscape—specifically, the site geology, its hillslope gradient, and the type of receiving water (e.g., a stream or a lake) to which they drain—provide the definition of ten unique "Watershed Management Zones" (WMZs) that identify both the critical attributes of the landscape from a watershed-process perspective and the types of stormwater management that is necessary to protect those processes.

3.1.2 Mapping Watershed Management Zones

3.1.2.1 Initial steps

The first step in mapping the distribution of the WMZs across San Luis Obispo County was to combine layers showing the County's generalized geology (five geologic units) and three categories of hillslope gradient (0–10%, 10–40%, and >40%) in GIS to produce a map of "Physical Landscape Zones." Next, six types of receiving waters (streams, rivers, lakes, wetlands, marine nearshore, and groundwater aquifers) were identified across the urban and urbanizing areas of the Region. For identifying these receiving waters, the primary data sources were the "NHD High" data layer from the US Geological Survey (which shows all streams represented on a 1:24,000 topographic map) and the US Fish and Wildlife Service's national wetland inventory. Those areas not draining to streams, rivers, lakes or wetlands identified by these two data layers were adjacent to the coastline and presumed to directly flow to the ocean. "Large" rivers were defined as those features on the NHD High coverage with a cumulative drainage area of at least 200 square miles; lakes had a minimum surface area of 2 acres. Areas with potential recharge to groundwater were presumed to overly the mapped groundwater basins of the Central Coast Region, using a GIS coverage of groundwater basins supplied by the Central coast Regional Water Quality Control Board; these areas therefore have two such "receiving waters," namely the groundwater aquifer and the surface-water feature previously identified. Catchment boundaries were taken from the

NHD High coverage for simplicity, although they do not always correspond precisely to the drainage divide as expressed by the highest resolution Digital Elevation Model (10-m) available for the region (and typically do not reflect any surface-water diversions resulting from constructed drainage infrastructure at all).

The layers showing the contributing areas to receiving waters and the areas overlying groundwater basins can then be intersected with that of the PLZs, resulting in the first-order definition of "Watershed Management Zones": namely, the amalgam of landscape areas having specific combinations of lithology and hillslope gradient (the PLZs) with the type of receiving water to which they drain. Although the number of WMZs is theoretically large (i.e., 15 PLZs times 6 receiving-water types = 90 combinations), many of the unique WMZs were found to have the same suite of stormwater management strategies associated with them, resulting in a much simpler set of final "management zones." Their definition constitutes the next step of the methodology.

3.1.2.2 Final definition and mapping of WMZs

Not every watershed process within a given PLZ influences the condition of every downstream receiving-water type equally. A simplified, binary division into those processes that are "significant" or "not significant" for the given receiving water was based on the assessment of watershed processes and their influence of the variety of receiving waters, using either the observational results from Task 3 or the scientific foundation from the published literature (Table 3-1).

Table 3-1. Significance of key watershed processes on the different types of receiving waters (marked with an "X"). Note that the interrelated processes of overland flow, interflow, infiltration, and ET, which in combination determine surface-water flow rates and volumes, are collectively of concern only for streams and wetlands.

RECEIVING WATER TYPE	Watershed Processes						
	Overland flow, rilling & gullying (OF)	Infiltration and groundwater recharge (GW)	Interflow (shallow groundwater mvmt.) (IF)	Evapotranspiration (ET)	Delivery of sediment to streams (DS)	Delivery of organic matter to waterbody (DO)	Chemical/biological transformations (CBT)
Streams	X	X	X	X	X	X	X
Wetland	X	X	X	X		X	X
Lake						X	X
Large rivers					X		X
Marine nearshore					X		X
Groundwater basins		X					X

These conditions and management approaches are summarized in Table 3-2, which shows the Watershed Management Zones associated with each unique combination of "Physical Landscape Zones" and receiving water type. Same-colored cells are anticipated to require the same set of stormwater management strategies, and so they are placed in the same WMZ. Asterisks indicate those WMZs for which management strategies will differ given the presence (*) or absence of an underlying groundwater basin. For the others, strategies will be the same regardless.

Table 3-2. WMZs associated with each combination of Physical Landscape Zone and receiving water.

	DIRECT RECEIVING WATER					
PHYSICAL LANDSCAPE ZONE	**Stream**	**Wetland**	**Lake**	**Lake, w/GW basin**	**Large rivers & marine nearshore**	**Rivers & marine, w/GW basin**
Franciscan mélange 0-10%	3	3	4	4	4	4
Franciscan mélange 10-40%	9	9	10	10	10	10
Franciscan mélange >40%	6	9	10	10	7	7
Pre-Quaternary crystalline 0-10%	3	3	4	4	4	4
Pre-Quaternary crystalline 10-40%	9	9	10	10	10	10
Pre-Quaternary crystalline >40%	6	9	10	10	7	7
Quaternary deposits 0-10%	1	1	4	4*	4	4*
Quaternary deposits 10-40%	1	1	4	4*	4	4*
Quaternary deposits >40%	5	8	10	10*	7	7*
Late Tertiary sediments 0-10%	1	1	4	4*	4	4*
Late Tertiary sediments 10-40%	1	1	4	4*	4	4*
Late Tertiary sediments >40%	5	8	10	10*	7	7*
Early to Mid-Tertiary sed. 0-10%	1	1	4	4*	4	4*
Early to Mid-Tertiary sed. 10-40%	2	2	10	10*	10	10*
Early to Mid-Tertiary sed. >40%	5	8	10	10*	7	7*

Recommended stormwater management strategies:

1	Overland flow avoidance, groundwater recharge / interflow, evapotranspiration
2	Overland flow avoidance / groundwater recharge, interflow, evapotranspiration
3	Chemical & bio transformations / overland flow avoidance, evapotranspiration
4	Chemical & bio transformations (*)/
5	Delivery of sediment / groundwater recharge, interflow, evapotranspiration
6	Delivery of sediment / avoidance of overland flow, evapotranspiration
7	Delivery of sediment / (*)
8	/ groundwater recharge, interflow, evapotranspiration
9	/ overland flow avoidance, evapotranspiration
10	/ (*)

- Processes listed before the "/" = key watershed processes; of primary concern for protection; should be subject to most stringent numerical criteria.
- Processes listed after the "/" = watershed processes of less critical importance; could be subject to less stringent numerical criteria.
- (*) denotes areas that do not require protection of the process of groundwater recharge *unless* underlain by a groundwater basin (may apply in WMZs 4, 7, and 10).

San Luis Obispo County is physiographically and geologically diverse; every WMZ is represented here (see maps in Appendix 2-A). The descriptions of the WMZs, with specific applicability to the watersheds of San Luis Obispo County, are as follows:

WMZ 1. Drains to stream or to wetland; underlain by Quaternary and Late Tertiary deposits 0-40%, and Early to Mid-Tertiary sedimentary rocks 0-10%

Attributes and Management Approach: This single WMZ includes the majority of the urban area of the County; it is defined by low-gradient deposits (Quaternary and Tertiary in age) together with the moderately sloped areas of these younger deposits that drain to a stream or wetland. The dominant watershed processes in this setting are infiltration into shallow and deeper soil layers; conversely, overland flow is localized and rare. Management strategies should minimize overland flow and promote infiltration, particularly into deeper aquifers if overlying a groundwater basin in its recharge area, as is the case for much of the County.

WMZ 2. Drains to stream or to wetland; underlain by Early to Mid-Tertiary sedimentary rocks 10-40%

Attributes and Management Approach: This WMZ is similar to #1 in both materials and watershed processes, but groundwater recharge is anticipated to be less critical in these areas because of lower rates of infiltration; thus, whereas management strategies need to minimize overland flow as with WMZ 1, they need not emphasize groundwater recharge as the chosen approach to the same degree.

WMZ 3. Drains to stream or to wetland; underlain by Franciscan mélange and Pre-Quaternary crystalline rocks 0-10%

Attributes and Management Approach: This WMZ includes those flat areas of the Region underlain by old, generally impervious rocks with minimal deep infiltration and so not overlying mapped groundwater basins. This WMZ is relatively uncommon County-wide, with only small scattered occurrences except in the eastern part of the City of San Luis Obispo. Overland flow is still uncommon over the surface soil; chemical and biological remediation of runoff, reflecting the slow movement of infiltrated water within the upper soil layer, is the dominant watershed process. Management strategies should promote treatment of runoff through infiltration and/or filtration, and in general by minimizing overland flow.

WMZ 4. Drains to lake, large river, or marine nearshore; underlain by all types 0–10%, and Quaternary and Late Tertiary deposits 10-40%

Attributes and Management Approach: This WMZ covers those areas geologically equivalent to WMZs 1 and 3 but draining to one of the receiving-water types that are not sensitive to changes in flow rates (in this watershed, Laguna Lake). The dominant watershed processes in this low-gradient terrain are those providing chemical and biological remediation of runoff. Many of the coastal terraces, particularly in the northwest part of the County, lie in this zone, but it is also widespread in the eastern part of the County with drainage into the Salinas River and its major tributaries, and to Soda Lake. In these areas (along with a more limited region southwest of downtown San Luis Obispo), an underlying groundwater basin also requires a specific focus on infiltrative management to support deep recharge into the underlying aquifer.

WMZ 5. Drains to stream; underlain by Quaternary deposits, Late Tertiary deposits, and Early to Mid-Tertiary sedimentary rocks >40%

Attributes and Management Approach: These steep, geologically young, and generally infiltrative deposits are critical to the natural delivery of sediment into the drainage system; management strategies should also maintain the high degree of shallow infiltration that reflects the relatively permeable nature of these deposits, although they generally do not overlie a recognized groundwater basin.

WMZ 6. Drains to stream; underlain by Franciscan mélange and Pre-Quaternary crystalline rocks >40%

Attributes and Management Approach: These steeply sloping geologic deposits typically abut WMZ 9, differing only in their increased gradient. They are important to the natural delivery of sediment into the drainage system but have little opportunity for deep infiltration, owing to the physical properties of the underlying rock. Management strategies should maintain natural rates of sediment delivery into natural watercourses but avoid any increase in overland flow beyond natural rates, which are low where undisturbed even in this steep terrain.

WMZ 7. Drains to large river or marine nearshore; underlain by all types >40%

Attributes and Management Approach: This WMZ is very rare in the urban parts of County because such terrain provides little space or opportunity for urban development. The receiving waters that characterize this WMZ are insensitive to changes in runoff rates but still depend on natural sediment-delivery processes for their continued health; thus, management strategies need to focus on maintaining this process in the few areas that the WMZ is found.

WMZ 8. Drains to wetland; underlain by Quaternary and Late Tertiary deposits, and Early to Mid-Tertiary sedimentary rocks >40%

Attributes and Management Approach: Equivalent to WMZ 5 but with a different receiving-water type, these steep and generally infiltrative deposits should be managed to maintain the relatively high degree of shallow (and locally deeper) infiltration that reflects the relatively permeable nature of these deposits. Delivery of sediment, however, is unlikely to be important to downstream receiving-water (i.e., wetland) health.

WMZ 9. Drains to stream or wetland; underlain by Franciscan mélange and Pre-Quaternary crystalline rocks 10–40%

Attributes and Management Approach: These moderately sloping, older rocks that drain to either a stream or wetland are neither extremely sensitive to changes in infiltrative processes (because the underlying rock types are typically impervious) nor key sources of sediment delivery (because slopes are only moderate in gradient). They generally do not overlie a groundwater basin, emphasizing the relative unimportance of supporting deep infiltration. Overland flow is still uncommon over the surface soil, and so management strategies should apply reasonable care to avoid gross changes in the distribution of runoff between surface and subsurface flow paths.

WMZ 10. Drains to lake and underlain by Pre-Quaternary crystalline rocks 10-40%

Attributes and Management Approach: These moderately sloping, older rocks are equivalent to WMZ 9 but drains into a receiving water that is insensitive to changes in runoff rates. It comprises moderately sloped areas that are not anticipated to be key sediment-delivery sources (by virtue of hillslope gradient), draining into a lake that generally does not require natural rates of sediment delivery for its continued health. The area itself of WMZ 10 does not overlie the groundwater basin, suggesting that a broad management focus on deep infiltration is unwarranted.

3.2 CALCULATION OF RUNOFF AND POLLUTANT LOADING

The purpose of modeling drainages across the SWRP region is to help identify catchment areas within the County with the greatest potential for mitigating stormwater impacts relative to one or more of the five multiple water-resource benefit categories (water quality, water supply, environment, flooding, community) specified in the *Guidelines*. Outputs from this spatial-opportunities analysis are intended to support the quantitative comparison of stormwater projects to identify those that achieve the greatest benefits for runoff control or pollutant reduction. The modeling approach described aligns with State Water Board guidelines to use quantitative metrics for project evaluation via planning-level estimates of runoff pollutant loading across San Luis Obispo County.

Management objectives of this modeling approach are to:

1. Characterize spatial patterns of stormwater runoff and pollutant loading throughout the County
2. Identify areas where opportunities to mitigate stormwater impacts are greatest
3. Provide a basis for quantifying potential reductions that can be integrated with MS4 compliance-based load reduction estimates.

This SWRP makes use of the Tool to Estimate Load Reductions (TELR; see Chapter 1). Within San Luis Obispo County, TELR has been implemented at two scales. Within the jurisdictions of MS4 permit holders (City of San Luis Obispo, Paso Robles, Atascadero, Morro Bay, Arroyo Grande, Pismo Beach, and the urbanized areas of unincorporated San Luis Obispo County), swTELR ("stormwater TELR") was used to estimate baseline runoff and particulate pollutant loading. Mapping of urban catchment drainages and integration of local spatial datasets was completed by City and County Staff with assistance from 2NDNATURE, with individually modeled subcatchments ranging from one to several hundred acres in area. Outputs are available to each permit holder online (www.swterl.com) and provided as maps in this SWRP (see Appendix 1-C).

Outside of these municipal areas, a coarser scale of analysis was applied to develop equivalent results within a tractable analytical framework, given the much larger area to be covered. R-TELR ("Regional TELR) was modified from the original TELR framework to provide full coverage across the County, making use of the CalWater Planning Watersheds (http://egis.fire.ca.gov/watershed_mapper/PDF/calw221_with_Fish_ESU_County.htm) as the analysis unit. Ranging from about 200 to nearly 100,000 acres each, these Planning Watersheds are typically one to two orders of magnitude larger than those used for swTELR, and so the discriminations are correspondingly less precise. However, in combination these applications provide coherent and consistent characterization of runoff and pollutant loadings across the County for use in the subsequent stages of this SWRP. Mapped results are provided in Appendix 3-A; a more complete description of R-TELR is provided in Appendix 3-B.

3.3 APPROACH TO ADDRESSING WATER-QUALITY NEEDS

The approach taken in this SWRP to address water-quality needs comprises (1) methods to characterize, and as possible quantify, the spatially explicit generation of pollutant loads throughout San Luis Obispo County; (2) a compilation of the available structural and non-structural "stormwater control measures (SCMs) to address polluted runoff; and (3) a decision-support framework to evaluate currently proposed capital projects and non-structural programs, and to identify promising new sites based on their potential suitability and value for hosting effective multi-benefit SCMs. The first two items are addressed in this section; the third is the topic of the next chapter in this SWRP.

3.3.1 Pollution-Generating Activities

This SWRP recognizes two primary *activities* that generate or contribute to polluted runoff or that impair beneficial use of stormwater and dry-weather runoff. The first is urbanization, echoing the findings from the last decade across the United States about the importance of this land use. In acknowledgment of this source's importance, the quantitative analysis of this land use's contribution to pollutant loads has been a primary focus of the Central Coast Region's NPDES MS4 stormwater permit, and its implementation (using swTELR) at a fine spatial scale (10's to 100's of acres) has been recently completed throughout the urban communities and incorporated cities of the County.

Unlike many of the other SWRPs that have already been completed, San Luis Obispo County has a second activity that can be a significant pollutant generator, namely cultivated agriculture. Although "stormwater runoff" is not normally associated as closely with this activity as with urbanization, the broadly rural nature of the County argues for its inclusion in this plan. To support this inclusion, the analytical framework already developed and applied to urban areas has been modified to be applied consistently and comprehensively over all of the non-urban areas of the County (using R-TELR).

3.3.2 Strategies to Address Polluted Runoff

The *strategies* evaluated in this SWRP to address the polluted runoff and its sources also fall into two broad categories, mirroring our recognition of the two groups of pollutant-generating land-use categories. In **urban areas**, we define three types of constructed "projects" and an additional set of programmatic actions that are most likely to achieve the goals of implementing applicable regulatory permits, contributing to the achievement of Total Maximum Daily Loads (TMDL), and satisfying other relevant water quality requirements:

1. Regional- and neighborhood-scale Capital Improvement Projects (CIPs)
2. Parcel-Scale LID for New (Public-Agency) Construction
3. Green Streets

Appendix 3-C provides brief descriptions of the first two project categories, organized by the scale of their intended treatment.

The third category, "Green Streets," embraces a range of municipal street treatments that incorporate Low Impact Development (LID) strategies to capture, store, treat and infiltrate stormwater to provide environmental and urban greening benefits. Pervious pavements, bioswales, bioretention and biofiltration are the most commonly used LID green street design Stormwater Control Measures (SCMs). "Complete streets" is another street design term and defined by the California Department of Transportation as "a transportation facility that is planned, designed, operated, and maintained to provide safe mobility for all users, including bicyclists, pedestrians, transit vehicles, truckers, and motorists, appropriate to the function and context of the facility." The term Complete/Green Streets is often used to describe a comprehensive street design.

Retrofit of existing streets to include green street SCMs is an approach that can provide multiple environmental, social and economic benefits including supporting SW NPDES regulatory compliance with the Post-Construction Requirements. When evaluating an existing street for potential green street retrofit, several factors influence feasibility including ability to route stormwater in/out of the SCMs, street grade and the ability of the native soils to infiltrate stormwater. Additionally, the street right-of-way width is an important factor as space for green street SCMs must be integrated within the other existing street functions including pedestrian, bike, vehicle and transit mobility, parking, driveways and existing landscaping and trees.

A city and regional identification of candidate green streets includes elimination of areas that generally are not favorable for green street design and inclusion of those streets and areas most likely to meet feasibility requirements. For example, residential streets are generally not ideal for green streets given the number of driveways and parking usage along the street that significantly limit where SCMs can be located. Also, streets without curb/gutter (e.g., soft shoulder) make it difficult to efficiently route stormwater into SCMs and furthermore, the sediment associated with the road shoulder often causes a clogging issue within the SCM. For details of alternative designs, this SWRP incorporates by reference the guidance contained in, for example, https://www.centralcoastlidi.org/projects.php.

In **agricultural areas** (and in contrast to urban areas), the focus of pollutant reduction is on programmatic actions, for which the Resource Conservation Districts (RCDs) are uniquely positioned to evaluate and implement. RCDs work with ranchers, farmers, and landowners in the County through technical assistance, financial assistance, and educational workshops on strategies to reduce sediment, nutrient and pesticide loading to surface and groundwaters, and improve irrigation efficiency. Programs such as the Mobile Irrigation Lab are used to complete irrigation efficiency evaluations and make recommendations for irrigation scheduling and system improvements. In March, 2012, CCRWQCB approved Conditional waiver of Waste Discharge Requirements for discharges from Irrigated Lands (Agricultural Order No. R3-2012-0011). This Order regulates discharges of waste from irrigated land by requiring individuals subject to the Order to comply with terms in order to ensure they do not cause or contribute to exceedances of water quality standards for surface water and groundwater. It requires discharges to implement and improve discharge management practices, monitoring and reporting (CCRWQCB 2012a). This requirement helps to provide a platform for coordination between dischargers and local agencies and RCDs to efficiently achieve compliance by implementing diverse projects located across many watersheds. Feasible opportunities for structural means to reduce pollution from stormwater and dry-weather flows are limited, but some examples are being implemented in the region such as denitrifying bioreactors, which provide major benefits to water quality through nitrogen reduction in agricultural operations.

3.3.3 Consistency with NPDES Permits

The approach being used in this SWRP to evaluate the effectiveness of proposed projects, and to identify optimal locations for new projects to best manage stormwater and dry-weather runoff, is entirely consistent with the current Phase II Small MS4 General Permit (2013-0001-DWQ, issue date February 5, 2013) that covers the major municipalities and all other urban communities within the County. In particular, Section E.12 of the NPDES permit requires permittees to meet post-construction stormwater management requirements through understanding and application of a watershed-process approach. As described above in Section 3.1, the importance of key watershed processes is inferred from physical attributes of the landscape, and their protection is achieved through measures that are tailored to those physical attributes (and grouped into the ten Watershed Management Zones [WMZs]). This SWRP makes full use of the WMZ mapping as the foundation of its analyses and recommendations, and so the actions undertaken with its guidance are fully supportive of the NPDES requirements.

3.3.4 Consistency with TMDLs

Within the County, the Central Coast Regional Water Quality Control Board has issued 12 TMDLs, with nearly all of them associated with agricultural runoff or natural sources:

- Arroyo de la Cruz indicator bacteria TMDL, approved May 17, 2011
- Morro Bay (including Chorro and Los Osos Creeks):
  - Pathogen TMDL, approved May 16, 2003
  - Sediment TMDL, approved May 16, 2003
- Chorro Creek nutrients and dissolved oxygen TMDL, approved July 7, 2006
- Dairy Creek dissolved oxygen TMDL, approved December 3, 2004
- Los Osos and Warden Creek and Warden Lake wetland nutrient TMDL, approved December 3, 2004
- San Luis Obispo Creek:
  - Nutrient TMDL, approved September 9, 2005
  - Pathogen TMDL, approved December 3, 2004
- Los Berros Creek nitrate TMDL, approved May 3, 2012
- Las Tablas Creek and Lake Nacimiento mercury TMDL, approved May 16, 2003
- Cholame Creek indicator bacteria TMDL, approved May 17, 2011
- Estrella River Basin boron TMDL, approved December 5, 2013

Most of the agricultural-based TMDLs will likely benefit from programmatic efforts that target agricultural and rangeland activities (Arroyo de la Cruz, Los Osos Creek, Los Berros Creek, Cholame Creek, and Estrella River). Only one TMDL is clearly associated with urban land use (San Luis Obispo Creek pathogens). The others are associated with historical mining (Las Tablas Creek) or wastewater treatment (Chorro Creek and San Luis Obispo Creek nutrients) and fall outside the purview of actions included in this SWRP.

CHAPTER 4. SCREENING, SCORING, AND PRIORITIZING OF SCMs

4.1 METHODOLOGY

The approach taken in this section to identify high-priority, multi-benefit stormwater control measures (SCMs) in San Luis Obispo County comprises three steps (Figure 4-1), described in greater detail in the sections that follow:

(1) A decision-support framework to evaluate currently proposed capital projects, and to identify promising sites for new capital and/or programmatic projects, for their suitability and effectiveness at achieving multiple benefits from stormwater and dry-weather runoff. This is the "Screening" step diagrammed in Figure 4-1.
(2) A template for quantifying the anticipated benefits of capital projects to support their prioritization, and a separate template for identifying and summarizing the non-quantifiable attributes of identified capital projects and non-structural programs ("Scoring" of Figure 4-1).
(3) A summary presentation format to allow stakeholders to make a final prioritization and implementation decisions from amongst identified SCMs, and to identify localities where future actions with the greatest potential benefits might be explored ("Prioritization" of Figure 4-1).

As noted in Step 1 above, this approach recognizes two related, yet somewhat independent, applications. In most previously submitted SWRPs, the first (and commonly only) evaluation is of previously identified capital projects. Project inclusion in an SWRP renders them eligible for various types of funding, and the quantification of their (design) benefits provides a useful disclosure of their prospective benefits. A related evaluation, that of previously identified non-structural programs, is not as commonly undertaken because they are not particularly amenable to quantification of their benefits. Nonetheless, these types of programs can considerably improve stormwater management and so are included here as well.

However, a framework solely designed to evaluate identified projects and programs is most useful only for those regions with a large existing portfolio of such actions. This is not the case for San Luis Obispo County, and so Step 1 also seeks to highlight areas that merit *future* consideration, based on promising combinations of opportunity and need for multi-benefit stormwater management. These are termed "Focus Areas" in the present plan, with specific potential sites highlighted as "Opportunity Projects" where appropriate.

A summary of the approach taken in this SWRP is diagrammed in Figure 4-1.

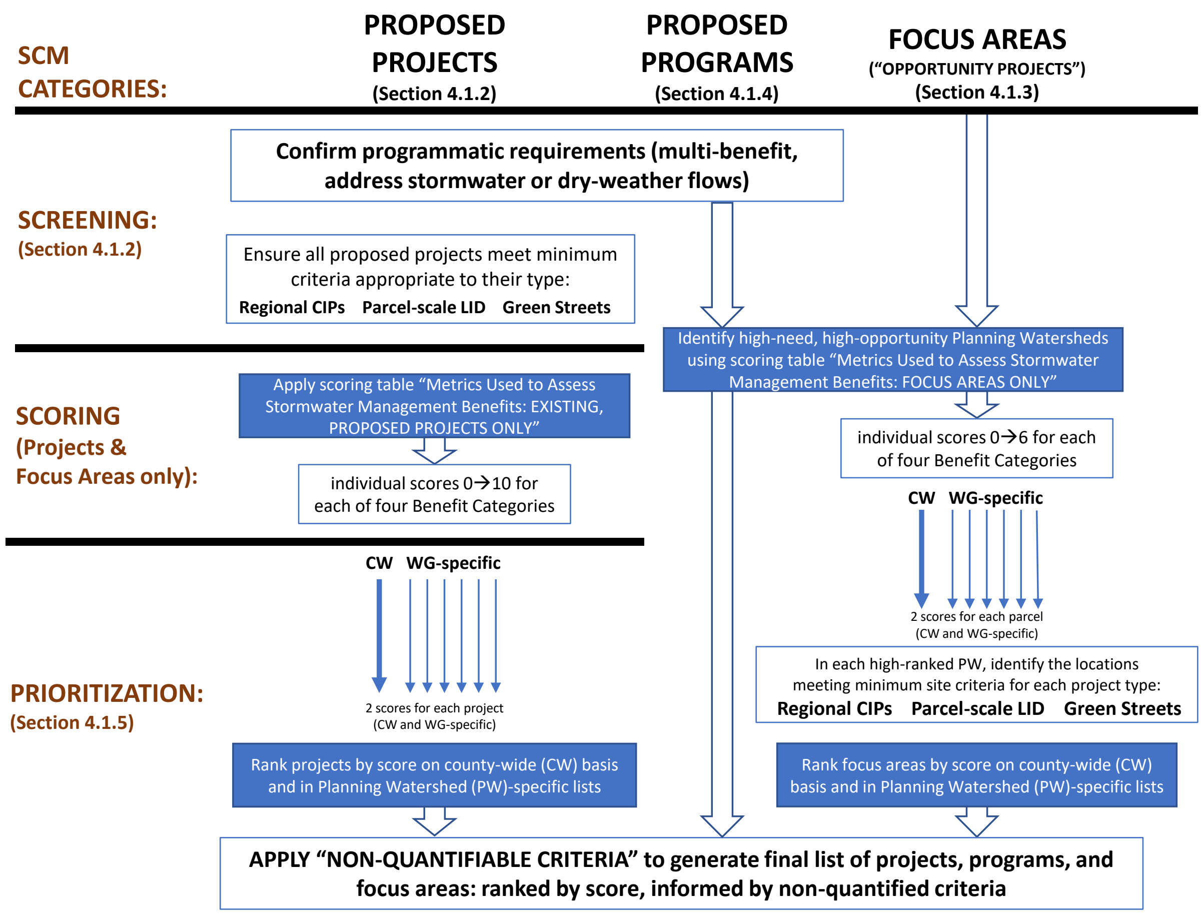


Figure 4-1. Diagram of the main steps leading to the prioritization of projects, programs, and Focus Areas as described in the following sections of this plan.

4.1.1 Screening (Step 1) and Scoring (Step 2) of Identified Projects

The ***screening*** of identified projects begins with the basic criteria articulated in the *Guidelines*:

- Must address hazards, opportunities, and/or resources affected by stormwater or dry weather runoff (p. 21);
- Must provide at least two "Main Benefits" (second column of Table 4 of the *Guidelines*, pp. 30–31, reproduced below as Figure 4-2).

TABLE 4. STORM WATER MANAGEMENT BENEFITS

Benefit Category	Main Benefit	Additional Benefit
Water Quality *while contributing to compliance with applicable permit and/or TMDL requirements*	Increased filtration and/or treatment of runoff	Nonpoint source pollution control
		Reestablished natural water drainage and treatment
Water Supply *through groundwater management and/or runoff capture and use*	Water supply reliability	Water conservation
	Conjunctive use	
Flood Management	Decreased flood risk by reducing runoff rate and/or volume	Reduced sanitary sewer overflows
Environmental	Environmental and habitat protection and improvement, including; - wetland enhancement/creation; - riparian enhancement; and/or - instream flow improvement	Reduced energy use, greenhouse gas emissions, or provides a carbon sink
		Reestablishment of the natural hydrograph
Community	Increased urban green space	Water temperature improvements
	Employment opportunities provided	Community involvement
	Public education	Enhance and/or create recreational and public use areas

Figure 4-2. Table 4 of the *Guidelines*, providing a list of the "Main Benefits" of which two (or more) must be satisfied by every proposed project in an SWRP. These are distributed amongst the five "Benefit Categories" of Water Quality, Water Supply, Flood Management, Environment, and Community that are each evaluated in subsequent stages of the scoring and prioritization process, described in detail below.

The ***scoring*** of identified projects follows the overarching guidance of the *Guidelines* (p. 21): "Plans shall include a metrics-based and integrated evaluation and analysis of multiple benefits to maximize water supply, water quality, flood management, environmental, and other community benefits within the watershed. (Wat. Code, § 10562, subd.(b)(2)." Table 3 of the *Guidelines* lists some examples of how these benefits might be quantified: these are reproduced with modifications (Table 4-1) to focus on those metrics of potentially greatest feasibility for San Luis Obispo County.

Table 4-1. Examples of how benefits from various SCMs might be quantified (modified from the *Guidelines*, 2015).

Benefit	Example Actions	Example Metric Units
Water Quality (for overall improvement in urban water quality, and to support achievement of TMDLs for pathogens and nitrogen)	Filtration SCMs Protection or reestablishment of natural buffers around receiving waters	**Treatment Design Storm** 85% 24-hr storm volume, 95% 24-hr storm volume **Pollutant Load Reduction** lbs/day, kg/day
Water Supply (through stormwater infiltration, and/or runoff capture and use	Infiltration SCMs Runoff capture SCMs	**Volume Infiltrated or Captured** acre-feet per year (afy)
Flood Management (through peak flow reduction)	Reducing runoff rates and/or volumes through infiltration, capture, and/or detention	**Volume Infiltrated or Captured** million gallons per day (mgd) **Flow Reduction** reduction in cfs
Environmental (habitat improvement, low-flow augmentation)	Riparian buffer protection or enhancement Infiltration/groundwater recharge SCMs	**Buffer Expansion** acres, linear feet **Infiltration Design Storm** 85% 24-hr storm volume **Biological Improvements** California Stream Condition Index
Community	Enhanced and/or created recreational and public use areas Community involvement through workshops Public education	**Size** number of residents served, acres of open space created/protected

For San Luis Obispo County, quantification is feasible for some but not all of the benefits suggested by Table 4-1. Unlike many other plans, covering more broadly urban areas with greater resources and a longer history of intensive stormwater management, most of the present effort covers agricultural or otherwise non-urban areas with limited prior investment in stormwater management. Complete quantification of all prospective benefits would require development of hydrologic models for the County's multiple component watersheds, a task that is beyond the resources of the region and almost surely unnecessary as well. As cataloged in Chapter 2, nearly all of the TMDLs in the County are associated with agricultural or natural sources, and so an intensive effort at precisely quantifying pollutant loadings, or rating stormwater treatment projects by their ability to reduce those loads, would be largely irrelevant to addressing underlying problems.

This plan also considers quantification of "Community benefits" an unnecessary imposition of false precision onto what are largely qualitative judgments. Although a few select program types may be amenable to comparison via quantitative metrics (e.g., number of students served by educational outreach), the majority of this benefit category is best characterized by more qualitative evaluations. They are included in the application of non-quantified criteria as part of the final prioritization of projects.

4.1.1.1 Screening criteria by project type

Beyond the two fundamental programmatic requirements (address stormwater or dry weather runoff and provide at least two "Main Benefits"), a more focused project-type-specific evaluation of minimum criteria is also necessary. It is anticipated that proposed projects will, in general, have already been determined to meet these criteria, but their explicit articulation here can also provide a useful framework for the initial screening of future project sites. The following criteria are anticipated to reflect the conditions needed for successful and cost-effective implementation of multi-benefit projects, as discriminated by their three main types:

<u>Regional- and Neighborhood-Scale CIPs</u>

1. Public parcel ownership
2. Minimum parcel size 0.25 acres
3. Undeveloped or only lightly developed land use (e.g. parkland)
4. Parcel slope <10%

<u>Parcel-Scale LID</u>

1. Public parcel ownership
2. Small parcel size (<0.25 acres, to discriminate from "regional" projects)

<u>Green Streets</u>

For candidate green streets, their preliminary screening is more nuanced, reflecting much prior work already accomplished by jurisdictions and nonprofit groups within the County. The following factors generally indicate a higher likelihood of feasibility:

- *Moderate traffic streets* - this street type often has a relatively wide right-of-way that may provide space for integration of green street SCMs and tends to not have limitations associated with residential streets (e.g., parking demand, driveways). High-traffic streets such as freeways were excluded as candidate green streets, although stormwater designs can be integrated into these areas as part of a regional or centralized design approach (e.g., long linear water quality swales, large detention/retention basins).

- *Commercial land use areas* - These areas are more likely to include a curb/gutter system that helps to design routing of stormwater in/out of the SCMs and street widths can be favorable for SCM siting. Commercial land use areas often have is existing stormwater infrastructure that may be needed to connect SCM undrains when native soil infiltration rates are not adequate. Furthermore, streets within the commercial land use areas are often the focus of economic viability, urban greening and community aesthetics goals.

- *Street grade* - a longitudinal street slope of 2%-5% is ideal for routing stormwater in/out of SCMs as runoff moves along the street length. Streets that are too "flat" make routing stormwater in/out of SCMs difficult while steep slopes present their own engineering challenges in the design of SCMs, which may include weirs or berms to address moderate slopes but generally, the design and associated SCM performance and stability decreases at slopes greater than 6%.

4.1.1.2 Quantifiable scoring criteria

For those identified projects that meet the above screening criteria, their anticipated performance across the quantifiable benefit categories of Water Quality, Water Supply, Flood Management, and Environment are evaluated based on available project information to the extent possible, using the criteria summarized below and in Table 4-2. More complete descriptions and rationale for each of the metrics are included as Appendix 4-A.

- Quantified metrics for water quality benefits include evaluation of the treatment design storm, nature and condition of the downstream receiving water, and predicted loadings from the catchment (the latter expressed in tons per acre per year of Total Suspended Solids). Pollution reduction from the project are also quantified from information on the project's design (if possible), using a spreadsheet-based model of runoff volumes and literature-based event mean concentrations for a selected group of pollutants. To maintain consistency of evaluating projects with both quantified and unquantified pollutant load reductions, these results do not influence project scoring but do inform the overall prioritization framework (see Section 4.1.4) and are available for subsequent stages of project definition and development (including preparation of proposals for grant funding).

- Quantified metrics for water-supply augmentation make use of the predicted magnitude of infiltration or water reuse, if available, together with measures of infiltration feasibility and the current and future adequacy of groundwater supplies.

- Quantified metrics for flood management make use of the predicted magnitude of infiltrated or otherwise detained water, the presence of existing downstream flooding problems, and the predicted magnitude of runoff (modeled by TELR in units of ft/yr).

- Quantified metrics for environment emphasize the size of protected or restored habitat, and the magnitude of flow restoration provided through infiltration.

Table 4-2. Summary of quantified metrics for existing projects. Data from Chapter 1; descriptions in Appendix 4-A.

BENEFIT CATEGORY and associated metrics	METRIC VALUES (sum for total)
WATER QUALITY: to receive a non-zero project score, project must remove pollutants from stormwater or dry weather runoff via chemical, physical, and/or biological processes	
Designed for treatment of the 85% 24-hr storm volume (Y/N)	2/0
Designed for treatment of the 95% 24-hr storm volume (Y/N)	1/0
Treats dry-weather flows	1/0
Sensitive downstream receiving water (WMZs 1, 2, 3, 5, 6, 8, or 9) (Y/N)	2/0
Specific TMDL or 303(d)-listed pollutants in downstream receiving water (including groundwater used for water supply) (Y/N)	2/0
TELR TSS loading in catchment (scaled, minimum to maximum loading County-wide)	0→2
SUM	**(0→10)**
WATER SUPPLY: to receive a non-zero project score, project must reduce net municipal or agricultural consumption through direct reuse or aquifer recharge of stormwater runoff	
Designed to infiltrate or otherwise reuse water (Y/N)	1/0
Projected quantity of water infiltrated or otherwise reused (scaled volume, minimum to maximum value of all proposed projects) (annual volume)	0→3
Overlies infiltration-favorable WMZ (WMZs 1, 2, 4, 5, 8) (Y/N)	2/0
In current supply-limited area (scaled, ground subsidence from 0 to maximum value, County-wide) (identified “critical groundwater areas” = maximum value)	0→3
In projected future supply-limited area (scaled, groundwater dependence index from 0 to maximum value, County-wide) (identified “critical groundwater areas” = maximum value)	0→1
SUM	**(0→10)**
FLOOD MANAGEMENT: to receive a non-zero project score, project must reduce runoff rates or volumes of stormwater runoff	
Designed to infiltrate or otherwise detain water (Y/N)	1/0
Quantity of water infiltrated or otherwise detained (scaled volume, minimum to maximum value of all proposed projects) (maximum facility volume per storm event)	0→3
Existing downstream flooding and/or sedimentation risks to public property and/or human health and safety (Y/N)	4/0
TELR runoff volume in catchment (scaled, minimum to max runoff, County-wide)	0→2
SUM	**(0→10)**
ENVIRONMENT: to receive a non-zero project score, project must restore/protect watershed and/or ecological processes impacted by stormwater or dry weather runoff	
Designed for treatment of the 85% 24-hr storm volume (Y/N)	2/0
Creates/restores/protects wetland, in-stream, or riparian habitat (scaled by area [0.1 to max score ≥10 acres] or length [1 to max score ≥100 ft])	0→2
Number of at-risk aquatic animal species (from EnviroAtlas) (scaled, 0 to maximum value, County-wide) (https://www.epa.gov/enviroatlas)	0→2
Length of identified critical steelhead habitat within catchment (scaled, 0 to maximum value, County-wide)	0→3
TELR runoff volume in catchment (scaled, minimum to max runoff, County-wide)	0→1
SUM	**(0→10)**

A total score for each project is obtained by multiplying each benefit category sum (which can range from 0 to 10) by a weighting factor. These factors were determined in consultation with the Technical Advisory Committee (TAC) and are specific to each of the nine Watershed Groups (Table 4-3). A final project score, which can range from 0 to 10, is determined by summing the four weighted benefit category totals.

Table 4-3. TAC-assigned weightings for the benefit category scores. All values in percent; all sum to 100% across the four categories.

	WATERSHED GROUP								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Water Quality	15	30	25	20	20	25	25	15	25
Water Supply	35	25	35	40	20	35	30	60	35
Flood Management	35	20	20	20	40	20	25	10	20
Environment	15	25	20	20	20	20	20	15	20

4.1.2 Screening (Step 1) and Scoring (Step 2) of Prospective Focus Areas

This SWRP has identified “Focus Areas” as those individual Planning Watersheds that are likely suitable for hosting one or more multi-benefit SCMs, whether or not any have yet been identified within them. The procedure to identify them makes use of a subset of the quantitative metrics used to score identified stormwater or dry-weather projects (see previous section). As for identified projects, the metrics for scoring potential Focus Areas have been selected to measure the opportunities and needs present in each of the Planning Watersheds to benefit from actions to improve the four quantified benefit categories identified by the *Guidelines* (Water Quality, Water Supply, Flood Management, and Environment).

An underlying assumption is that all subsequently proposed projects within these Focus Areas will meet the fundamental requirements of all stormwater resource plan projects (namely, address stormwater or dry-weather flows and provide multiple benefits). Thus, the purpose of the Focus Area evaluation is not to specify the type or detail of any specific SCM, but rather to identify (1) the Planning Watersheds with the highest needs and opportunities for locating beneficial stormwater or dry-weather treatment projects; and (2) within those catchments with the greatest need and opportunity within each Watershed Group, the parcels that meet the minimum criteria for project feasibility (see Section 4.1.1.1 for the feasibility criteria for Regional- and Neighborhood-scale CIPs, Parcel-scale LID, and Green Streets).

The scoring process for Focus Areas is analogous to that for identified projects. Needs and opportunities, at a Planning Watershed scale, are quantified for each of the benefit categories through the evaluation and scoring of up to three metrics, all of which overlap with the Identified Projects metrics (previous section) and whose maximum values sum to 6 within each category. These metrics were selected to be project-independent, evaluating the existing risks to resources and the opportunity for successful implementation, using data that are available throughout the County and accessible through GIS. Scores are either assigned on a “yes/no” basis (i.e., full value or 0 value, denoted in the list below as 1/0, 2/0, etc.) or as a proportional variable that can range continuously from 0 to its maximum value (denoted by 0→1, 0→2, etc.). They are summarized in Table 4-4, with more complete descriptions and the range of observed values in San Luis Obispo County included as part of the discussion in Appendix 4-A.

The total score for each benefit category (0 to 6 for each) is multiplied by the same Watershed Group-specific weighting factor that has been assigned by the TAC for identified projects (Table 4-3), reflecting the locally determined relative importance of each category. These weightings total 100%, and so the sum of the weighted benefit-category scores provides a final value for each Planning Watershed, based on its quantified metrics, that can range from 0 to 6.

Table 4-4. Summary of the quantified criteria and scores applied to Planning Watersheds to identify Focus Areas for potential future SCM design and implementation.

BENEFIT CATEGORY and associated metrics	METRIC VALUES (sum for total)
WATER QUALITY	
Sensitive downstream receiving water (WMZs 1, 2, 3, 5, 6, 8, or 9) (Y/N)	2/0
Specific TMDL or 303(d)-listed pollutants in downstream receiving water (including groundwater used for water supply) (Y/N)	2/0
TELR TSS loading in catchment (scaled, minimum to maximum loading County-wide)	0→2
SUM	**(0→6)**
WATER SUPPLY	
Overlies infiltration-favorable WMZ (WMZs 1, 2, 4, 5, 8) (Y/N)	2/0
In current supply-limited area (scaled, ground subsidence from 0 to maximum value, County-wide) (identified "critical groundwater areas" = maximum value)	0→3
In projected future supply-limited area (scaled, groundwater dependence index from 0 to maximum value, County-wide) ("critical groundwater areas" = maximum)	0→1
SUM	**(0→6)**
FLOOD MANAGEMENT	
Existing downstream flooding and/or sedimentation risks to public property and/or human health and safety (Y/N)	4/0
TELR runoff volume in catchment (scaled, minimum to max runoff, County-wide)	0→2
SUM	**(0→6)**
ENVIRONMENT	
Number of at-risk aquatic animal species (from EnviroAtlas) (scaled, 0 to maximum value, County-wide) (https://www.epa.gov/enviroatlas)	0→2
Length of identified critical steelhead habitat within catchment (scaled, 0 to maximum value, County-wide)	0→3
TELR runoff volume in catchment (scaled, minimum to max runoff, County-wide)	0→1
SUM	**(0→6)**

Although an evaluation of potential suitability could be made for every parcel and street in the County, this SWRP has sought to narrow the population of prospective sites for future capital projects by considering only the highest-rated Planning Watersheds by metric score. Within those areas, all publicly owned parcels were identified in GIS on the basis of Assessor's records and evaluated for potential suitability of regional-, neighborhood-, or parcel-scale projects using the criteria of Section 4.1.1.1. Suitability for green streets was evaluated throughout the incorporated cities, based on the likelihood that only these roadways would be high priorities for active stormwater management for many years to come. Some of these roadways have already been identified as promising sites for green street retrofitting, and these are included in the list of identified projects (see Section 4.2.1).

4.1.3 Evaluation of Programs (non-capital projects)

Following the lead of other SWRPs, programs and other non-structural projects are evaluated using non-quantified criteria only (next section). An additional screening, that of the priority Planning Watersheds from the procedure outlined in Section 4.1.2 (above), can inform the prioritization of these types of actions.

Programs highlight both the utility and the limitations of this process for the following reasons:

- Programs often provide multiple benefits but ultimate outcomes are very difficult to quantify.
- Programs don't necessarily have defined locations within a city or county.
- Benefits are varied and often fall outside of pure stormwater management objectives.
- Community benefits may be more defined with programs than other actions, and so the results are not always comparable with capital projects.

These factors do not preclude the evaluation of program benefits, but the emphasis in the *Guidelines* on quantitative metrics raises the likelihood that capital projects are more likely to be prioritized through the stormwater resource planning process. Only through careful attention to the non-quantified criteria evaluation (next section) can this bias be adequately addressed.

4.1.4 Non-Quantified Criteria (Step 3)

A variety of other considerations besides those covered by the quantified metrics (above) typically guide the identification, selection, and implementation of SCMs. For this SWMP, these were identified by first compiling a wide range of non-quantified criteria used in several other SWRPs reviewed during the preparation of this work (specifically those for Ventura County, San Mateo County, San Diego County, and Russian River). This list of prospective criteria was presented to the TAC, who each identified those categories that they considered most important criteria for the area of their individual Watershed Group. Those identified in this SWRP as "primary" were so identified by 4 or more TAC members; those designated "secondary" were identified by at least two TAC members. A few additional criteria were subsequently added, based on considerations expressed in the *Guidelines* or otherwise offered by State Water Board and local staff. These led to a final compiled list of "yes/no" elements, grouped into five major evaluation categories with 5 elements each, and of which two are "primary" (Table 4-5). Although comprehensive, this approach is also rather cumbersome to present and its results difficult to digest; thus, a rubric was established to summarize the results for each of the five categories:

- "Full credit": more than 3 identified attributes, or all "primary" criteria, within the evaluation category are met (marked by ● on the summary reporting sheet for all identified projects/programs)
- "Partial credit": two or three identified attributes (marked by ⦿)
- "No credit": 0 or 1 identified attribute (marked by ○)

Table 4-5. Non-quantified criteria to be evaluated for every identified project and non-structural program, grouped into five "evaluation categories" (Community, Project Readiness, Project Value and Performance, Non-Water-Resource Environmental, and Coordination and Collaboration). Bold-faced criteria were identified as "primary" by the TAC.

▪ COMMUNITY ❖ **Provides habitat, urban greening, open space to DACs** ❖ **Enhances/creates recreational and public use areas** ❖ Provides public education ❖ Provides urban greening (aesthetic, shading, air quality, livability) ❖ Provides community involvement
▪ PROJECT READINESS ❖ **O&M funding secured** ❖ **Funding is committed** ❖ Project site secured ❖ Benefits quantified ❖ Near-construction-ready design complete
▪ PROJECT VALUE AND PERFORMANCE ❖ **Projects located on public land (State Board Priority)** ❖ **Financially feasible w/o external funding** ❖ Supports regulatory compliance ❖ Quantified reductions in pollutants or volume are significant ❖ Efficient O&M (< 1 action/year required)
▪ ENVIRONMENTAL (non-water resource) ❖ **Offers climate change resiliency** ❖ **Protects / increases native vegetation** ❖ Greenhouse gas emission reduction ❖ Provides a carbon sink ❖ Reduces heat island effect
▪ COORDINATION & COLLABORATION ❖ **Meets multiple agency objectives** ❖ **Funding is leveraged** ❖ Public/stakeholder engagement ❖ Supports broader effort (e.g., link in contiguous wildlife corridor) ❖ Identified in prior plan or planning process

4.1.5 Prioritization of Identified Projects and Programs (Step 3, cont.)

The approach to prioritization of identified projects and programs in this SWRP reflects the integration of prior quantified and non-quantified evaluations. However, it also acknowledges the common reality that decisions on implementation are often driven (or at least strongly influenced) by situation-unique factors. In the judgment of the plan's Project Management Team (PMT), incorporating these disparate factors into a single "score" or "ranking" is neither realistic nor desirable. Instead, prioritization in this SWRP emphasizes the transparent display of key summary elements for every identified project and program, the linkage of those summary elements back to their more detailed components, and a robust implementation strategy (Chapter 5) that should prove better suited than any rote calculus to select and advance the most beneficial and feasible project(s) towards implementation.

The process described in the prior sections give rise to three key summary element, which can be efficiently displayed in a list that includes every identified project and program:

(1) The quantified metric score for each project (i.e., the weighted sum of the four benefit-category scores) (from Tables 4-2 and 4-3);
(2) The summary rating for the five non-quantified evaluation categories (Table 4-5) for both projects and programs; and
(3) The estimated cost of implementation, to a level of precision appropriate for the stage of design.

Because any list must have both a first and last entry, some degree of implied ranking is inescapable. The PMT acknowledges that reality and has judged that the results will be most useful to current and future stakeholders across the County if the presentation of projects/programs is first segregated by Watershed Group; and that within each Watershed Group the projects are presented in rank order of their quantified metric scores (note that programs have no quantified score, and so will always be clustered at the end of these WG-specific lists). Associated with each project's score are the summary qualitative ratings and the estimated cost.

The PMT has further judged that separation of these WG-specific lists should *not* be segregated into "high," "medium," and "low" categories, as is common across many (but not all) prior SWRPs, because any such designation requires rigid thresholds that may ultimately be trumped by a broader range of considerations.

4.2 APPLICATION OF THE SCREENING, SCORING, AND PRIORITIZATION CRITERIA

As of the preparation of this initial version of the San Luis Obispo County SWRP, 32 projects and four programs (Table 4-6) have been identified, scored, and prioritized in accordance with the approach described in Section 4.1.

Table 4-6. List of projects and programs (the last four entries, in brown font) included in this SWRP. Project descriptions are provided in Appendix 4-B.

Project Name	Watershed Group
San Simeon Creek Road Flooding Remediation	1
Santa Rosa Creek Floodplain & Wetland Retention Plan	
Santa Rosa Creek Streamflow Enhancement	
Capture and Reuse of Storm Water. Conceptual Phase	2
Bioreactor Installation in Morro Bay Watershed	
Cam San Luis Obispo SCMs	
2nd Street Baywood Green Street Project	
Embarcadero Surf Project	
Cloisters Project	
Embarcadero Boat Wash Project (Alt. 1)	
Embarcadero Boat Wash Project (Alt. 2)	
Morro Bay State Park Marina Parking Lot LID	
Meadow Park Stormwater Capture and Use	3
Mitchell Park Bioretention	
Higuera Widening Project	
Stormwater Infiltration basins	4
Pismo Preserve Roads Improvement Project	
Corbett Creek Floodplain and Stream Restoration Project	
Oceano Drainage Improvement Project	
South Halcyon Green / Complete Street	
On-farm BMP implementation to decrease sediment transport to Oso Flaco Watershed	5
Upper Spring Street Low Impact Development Project	7
Mountain Springs Sedimentation Basin	
Montebello Oaks Basin Retrofit	
Grand Canyon Basin Retrofit	
Melody Basin Retrofit	
Niblick LID Drainage Retrofit	
Atascadero Sunken Gardens Stormwater Capture	
El Camino Real Greenstreets Project - Downtown Corridor	
Toad Creek Basins 8A and 8B (two projects)	
San Juan Storm Water Infiltration Project	8
Stormwater Rewards Rebate Program	All
Region-wide Key Percolation Zone Study	
Earth Genius - Educational Programming	
Agricultural Water Management	

4.2.1 Identified Capital Project SCMs—screening and scoring

Following the approach outlined in Section 4.1.1, the 32 identified projects have summary scores as listed in Table 4-7 and mapped in Figure 4-3. The complete scoring results are provided as Appendix 4-C. Average annual pollutant load reductions have also been calculated for those projects with sufficient design details to make reasonable estimates, with values tabulated in Appendix 4-D.

Table 4-7. List of identified projects and their final scores. See Appendix 4-C for the components of these summary scores. * = no projects have been identified to date in Watershed Groups 6 and 9.

Project Name	WG 1	WG 2	WG 3	WG 4	WG 5	WG 6*	WG 7	WG 8	WG 9*
San Simeon Creek Road Flooding	4.5								
Santa Rosa Creek Floodplain & Wetland Retention Plan	6.4								
Santa Rosa Creek Streamflow Enhancement	6.6								
Capture and Reuse of Storm Water		6.6							
Bioreactor Installation in Morro Bay Watershed		3.8							
Camp San Luis Obispo projects		8.0							
2nd Street Baywood Green St		6.4							
Embarcadero Surf		4.4							
Cloisters		4.2							
Embarcadero Boat Wash (small)		4.3							
Embarcadero Boat Wash (large)		4.4							
Morro Bay State Park Marina Parking Lot LID		4.1							
Meadow Park Capture and Use			5.6						
Mitchell Park Bioretention			7.4						
Higuera Widening Project			3.8						
Stormwater Infiltration Basins				8.7					
Pismo Preserve Roads Improvement				5.2					
Corbett Ck Floodplain and Stream Restoration				4.0					
Oceano Drainage Improvement				4.9					
South Halcyon Green Street				4.5					
Oso Flaco Watershed					2.6				
Upper Spring Street LID							6.6		
Mountain Springs Sed Basin							4.0		
Montebello Oaks Basin Retrofit							2.8		
Grand Canyon Basin Retrofit							2.9		
Melody Basin Retrofit							6.5		
Niblick LID Drainage Retrofit							1.7		
Atascadero Sunken Gardens Stormwater Capture							8.0		
El Camino Real Greenstreets							7.7		
Toad Creek Basin 8A							6.9		
Toad Creek Basin 8B							7.1		
San Juan Storm Water Infiltration								3.1	

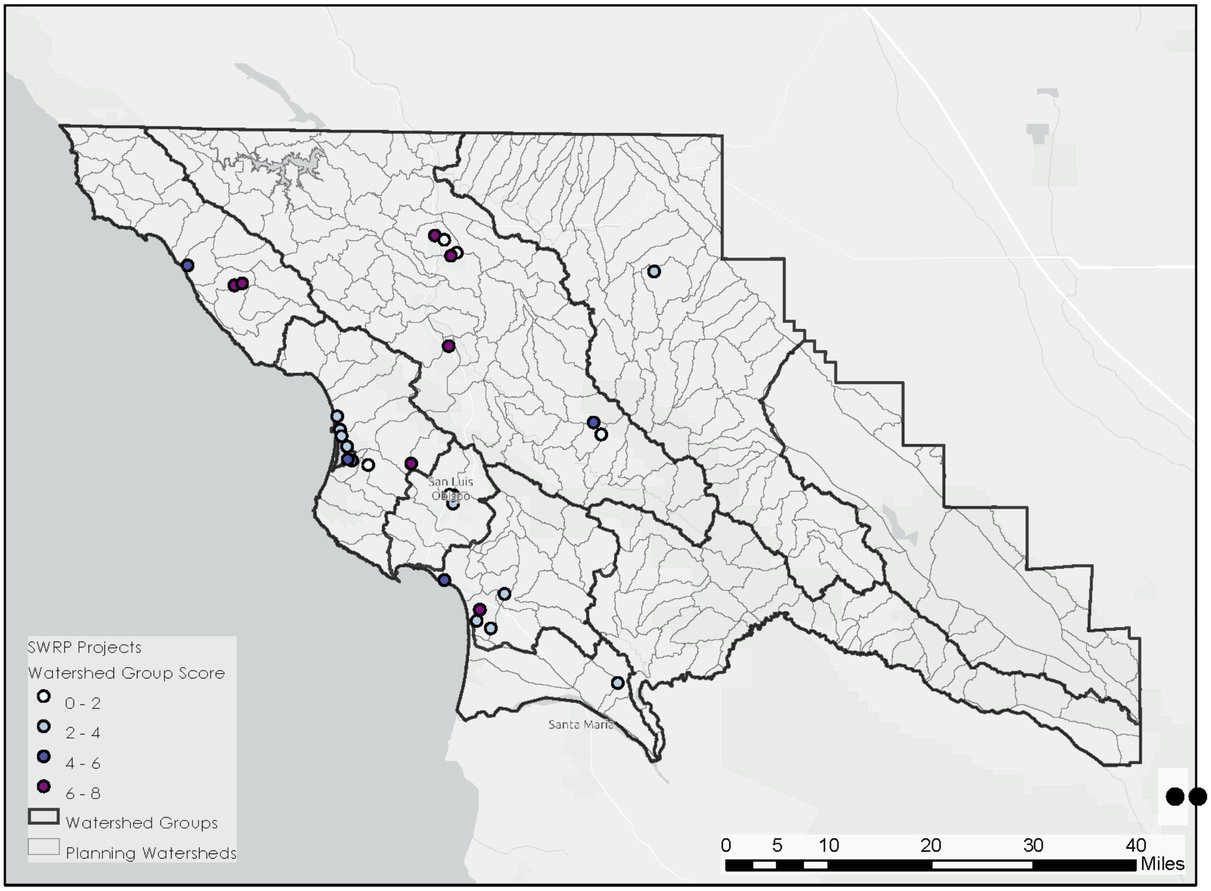


Figure 4-3. Map of identified project locations. Each project is color-coded by its metric score (Table 4-7).

4.2.2 Focus Areas for Prospective SCMs—screening and scoring

4.2.2.1 Scoring of Planning Watersheds

Following the approach outlined in Section 4.1.2, each of the 267 Planning Watershed in San Luis Obispo County were scored and stratified within their respective Watershed Group (Figure 4-4). The complete scoring results are tabulated in Appendix 4-E.

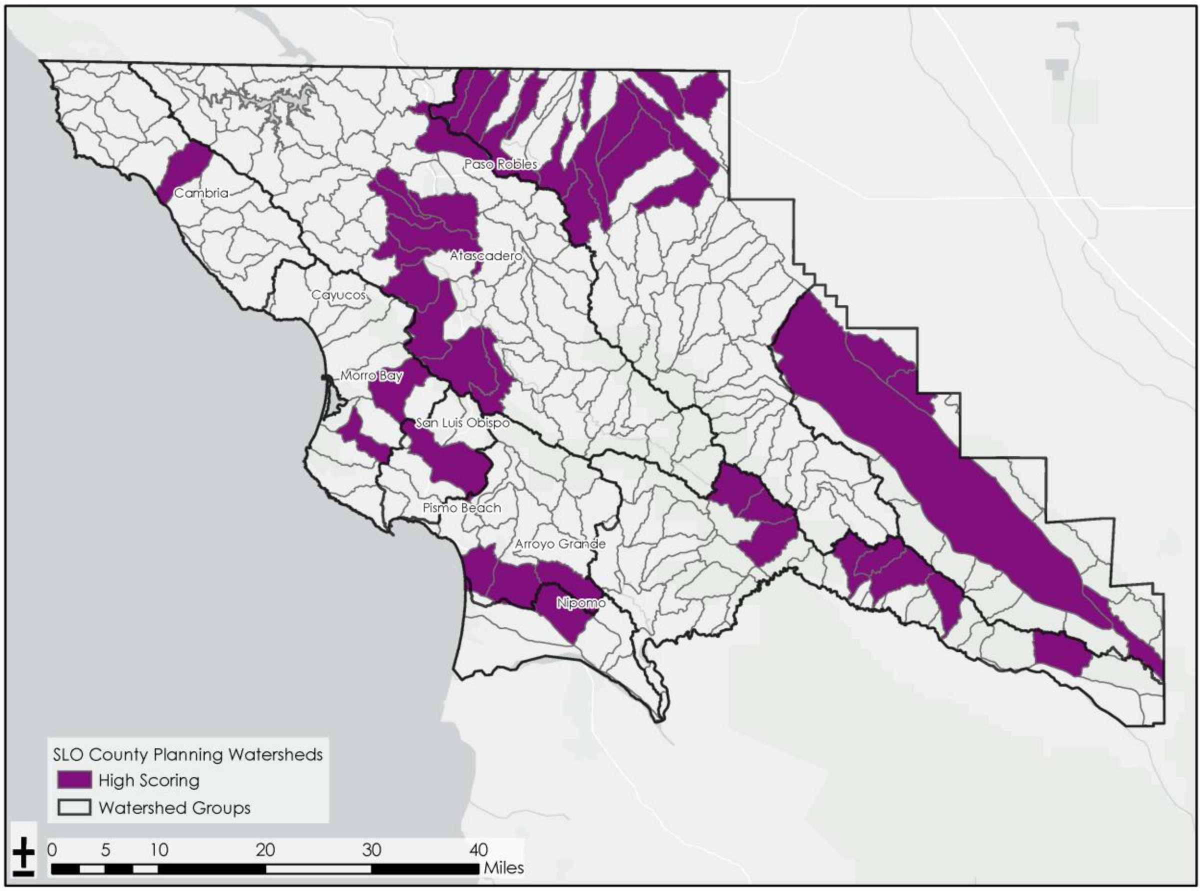


Figure 4-4. Planning Watersheds (light gray outlines), with the top-scoring (upper 20%) Planning Watersheds within each Watershed Group highlighted in magenta.

4.2.2.2 Identification of prospective capital project sites

Within the County's municipal areas, public parcels meeting the screening requirements for Regional-, Neighborhood-, and Parcel-scale capital projects are displayed in Figure 4-5. More detailed maps and a list of the identified parcels are included as Appendix 4-F.

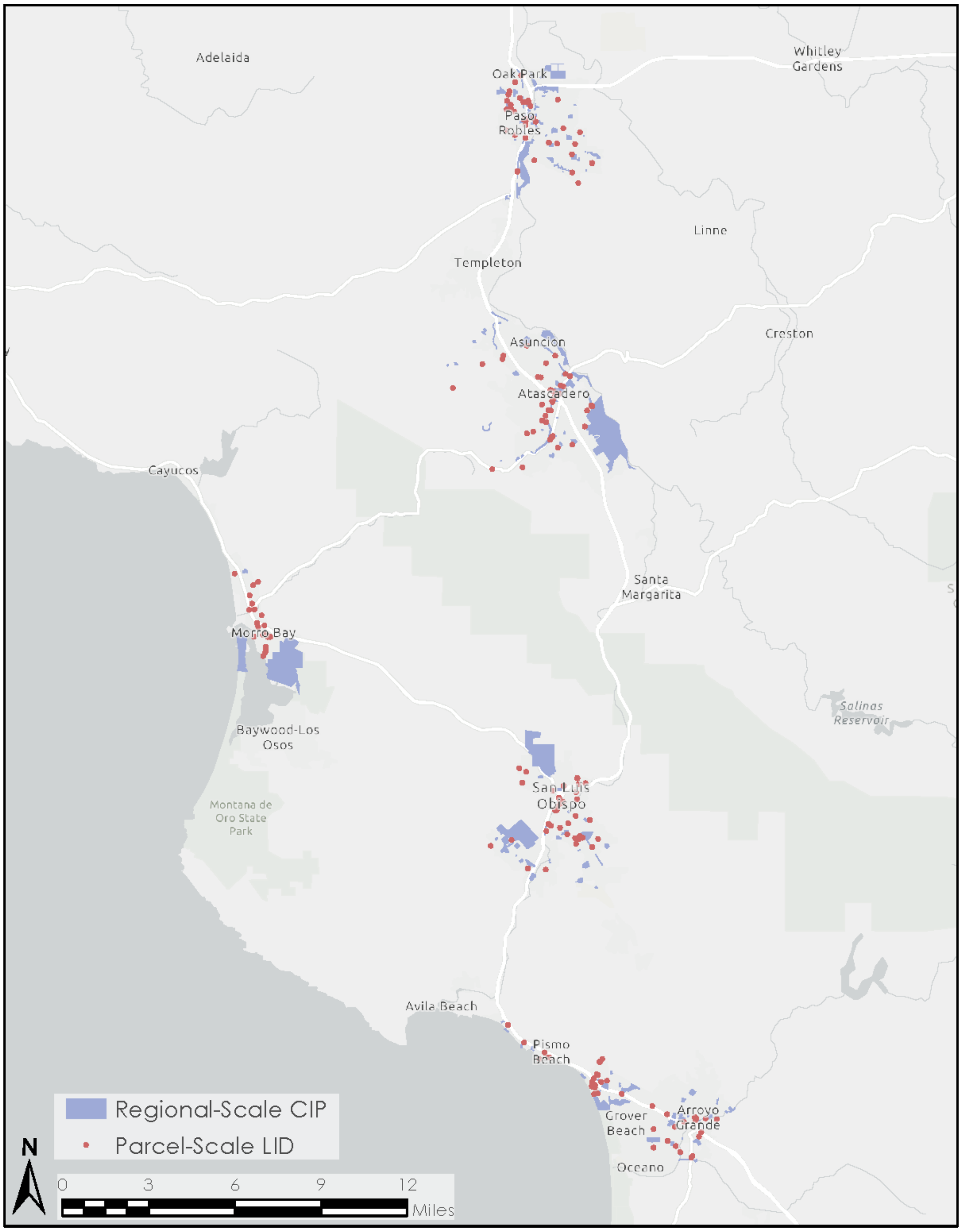


Figure 4-5. Location of public parcels meeting the criteria for potential multi-benefit stormwater projects within the municipalities of the County. See Appendix 4-F for more detailed maps and the list of parcels.

4.2.2.3 Identification of prospective green streets

Using the criteria for identifying potentially high-feasibility green streets, and in consultation with several of the potential host municipalities, a range of potential green street retrofit locations were identified and mapped on Figure 4-6, with more detailed maps provided in Appendix 4-G. Three of the municipalities have already accomplished a comprehensive review of green street options, resulting in the following identified sites (and their lengths):

City of Paso Robles:

1. 6th Street (bound by Spring and Pine Streets) (743 ft)
2. 8th Street (bound by Spring and Pine Streets) (747 ft)

City of San Luis Obispo:

1. Slack Street (bound by Longview Lane and 1 block east of Henderson at street end) (2242 ft)

Morro Bay:

1. Main Street (bound by Atascadero Rd. and Zanzibar St.; note that Damaris kept line going north for approximately 1 block where main turns into Zanzibar Terrace) (9990 ft)
2. Atascadero Road (bound by Hwy 1 and Embarcadero) (1714 ft)
3. Kennedy Way (bound by Dunes Street and Quintana Rd) (860 ft)
4. Embarcadero (bound by approximately 100 yds north of Surf Street to Coleman Road) (4170 ft)
5. Beach Street (bound by Market and Monterey) (1033 ft)
6. Dunes Street (bound by 1 block west of Market and Quintana Rd) (1939 ft)
7. Harbor Street (bound by Market and Morro Bay Blvd) (2646 ft)
8. Morro Bay Blvd. (bound by Market and Quintana Rd) (2991 ft)
9. Pacific Street (bound by Market and Piney Way) (1686 ft)
10. Kern Street (bound by Morro Bay Blvd and Pacific St) (407 ft)

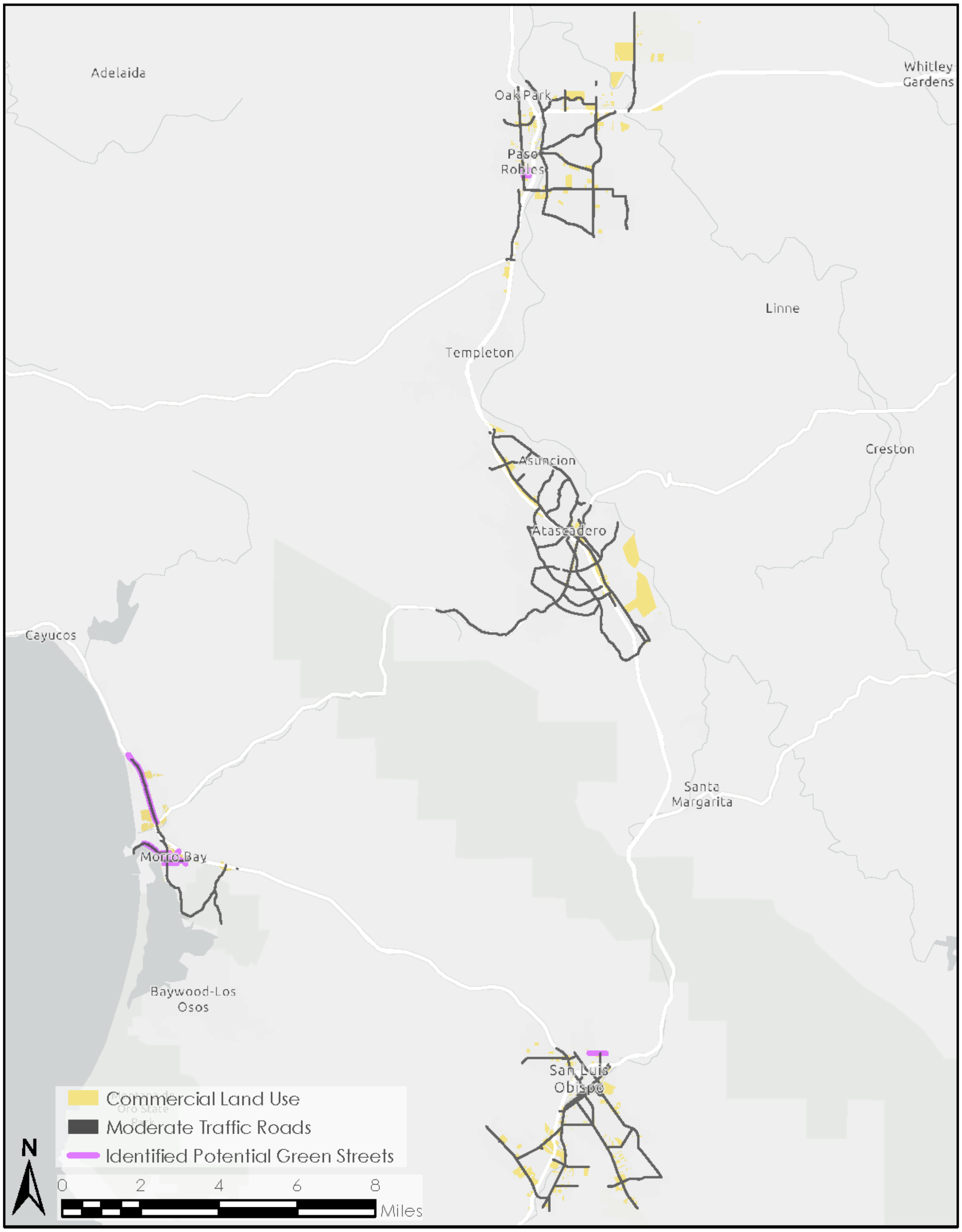


Figure 4-6. Potential locations for green streets in San Luis Obispo County municipal areas, plus those locations already identified by specific jurisdictions. See Appendix 4-G for more detailed maps and a list of road segments.

4.2.3 Prioritization of Projects and Programs

Prioritization of SCMs in this plan is a two-step process. The first is the assignment and summarizing of non-quantified benefits (Section 4.1.4), and the second is the presentation of quantified benefits, non-quantified benefits, and cost in a set of ranked lists, segregated by Watershed Group. These results are presented in Table 4-8. This summary, with the associated detailed breakdowns of scores and ratings provided in the appendices, is intended to provide stakeholders with the information necessary to advance projects and programs forward towards implementation.

Table 4-8. Summary table of project and program scores, non-quantified metrics, and cost, listed in quantitative metric-score order by Watershed Group.

	WATERSHED GROUP	METRIC SCORE	COMMUNITY	PROJECT READINESS	PROJECT VALUE AND PERFORMANCE	ENVIRONMENT (non-water resource)	COORDINATION & COLLABORATION	ESTIMATED COST
Santa Rosa Creek Streamflow Enhancement	1	6.6	⦿	⦿	⦿	●	●	$631,000
Santa Rosa Creek Floodplain & Wetland Retention Plan	1	6.4	⦿	⦿	⦿	●	●	$166,000
San Simeon Creek Road Flooding Remediation	1	4.4	○	○	○	●	●	$100,000
Camp San Luis Obispo projects	2	8.0	⦿	⦿	○	○	○	unknown
Capture and Reuse of Storm Water	2	6.6	○	○	●	○	●	$200,000
2nd Street Baywood Green Street Project	2	6.4	●	⦿	⦿	●	●	$525,000
Embarcadero Surf Project	2	4.4	●	⦿	⦿	●	⦿	$106,000
Embarcadero Boat Wash (large)	2	4.4	●	⦿	⦿	●	⦿	$243,000
Embarcadero Boat Wash (small)	2	4.3	●	⦿	●	●	⦿	$33,000
Cloisters Project	2	4.2	●	⦿	●	●	⦿	$608,000
Morro Bay State Park Marina Parking Lot LID	2	4.1	●	⦿	⦿	●	⦿	$1,350,000
Bioreactor Installation in Morro Bay Watershed	2	3.8	⦿	○	⦿	○	⦿	$50,000
Mitchell Park Bioretention	3	7.4	⦿	⦿	●	●	○	$50,000
Meadow Park Capture and Use	3	5.6	⦿	⦿	⦿	○	○	$595,000
Higuera Widening Project	3	3.8	○	○	○	○	○	unknown

Stormwater Infiltration Basins	4	8.7	●	○	○	○	○	unknown
Pismo Preserve Roads Improvement	4	5.2	⊙	○	⊙	●	⊙	20,000
Oceano Drainage Improvement	4	4.9	⊙	○	○	○	○	$6.4M
South Halcyon Green Street	4	4.5	●	⊙	⊙	●	○	unknown
Corbett Creek Floodplain and Stream Restoration	4	4.0	○	○	○	●	⊙	unknown
Oso Flaco Watershed	5	2.6	○	○	○	○	○	unknown
Atascadero Sunken Gardens Stormwater Capture	7	8.0	⊙	⊙	⊙	○	●	$1,500,000
El Camino Real Greenstreets	7	7.7	●	○	⊙	●	⊙	$1,500,000
Toad Creek Basin 8B	7	7.1	⊙	○	○	●	●	$3,577,000
Toad Creek Basin 8A	7	6.9	⊙	○	○	●	●	$3,577,000
Upper Spring Street LID	7	6.6	●	⊙	⊙	●	○	$1,800,000
Melody Basin Retrofit	7	6.5	⊙	○	⊙	○	○	$200,000
Mountain Springs Sedimentation Basin	7	4.0	●	○	○	○	○	$250,000
Grand Canyon Basin Retrofit	7	2.9	⊙	○	⊙	○	○	$150,000
Montebello Oaks Basin Retrofit	7	2.8	⊙	○	⊙	○	○	$150,000
Niblick LID Drainage Retrofit	7	1.7	○	○	○	○	○	$27,000
San Juan Storm Water Infiltration	8	3.1	⊙	○	○	●	●	$250,000
Stormwater Rewards Rebate Program			●	○	○	●	⊙	$264,000
Region wide Key Percolation Zone Study			⊙	○	○	⊙	○	$56,000
Earth Genius - Educational Programming			●	⊙	●	●	●	$5,000 - $15,000 per school, per year
Agricultural Water Management			(information not presently available)					

4.3 SUMMARY OF RESULTS

The projects identified in this SWRP represent a potential for substantive progress towards addressing the primary stormwater-resource-related challenges facing San Luis Obispo County. From the watershed characterizations presented in Chapter 1, these challenges are:

1. Three groundwater basins in critical overdraft, plus others with projected future shortfalls in supply relative to anticipated demand;
2. Insufficient low flow in the coastal streams that provide critical summer habitat for ESA-listed steelhead;
3. Insufficient conveyance capacity that result in relatively localized, but locally severe, flood conditions;
4. 12 TMDLs, albeit primarily associated with agricultural land uses or loadings from natural sources; and

5. A variety of flow- and water-quality-related impacts to the County's urban streams as they pass through and downstream of urban areas.

The present list of identified capital projects and programs (Table 4-8) is insufficient to fully address these challenges, which is why this SWRP has also highlighted the highest priority Planning Watersheds across all nine Watershed Groups. These "Focus Areas" are likely to provide the best opportunities to address these ongoing stormwater management problems, with the overriding goal of making use of stormwater runoff as a multi-benefit resource, and whose management in accord with the key watershed processes is most likely to achieve long-term benefits for people and the ecosystem alike.

CHAPTER 5. PLAN IMPLEMENTATION

5.1 INTRODUCTION

The SWRP is a living document and will be updated, evaluated, and revised periodically dependent upon input from the public, stakeholders, resource agencies, and local government as well as in response to changes in funding opportunities in which a review and update of the SWRP may be necessary to align potential projects. The SWRP is also designed to be accessible and used by the public to identify valuable, multi-benefit projects that enhance stormwater resource management. Therefore, the development of this SWRP is intended to be a tool to guide development, implementation, and monitoring of stormwater projects at both the watershed and regional scale. Availability of new data and information may also drive periodic revisions of the SWRP to reflect improved understanding of watershed conditions and priorities. The SWRP will rank projects using the metrics provided in the prioritization methods (Chapter 4), although the final determination of priorities will be determined by local and regional policies and directives. The SWRP, and consequently the Implementation Strategy described in this chapter, will outline the ways to ensure valuable, high-priority projects with multiple benefits are identified, and that there is an adaptive management process in place to monitor projects.

The technical memo below discusses the plan for implementation of the SWRP. For the SWRP to be effective, an adaptive management and funding strategy is needed to transition from planning to initial and long-term implementation. As the SWRP draws in part from existing regional and watershed plans to provide a functionally equivalent SWRP, the implementation strategy efforts for this plan build upon those existing efforts, which include the IRWM Plan and other relevant plans referenced in this document. This strategy will also discuss data compilation, management, and storage protocols including mechanisms to make all project data and outputs available to stakeholders, assess monitoring programs and data quality control, update data, and identify data gaps. The plan will also be periodically reviewed and revised to reflect changes in SWRP management strategies, completion of data gaps informing key areas for stormwater management, and implementation of SWRP projects and programs which will guide the effectiveness of future projects and programs.

5.2 RESOURCES FOR PLAN IMPLEMENTATION

According to the Water Code, the SWRP should identify the resources that the participating entities are committing for implementation of the Plan Water Code §10562(d)(8).

5.2.1 Decision Support Tools and Data Management

The County of San Luis Obispo will host a spatial data viewer to provide access to data sets used in the spatial project prioritization. These will include inputs and outputs from the regional modeling approach (R-TELR) along with data sets created by other organizations that were used in the spatial prioritization. The metadata for each of these layers will provide a data description and links to the source data sets or data generating organizations. It is not anticipated that these data layers will need to be updated on timeframes shorter than 5 years. These spatial data layers primarily provide a baseline indication of the relative impacts and opportunities throughout the County, summarized at the Planning Watershed Scale. As such, the Planning Watersheds scoring output will not need to change with the addition of new projects.

The County will also maintain the project scoring spreadsheet that provides a semi-automated multi-benefit scores for projects based on region-weighted scoring of spatial and project benefit metrics. The primary need for regular updates by County GIS staff will be the addition of new projects to both the spatial data layers and the scoring spreadsheet as this information becomes available. Because a component of the scoring requires locating projects within a Planning Watershed and/or a TELR catchment, addition of projects to the spreadsheet will require either joining of project locations to these hydrographic boundary datasets in a GIS or manual identification of Planning Watershed/TELR catchment using Google Earth and the associated KML files (provided by 2NDNATURE). Once this is complete, the spatial portion of the project scoring is automated. County staff will need to update the benefits portion of the project scoring spreadsheet for each new project added to obtain a project score based on project descriptions or design specifications.

The San Luis Obispo County Watersheds Management Plan, Phase I identified several key data gaps to watershed health and function. Development and management of stormwater resources through this SWRP fills a key data gap covering the 25 watersheds in SLO County. Development of Phase II of the San Luis Obispo County Watersheds Management Plan will address data gaps that are complimentary to stormwater resources such as water quality, water quantity, flood management, and environmental benefits. Likewise, as the RCDs of SLO County continue to fill in data gaps for Phase II of the San Luis Obispo County Watersheds Management Plan, the information will be incorporated into the IRWMP.

5.3 IMPLEMENTATION STRATEGY

5.3.1 Adoption of SWRP into Integrated Regional Water Management Plan

Once concurrence from SWRCB is achieved, the Plan will be incorporated by the Regional Water Management Group (RWMG). The RWMG will determine how the SWRP will fit into the broader management objectives of the SLO County IRWM Plan. Upon incorporation of the Final SWRP to the IRWMP, updates to the projects list prioritized for funding, or other information on the watershed's priorities will be conducted by the RWMG. The SWRP project list will be merged with the existing IRWM Full Project List. The group presently meets regularly on a monthly basis and the SWRP will continue to be a regular agenda item to discuss as needed. Additional meetings will occur as needed based on grant funding announcements. Updates to the SWRP will be posted on the County's SWRP website.

The RWMG will be responsible for making the announcement(s) and setting the schedule for project solicitation. Future calls for projects will be solicited by the RWMG to the existing stakeholder list. The stakeholder list will be updated as needed. Projects will be submitted using an online form, along with supporting information, to run the project through the prioritization process. New projects submitted through this online form will then be scored and prioritized (see Chapter 4) by the Review Committee (RC) annually and then on an as needed basis throughout the year. The RC will be initially comprised of the current Project Management Team and may be modified based on input from RWMG. The RC will then recommend the new projects with their associated prioritized score to the RWMG for inclusion in the SWRP (Figure X). When the solicitation for Round 2 of the Prop 1 Storm Water Grant Program is announced, anticipated Winter 2019, project proponents may update information previously submitted during the first solicitation of projects for inclusion on the SWRP Project List.

5.3.2 Entities Responsible for Project Implementation

Project implementation will vary depending on project proponent participation and as funding sources become available. Project entities are responsible for implementing their projects; however, the Plan encourages collaboration between project leads to reach more multi-benefits within each Watershed Group and regionally. Project proponents will ensure agreements are in place with landowners, ensure the availability of match funding, apply for grant funding, and enter into an agreement with the State and/or other grantor. Project proponents will be responsible for obtaining any permits, providing project management staff to complete the designs, implementation, maintenance and reporting.

5.3.3 Community Participation

The SWRP has developed a Stakeholder Outreach Plan to engage and solicit input from various stakeholders throughout SLO County. Please see Chapter 2 for the Stakeholder Outreach Plan for a detailed description.

5.3.4 Strategy for Obtaining Necessary Permits

Permitting will be the responsibility of project proponents and must comply with Federal, state, and local requirements, including relevant permits and CEQA. Potential permits may include: County Grading and/or minor use construction permit, USFS Special Use Permits, Clean Water Act Section 404 and 401 permits, CDFW Streambed and Lake Alteration Agreement, Coastal Commission's Coastal Development permit, and/or Caltrans encroachment permits.

5.3.5 Potential Funding Sources

Potential funding sources for multi-benefit stormwater and dry weather runoff projects:

- California Coastal Conservancy Proposition 1 Grants
- California Department of Fish and Wildlife Proposition 1 and Fisheries Restoration Grants
- California Water Resources Control Board SWRP Proposition 1 Implementation Grants
- California Water Resources Control Board 319(h) Program Grants

- California Wildlife Conservation Board Habitat Enhancement and Restoration Program Grants
- Integrated Regional Water Management Plan Implementation Grants
- Bureau of Reclamation WaterSMART Drought
- Response Program Grants
- National Oceanic and Atmospheric Administration Bay Watershed
- Education and Training and National Marine Fisheries Service Fisheries Research Grants
- Various Federal Fish & Wildlife Service Grants
- Various United States Department of Agriculture's Natural Resources Conservation Service Environmental Quality Incentives Program and Conservation Stewardship Program Grants
- Various Federal Department of Energy Grants
- California Department of Conservation's Sustainable Agricultural Lands Conservation Program's Agricultural Easement Grants
- Sponsored by proponent

5.4 ADAPTIVE MANAGEMENT

The SWRP Guidelines state the SWRP should be a living document, implemented as an adaptive Plan with ongoing monitoring and check-ins to ensure regulatory objectives and multiple benefit goals are being met. The SWRP should "identify the development of appropriate decision support tools and the data necessary to use the decision support tools" Water Code §10562(d)(8) to support the adaptive management process. As discussed in 2.1, the SWRP will be adapted at least annually when the RC meets and more frequently as decided by the RWMG as needed.

5.4.1 Purpose of Adaptive Management

Adaptive management is a structured, iterative process which allows for changes to be made with the goal of improving future management. In order to decrease uncertainty over time and improve management in the long term, data and information will be needed to inform the Plan. Taking an adaptive management approach to the SWRP allows for an evolving Project List and scoring metrics that will become more robust as more information, be it best available science, funding opportunities, or design phase, becomes available. Ensuring that the SWRP takes an adaptive approach will ensure its usefulness into the future.

5.4.2 Adaptive Management Procedure

The Plan will be updated by the RWMG based on best available science, new data sets (e.g. new USGS shapefiles as available), TELR algorithms, and will need to seek future funding in order to update models on a regular basis. After new information becomes available, adjustments by the RWMG can be made and those adjustments can then be implemented. Adjustments to the weighting of the metrics may be needed over time as implemented projects may alter the desired weighting of the multiple benefits. For example, if TMDLs objectives are met by implementation of a project or program currently on the list, a Watershed Group may decide water quality no longer needs to hold as high a weighting as at present and potentially will adjust the weighting of benefits to reflect the changed parameter. As the RWMG works with project proponents, communication of information needed concerning proposed projects will improve the ability to evaluate those projects using the scoring framework. Lack of project information may result a low score, even for "good" projects, due to an inability to adequately assess the project. As relevant information is obtained about the project, a more accurate score can be determined. This also applies to the assessment of qualitative benefits where information concerning specific project benefits can improve the overall understanding of an individual project's benefits related to water quality, water supply, flood control and community.

5.5 TRACKING IMPLEMENTATION PERFORMANCE MEASURES

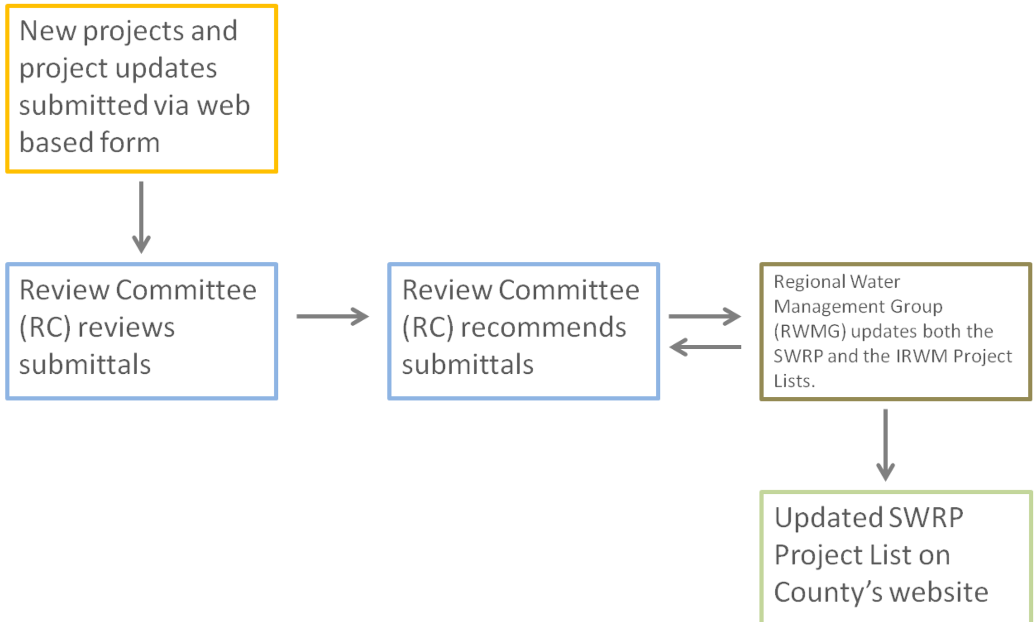
Tracking performance measures allows for communication between project proponents and the RWMG. Tracking measures is needed to ensure regulatory requirements and multi-benefit goals are being met. The IRWM framework for tracking performance measures will also be used for SWRP projects. The performance measures and metrics provide a basis for further developing a detailed project performance database which will identify:

- Project goals
- Desired outcomes
- Output indicators – measures to effectively track output
- Outcome indicators – measures to evaluate change that is a direct result of the work
- Measurement tools and methods
- Measurable targets that are feasible to meet during the life of the proposal
- Monitoring measurements and interpretation of change in output indicators over time

As projects are implemented, quantification of benefits per the metrics and weighting established in the Approach may become available as grant reporting requirements mandate. For example, a project implemented that achieves water quality goals to meet TMDL and MS4 permit objectives may be documented and used to measure performance of the project or program. Project proponents will provide monitoring data to the state of California, in forms and formats needed to be included in the state's databases, where this is a condition of any grant funding. Additionally, required final and annual reporting of projects can be used to provide information to stakeholders and other interested parties on lessons learned and the quantified and non-quantified outcomes of the project.

Projects at a conceptual stage on the Project List at this time may not have had adequate data to have gone through the metrics scoring approach. As these projects increase in their development to design phases, quantitative measurements of anticipated benefits can then be used in the metrics scoring approach. Project proponents will be able to score their projects using the approach at any time in the development and inclusion of a project to the Project List.

Figure 5-1. Flow chart summarizing the Project List update process, which will occur annually and then as needed during the year.



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