Appendix C.1 North Coast Sub-region Watersheds

1. Big Creek-San Carpoforo Creek Watersheds
2. San Simeon-Arroyo de La Cruz Area Watersheds
3. Santa Rosa Creek Area Watershed
4. Cayucos Creek-Whale Rock Area Watersheds
5. Morro Bay Watershed

Big Creek – San Carpoforo Creek Area Watershed

Hydrologic Unit Name	Water Planning Area	Acreage	Flows to	Groundwater Basin(s)	Jurisdictions
Estero Bay 10	Cambria WPA 2	264,552 acres total 13,046 acres (within San Luis Obispo County)	Pacific Ocean at Monterey Bay National Marine Estuary	San Carpoforo Valley	County of San Luis Obispo

Description:

The Big Creek Watershed straddles San Luis Obispo County and Monterey County with 13,046 acres out of 264,552 total acres within SLO County. This snapshot represents data related to those sub-watersheds located within the CalWater HUC 10 watershed grouping in San Luis Obispo County. The watershed lies along the Pacific Ocean with the southernmost outfall at Ragged Point, north of San Simeon. The most notable waterway within the San Luis Obispo portion of the Big Creek watershed is San Carpoforo Creek, which has its headwaters in the Los Padres National Forest at the Santa Lucia Range. 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. Peak elevation for the watershed is approximately 2,610 feet high with the low being roughly 16 feet above sea level with ocean outfall in Monterey County. The dominant land use is Los Padres National Forest and rangeland agriculture, with a majority of rangeland concentrated in the area of Hearst Ranch. A rugged shoreline and mountainous eastern ridge characterize the northern portion of the watershed. The creek was the route of the historic Portola Expedition and was identified as an area of high ecological significance by the Forest Service.

Watershed Plans:

No existing plans to date

Big Creek – San Carpoforo Creek Area Watershed

Characteristics

	Physical Setting	
	Rainfall	Average Annual: 19 in. (coast) - 36 in. (mountains) (NRCS Shapefile, 2010)
	Air Temperature	Summer Range (August 2001-2012): 50°-77°F Winter Range (December 2001-2012): 44°-62°F (Big Sur, ncdc.noaa.gov)
	Geology Description	Steep Franciscan non-infiltrative headwaters – Category #6 (Bell, pers. comm., 2013). Mountains of the rugged Big Creek Watershed coastline notably rise to 5,000 foot summits within two miles of ocean in Monterey County, the most abrupt elevation change of the entire Pacific shore. Several hundred million years ago, river-borne sediments from a mountain range in what is now Mexico were deposited along the west coast. Layers of sandstone, siltstone and limestone were compressed and folded by the underriding of tectonic plates at the continent's edge. The sediments metamorphosed with pressure into schist, gneiss, granofels and marbles of the Franciscan Formation, now the oldest rocks in the Santa Lucia Range. By 65 million years ago this plate, called the Salinan Block, began to drift northward by plate tectonic movement. The block's progress was halted by Pacific Ocean crust and started a process of faulting and uplifting which continues today. Seismic activity is frequent along lateral faults that result in canyons running parallel to the coast instead of directly into it. Highest peaks are granitic rock, which are more resistant to erosion. Taller peaks may also be marble (metamorphosed limestone). Original sediments of sandstone and siltstone have been tilted up into cliffs in some areas (Chipping, 1987). The San Carpoforo Valley Groundwater Basin underlies San Carpoforo Valley in northwestern San Luis Obispo County. The basin is bounded on the west by the Pacific Ocean and on all other sides, by impermeable rocks of the Jurassic to Cretaceous age Franciscan Group (Ca Dept of Water Resources, 2003).
	Hydrology	
	Stream Gage	Yes; USGS 11142550, last recorded in 1978. (San Carpoforo Creek near Hwy 1)
	Hydrology Models	No source identified
	Peak Flow	14,200 cfs, 1978 (USGS, viewed August 2013)

Big Creek – San Carpoforo Creek Area Watershed

	Base Flow	148.6 cfs, 1978 (USGS, viewed August 2013)
	Flood Reports	No source identified
	Flood Control Structures	No data available
	Areas of Heightened Flood Risk	No data available
	Biological Setting	
	Vegetation Cover	Primarily coast live oak woodland, and mixed evergreen forest consisting of continuous coast live oak and California bay with some coastal redwood. Some coastal scrub, buckbrush chaparral, serpentine chaparral, and chamise chaparral, non-native annual grassland, intermittent ponderosa pine, and valley foothill riparian consisting of continuous coast live oak are present. (SLO County vegetation shapefile, 1990) Coastal redwood has limited distribution in San Luis Obispo County and is primarily found along the North Coast. *Data limited by age of shapefile available*
	Invasive Species	No data available
	Special Status Wildlife and Plants	*Key*: FE - Federal endangered, FT - Federal threatened, SE - State endangered, ST - State threatened, SSC - State Species of Special Concern; FP- Fully Protected, SA – Special Animal, CRPR – CA rare plant rank (CNDDB, viewed August, 2013) Locations listed refer to USGS 7.5' quadrangle names. Only the portion overlapping the watershed boundary was considered. *Data limited to observations, not complete inventory*

Species	Status	BURNETT PEAK	BURRO MOUNTAIN	PIEDRAS BLANCAS	SAN SIMEON
Animals					
black swift	SSC		x		
foothill yellow-legged frog	SSC		x		
monarch butterfly	SA	x	x	x	x
prairie falcon	SA Nesting	x	x	x	x
Smith's blue butterfly	FE		x		
steelhead - south/central California coast DPS	FT		x		
western pond turtle	SSC		x		
Plants					
Brewer's spineflower	CRPR 1B.3		x		

Big Creek – San Carpoforo Creek Area Watershed

Species	Status	BURNETT PEAK	BURRO MOUNTAIN	PIEDRAS BLANCAS	SAN SIMEON
bristlecone fir	CRPR 1B.3	x	x		
Cone Peak bedstraw	CRPR 1B.3		x		
Cook's triteleia	CRPR 1B.3		x		
Hardham's bedstraw	CRPR 1B.3	x	x		
late-flowered mariposa-lily	CRPR 1B.2	x	x		
most beautiful jewel-flower	CRPR 1B.2		x		
Palmer's monardella	CRPR 1B.2		x		
San Luis Obispo sedge	CRPR 1B.2	x	x	x	x
Santa Lucia bedstraw	CRPR 1B.3		x		

Steelhead Streams	Yes; San Carpoforo Creek (Becker et. al, 2010) The California Department of Fish and Game considers the San Carpoforo Creek to be one of two of the most important spawning streams for threatened steelhead in San Luis Obispo County (Ventana Wilderness Alliance, 2007).
Stream Habitat Inventory	Yes; Department of Fish and Game, 1995 *Data limited by age of last inventory*
Fish Passage Barriers	None identified
Designated Critical Habitat	Yes; Steelhead Trout (USFWS Critical Habitat Mapper, viewed 2013)
Habitat Conservation Plans	None identified
Other Environmental Resources	San Luis Obispo Coastal Zone, Monterey Bay National Marine Sanctuary, Hearst Ranch Conservation Project (SLO County Flood Control and Water Conservation District, 2007)
Land Use	
Jurisdictions & Local Communities	County of San Luis Obispo
% Urbanized	0% (SLO County LUC)
% Agricultural	82% - 17.3 sq mi: rangeland (SLO County LUC)
% Other	1% recreation; 17% rural residential (SLO County LUC)
Planning Areas	North Coast Planning Area (SLO County)
Potential growth areas	None identified

Big Creek – San Carpoforo Creek Area Watershed

	Facilities Present	Hearst Ranch
	Commercial Uses	Ragged Point Inn and Resort, tourism, agriculture (livestock grazing)
	Demographics	
	Population	13 (US Census Block, 2010)
	Race and Ethnicity	Caucasian, representing 100%. (US Census Block, 2010)
	Income	MHI $51,557 (includes rural lands of coastal communities from northern SLO boundary to Morro Bay) (US Census Tracts, 2010)
	Disadvantaged Communities	No; 0% individuals below poverty (US Census Tracts, 2010)
	Water Supply	
	Water Management Entities	None identified for the portion of the watershed located within San Luis Obispo County – existing uses served by Individual wells
	Groundwater	Yes; Alluvial, San Carpoforo Valley Basin San Carpoforo Valley
	Surface Water	No public reservoirs in the watershed. Identified as fully appropriated stream system for entire year according to the SWRCB's Water Code 1205-1207.
	Imported Water	None
	Recycled/Desalinated Water	None
	Key groundwater percolation area(s)	No data on key areas identified Recharge to the basin is largely by percolation of stream flow and to a lesser extent from infiltration of precipitation and excess irrigation flow *(*Ca Dept. of Water Resources, 2003).
	Water budget	None to date
	Water Uses	
	Beneficial Uses	*San Carpoforo Creek* - Municipal and Domestic Supply (MUN), Agricultural Supply (AGR), Industrial Service Supply (IND), Ground Water Recharge (GWR), Water Contact Recreation (REC-1), Non-Contact Water Recreation (REC-2), Wildlife Habitat (WILD), Cold Fresh Water Habitat (COLD), Warm Freshwater habitat (WARM), Migration of Aquatic Organisms (MIGR), Spawning, Reproduction, and/or Early Development (SPWN), Threatened, or Endangered Species (RARE), Freshwater Replenishment (FRESH), and Commercial and Sport Fishing (COMM). *Chris Flood Creek* - Municipal and Domestic Supply (MUN), Agricultural Supply (AGR), Groundwater Recharge (GRW), Water Contact

Big Creek – San Carpoforo Creek Area Watershed

		Recreation(REC-1), Noncontact Water Recreation(REC-2), Wildlife Habitat(WILD), Cold Freshwater Habitat(COLD), Warm Freshwater Habitat (WARM), and Commercial and Sport Fishing (COMM). (CCRWQCB, 2011)
	Other Unique Characteristics	
	Monterey Bay National Sanctuary	Flows south out of the Santa Lucia Range in the northern Los Padres National Forest, onto lands owned by the Hearst Corporation and then to the Pacific Ocean. Pacific Ocean outfall designated as State Marine Conservation Area and State Marine Reserve within the Monterey Bay National Marine Sanctuary. Supports one of the few remaining populations of sensitive foothill yellow legged frogs on the Central Coast, as well as endangered California red-legged frogs.
	San Luis Obispo Coastal Zone	Spanning 118 miles of coastline with numerous wide sandy beaches, sheltered bays, and vista points offering scenic views of the Pacific Ocean. The coastal zone of San Luis Obispo County is known throughout the state for its beauty and diversity. The north coast is characterized by the rugged headlands to Big Sur. The rocky shoreline along the Hearst Ranch is highly valued for offshore views of marine mammals as well as scenic cliffs and rocky points.
	Hearst Ranch	Hearst Ranch encompasses an impressive variety of habitats and topography - elevations on the Ranch rise from sea level along the coastline to 3,600 feet on some of the peaks along the ridgeline of the Santa Lucia Mountains. Grassland-covered coastal terraces extend to natural sea bluffs, rocky headlands and sandy beaches. Over 1,400 acres of riparian woodland is present on the property. Riparian woodland species include Sycamore and Coast live oak.
	Climate Change Considerations	
		See IRWMP, 2014 Section H, Climate Change *Data general to North County, not watershed specific*

Watershed Codes

CalWater / DWR Number	HA	Hydrologic Area Name	HSA	Hydrologic sub-area name	SWRCB Number	CDF Super Planning	CDF Watershed Name
3310.110101	1	Cambria	1	San Carpoforo	310.11	Jones Mtn.	Chris Flood Creek
3310.110102	1	Cambria	1	San Carpoforo	310.11	Jones Mtn.	Upper San Carpoforo Creek

Big Creek – San Carpoforo Creek Area Watershed

3310.110201	1	Cambria	1	San Carpoforo	310.11	Breaker Point	Lower San Carpoforo Creek
3310.110203	1	Cambria	1	San Carpoforo	310.11	Breaker Point	Mount Mars
Source: Excerpt from California Interagency Watershed Map of 1999, Calwater 2.2.1 (CA Resource Agency, 2004 Update)							

Major Changes in the Watershed

- Native American use of the Big Creek watershed goes back at least 6,500 years. Shell middens along the creek can be as much as 14 feet deep, indicating a long history of use. In addition, the remains of historic homestead sites still exist, like those of Gamboa and Boronda (Ventana Wilderness Alliance, 2007)
- San Carpoforo Creek was the route of the historic Portola Expedition of 1769, which led to the establishment of the California Missions and ultimately the European colonization of northern California. According to journal entries by Portola members, contact between Portola and native people took place on the banks of the San Carpoforo and therefore, the area is considered to be one of the last primal remnants of the original encounter between indigenous and European consciousness anywhere on the Pacific coast. In addition, a venerable grove of olive trees near the confluence of San Carpoforo and Dutra Creeks marks the location where an outpost of the Mission San Antonio de Padua once stood (Ventana Wilderness Alliance, 2007)
- In 1937, Highway 1 between Carmel and San Luis Obispo was completed, providing a coastal ink between the Central Coast and Northern California. (Monterey County Historical Society, 2013)

Watershed Health by Major Tributary

Tributary Name	**Ephemeral / Perennial**	**303d Listed/ TMDLs**	**Pollution Sources** NP (non-point) MP (Major Point)	**Environmental Flows**
Chris Flood Creek	Undetermined	Not assessed	Undetermined	Not assessed
Lower San Carpoforo Creek	Undetermined	Not assessed	Undetermined	Spring: 2.0 cfs Summer: 0.62 cfs
Mount Mars Creek	Undetermined	Not assessed	Undetermined	Not assessed
Upper San Carpoforo Creek	Undetermined	Not assessed	Undetermined	Not assessed

Watershed Health by Major Groundwater Basin

Big Creek – San Carpoforo Creek Area Watershed

Groundwater Basin	Estimated Safe Yield	Water Availability Constraints	Drinking Water Standard Exceedance	Water Quality Objective Exceedance
San Carpoforo Valley	No data available	physical limitations and potential water quality issues (Carollo, 2012)	No	None (CCRWQCB, 2011)

* No new data available since 1975

Groundwater Quality Description: Groundwater is found in Holocene and late Pleistocene age alluvium. Issues affecting the basin include seawater intrusion and limited basin yield. Recharge to the basin is largely by percolation of stream flow and to a lesser extent from infiltration of precipitation and excess irrigation flow (DWR 1958). The estimated total groundwater storage capacity is 1,800 AF (DWR 1975).

No information is available describing water quality in the basin (Carollo, 2012).

Primary Issues

Issue	*Potential Causes*	*Referenced from*
Seawater intrusion into GW basin	Reduced groundwater quantity	Carollo, 2012
Limited GW basin yield		Carollo, 2012
Outdated Groundwater Basin data		Carollo, 2012

The northern part of the San Luis Obispo Coastline and the southern part of the Monterey coastline remains one of the few minimally disturbed watersheds within our study area. However, impacts due to climate change continue to affect all areas of the County and, in combination with periods of drought, coastal creeks continue to see diminished flows which impacts the health of the ecological community.

To date, no watershed plans were identified to provide further detailed analysis of the health and/or issues facing this watershed. Further analysis is needed to know whether threats exist and what steps should be taken to maintain and enhance the health of the watershed.

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San Simeon - Arroyo de la Cruz Area Watersheds

Hydrologic Unit Name	Water Planning Area	Acreage	Flows to	Groundwater Basin(s)	Jurisdictions
Estero Bay 10	1, San Simeon	60,141 acres	Pacific Ocean (Monterey Bay National Marine Sanctuary)	Arroyo de la Cruz Valley, Piedras Blancas Point, San Simeon Point, San Simeon Valley, Santa Rosa Valley	County of San Luis Obispo, San Simeon, Cambria (ptn)

Description:

The San Simeon-Arroyo de la Cruz area watershed grouping ("watershed") is located within the North Coast region of the county. This watershed drains approximately 51,500 acres and originates on the western slopes of the Santa Lucia Mountains, flowing to the Pacific Ocean at San Simeon State Beach. Although smaller creeks within this watershed grouping have direct drainages to the ocean, there are two major drainages – Arroyo de la Cruz and San Simeon Creek. San Simeon Creek headwaters occur in the Coast Ranges to the northeast of Cambria. Elevations in the watershed range from 3,559 feet above sea level in the Santa Lucia Range at the eastern most watershed boundary to sea level along the coast. The dominant land use throughout the watershed is agriculture, specifically rangeland. The watershed includes the disadvantaged community of San Simeon, the northern portion of Cambria and the Hearst San Simeon State Historical Monument. San Simeon Estuary is located within San Simeon State Beach and is the home to several biotic communities including salt and freshwater marshes, grasslands, Monterey pine forest, as well as estuarine habitats. The watershed also contains multiple creeks that support critical Steelhead Trout habitat.

Existing Watershed Plans:

No existing plans to date

San Simeon - Arroyo de la Cruz Area Watersheds

Characteristics:

	Physical Setting	
	Rainfall	Average Annual: 19 in. (coast) - 42 in. (mountains) (NRCS shapefile, 2010)
	Air Temperature	Summer Range (August 1999-2012): 58°-77°F Winter Range (December 1999-2012): 45°-59°F (Hearst Castle, NOAA National Climatic Data Center, viewed 2013)
	Geology Description	Lower Arroyo de la Cruz sub-watershed has steep Franciscan non-infiltrative headwaters with a flat Franciscan low infiltrative valley – Category #2. Upper Arroyo de la Cruz, Burnett Creek, Arroyo de los Chinos, Arroyo de Corral and Pico Creek have steep pre-Quaternary non-infiltrative headwaters with flat Franciscan low infiltrative valleys – Category #4. Middle Arroyo de la Cruz, Oak Knoll Creek and Broken Bridge Creek sub-watersheds have steep Franciscan non-infiltrative headwaters – Category #6 (Bell, pers. comm., 2013). The name San Simeon refers to some of the geologic structures present in the area, particularly elements of the coastal Jurassic Age landforms and ophiolite mineral formations. The San Simeon Terrain is a mass of ophiolite, Franciscan Melange, and Lospe and Monterey Formation that lies on the west side of the San Simeon Fault and was considered to have moved along the San Simeon-Hosgri fault system. The area is part of the Coastal Melange Zone, with the main rock type being Franciscan Formation, a mixture of metamorphic and igneous rocks formed under high pressure and temperature during subduction 300 to 50 million years ago (Chipping, 1987) Present in this watershed are mainly marine-sedimentary and metasedimentary rocks. Nearer to the coast minor-marine and nonmarine parent rock types dominate with little metavolcanic rock and some scattered plutonic rock inclusions. The soils found in the watershed are moderate to well-drained fine to

San Simeon - Arroyo de la Cruz Area Watersheds

		moderately coarse textured with moderate permeabilities in stream channels. Poor to moderately well drained, fine or clay soils, with shallow over nearly impervious layers with slow permeability. Sand and sandy loams near coast, predominately loam textured soils in middle region, and very cobbley and gravelly clay loams in hills. Groundwater is found in Holocene and late Pleistocene age alluvium that consists of sand, gravel, and clay and ranges to 130 feet thick (Carollo, 2012; Chipping, 1987).
	Hydrology	
	Stream Gage	Yes; USGS 11142500 (Arroyo de la Cruz near Hwy 1) The San Simeon Stream Gage Station is located at Lower San Simeon Creek (#22) 35-35-59 121-06-52 (USGS, viewed August 2013)
	Hydrology Models	No source identified
	Peak Flow	23,700 cfs (USGS, 1950-1979 viewed August 2013) San Simeon Creek 45,380 AFY (SLO County Flood Control and Water Conservation District, 2005)
	Base Flow	San Simeon Creek 1200 AFY (SLO County Flood Control and Water Conservation District, 2005)
	Flood Reports	No source identified
	Flood Control Structures	Bridges:1 over Hearst Ranch Creek on SLO San Simeon Road (PWD Bridges GIS layer) Cambria Flood Control Project: 1. Bypass channel along Santa Rita Creek in the West Village 2. Gravity pressure stormdrain system to collect runoff from central residential area and divert to Santa Rosa Creek
	Areas of Heightened Flood Risk	Cambria: poor drainage facilities, steep topography, location of residential parcels below street grade. Santa Rosa Creek in West Village – up to 8 feet of water in storms of 1995 Cayucos: steep topography, poor drainage network
	Biological Setting	

San Simeon - Arroyo de la Cruz Area Watersheds

Vegetation Cover	Primarily coastal oak woodland consisting of continuous, coast live oak; and non-native annual grassland mixed chaparral consisting of chamise, scrub oak and serpentine Manzanita; buckbrush and chamise chaparral; coastal scrub consisting of black sage; intermittent ponderosa pine; montane hardwood consisting of coast live oak; and open foothill pine. (SLO County vegetation shapefile, 1990) Many drainages in this watershed are lined with willow riparian scrub, and provide unique habitats for shorebirds, waterfowl and songbirds. *Data limited by age of shapefile*
Invasive Species	Wild oats (*Avena fatua*), field mustard (*Brassica rapa*), and ripgut grass (*Bromus diandrus*), as well as rapidly spreading species, such as Italian thistle (*Carduus pycnocephalus*) and yellow star-thistle (*Centaurea solstitialis*) (Caltrans, 2006) *Data limited to observations, not complete inventory*
Special Status Wildlife and Plants	*Key*: FE - Federal endangered, FT - Federal threatened, SE - State endangered, ST - State threatened, SSC - State Species of Special Concern; FP- Fully Protected, SA – Special Animal, CRPR – CA rare plant rank (CNDDB, viewed August, 2013) Locations listed refer to USGS 7.5' quadrangle names. Only the portion overlapping the watershed boundary was considered. *Data limited to observations, not complete inventory*

Species	Status	ATASCADERO	CAYUCOS	CYPRESS MTN	MORRO BAY NORTH	MORRO BAY SOUTH
	Animals					
black legless lizard	SSC				x	x
California red-legged frog	FT	x	x	x	x	
coast horned lizard	SSC				x	
Coast Range newt	SSC			x		
globose dune beetle	SA		x		x	x

San Simeon - Arroyo de la Cruz Area Watersheds

Species	Status	ATASCADERO	CAYUCOS	CYPRESS MTN	MORRO BAY NORTH	MORRO BAY SOUTH
monarch butterfly	SA		x		x	
Morro Bay blue butterfly	SA				x	x
Morro shoulderband (=banded dune) snail	FE				x	
pallid bat	SSC		x		x	x
San Luis Obispo pyrg	SA				x	
sandy beach tiger beetle	SA		x		x	x
southern steelhead - southern California DPS	FE		x			
steelhead - south/central California coast DPS	FT		x	x	x	
tidewater goby	FE		x		x	
western pond turtle	SSC	x	x	x	x	
western snowy plover	FT				x	
Plants						
adobe sanicle	SR; CRPR 1B.1		x			
Betty's dudleya	CRPR 1B.2		x		x	
Blochman's dudleya	CRPR 1B.1		x		x	x
Blochman's leafy daisy	CRPR 1B.2				x	
Brewer's spineflower	CRPR 1B.3	x			x	
California seablite	FE; CRPR 1B.1		x		x	
Cambria morning-glory	CRPR 4.2		x			
Carmel Valley bush-mallow	CRPR 1B.2	x		x		
compact cobwebby thistle	CRPR 1B.2		x			
Cook's triteleia	CRPR 1B.3			x		
Cuesta Ridge thistle	CRPR 1B.2	x			x	
Eastwood's larkspur	CRPR 1B.2		x	x	x	
Hardham's bedstraw	CRPR 1B.3			x		
Jones' layia	CRPR 1B.2		x		x	
late-flowered mariposa-lily	CRPR 1B.2					x
Miles' milk-vetch	CRPR 1B.2		x		x	
Monterey spineflower	FT; CRPR 1B.2					x
most beautiful jewel-flower	CRPR 1B.2	x		x	x	
Palmer's monardella	CRPR 1B.2	x			x	

San Simeon - Arroyo de la Cruz Area Watersheds

Species	Status	ATASCADERO	CAYUCOS	CYPRESS MTN	MORRO BAY NORTH	MORRO BAY SOUTH
San Benito fritillary	CRPR 1B.2				x	
San Joaquin spearscale	CRPR 1B.2				x	
San Luis Obispo owl's-clover	CRPR 1B.2		x		x	x
San Luis Obispo sedge	CRPR 1B.2	x				
Santa Lucia bush-mallow	CRPR 1B.2	x		x	x	
woodland woollythreads	CRPR 1B.2			x		

Steelhead Streams	Yes; Arroyo de los Chinos Creek, Arroyo de la Cruz Creek, Pico Creek, San Simeon Creek, Steiner Creek (Becker et. al., 2010.
Stream Habitat Inventory	Yes; DFG, August 1973 and September 1992 *Data limited by age of last inventory*
Fish Passage Barriers	Van Gordon Creek, 0.2 mile east (upstream) of Van Gordon Creek Rd. on San Simeon Creek Rd. ID #167; Unnamed Tributary of San Simeon Creek, 7 miles upstream of Hwy 1 on San Simeon Creek Rd., ID #46 (PAD Database)
Designated Critical Habitat	Yes; For Steelhead - San Simeon Hydrologic Sub-area 331013. Outlet(s) = Arroyo del Corral (Lat 35.6838, Long –121.2875); Arroyo del Puerto (35.6432, –121.1889); Little Pico Creek (35.6336, –121.1639); Oak Knoll Creek (35.6512, –121.2197); Pico Creek (35.6155, –121.1495); San Simeon Creek (35.5950, –121.1272) upstream to endpoint(s) in: Arroyo Laguna (35.6895, –121.2337); Arroyo del Corral (35.6885, –121.2537); Arroyo del Puerto (35.6773, –121.1713); Little Pico Creek (35.6890, –121.1375); Oak Knoll Creek (35.6718, –121.2010); North Fork Pico Creek (35.6886, –121.0861); San Simeon Creek (35.6228, –121.0561); South Fork Pico Creek (35.6640, –121.0685); Steiner Creek (35.6032, –121.0640); Unnamed Tributary (35.6482, –121.1067); Unnamed Tributary (35.6616, –121.0639); Unnamed Tributary (35.6741, –121.0981); Unnamed Tributary (35.6777, –121.1503); Unnamed

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		Tributary (35.6604, –121.1571); Unnamed Tributary (35.6579, –121.1356); Unnamed Tributary (35.6744, –121.1187); Unnamed Tributary (35.6460, –121.1373); Unnamed Tributary (35.6839, –121.0955); Unnamed Tributary (35.6431, –121.0795); Unnamed Tributary (35.6820, –121.2130); Unnamed Tributary (35.6977, –121.2613); Unnamed Tributary (35.6702, –121.1884); Unnamed Tributary (35.6817, –121.0885); Van Gordon Creek (35.6286, –121.0942). (Federal Register- Vol. 70, No. 170 / Friday, September 2, 2005) California Red-Legged Frog (USFWS Critical Habitat Portal, viewed 2013)
	Habitat Conservation Plans	No; HCP/NCCP meeting occurred on 3.19.01 (D. Highland, CDFW files)
	Other Environmental Resources	San Simeon State Beach, William Randolph Hearst Memorial State Beach, Hearst Ranch Conservation Project, San Simeon Creek Groundwater Basin, Rocky Butte Botanical Area (SLO County Flood Control and Water Conservation District, 2007)
	Land Use	
	Jurisdictions & Local Communities	County of San Luis Obispo, Town of San Simeon, North portion of the Town of Cambria
	% Urbanized	3% (commercial, multi-family residential, and residential single family)(U.S. Census Block, 2010).
	% Agricultural	94.4% Agriculture (row crop, orchards, rangeland)(U.S. Census Block, 2010).
	% Other	1.4% rural land; 1.2% Recreation (U.S. Census Block, 2010).
	Planning Areas	North Coast Planning Area
	Potential growth areas	Hearst Corporation property; North Coast Planning Area, Hearst Castle staging area, San Simeon Village, Pine Resort Area (SLO County, 2011)
	Facilities Present	Piedras Blancas Light House, Hearst Ranch / Hearst Castle (Hearst San Simeon State Historical Monument), San Simeon State Park

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		Three wells for Cambria Community Services District are located in Lower San Simeon Creek. Wastewater treatment spray fields are also located in this area. Treated wastewater infiltrates back into the groundwater aquifer.
	Commercial Uses	Industrial facilities - Cambria Rock (Sand and Gravel mine along San Simeon Creek); Rancho San Simeon Pit (Decomposed Granite Mine); Arroyo Del Oso Pit (Sand and Gravel mined at the mouth of Arroyo Del Oso Alo); Agriculture – majority rangeland; Recreation and tourism at San Simeon, Coastal Beaches, and Hearst Castle.
	Demographics	
	Population	998 in watershed (US Census Blocks, 2010) 450 in San Simeon (US Census Blocks, 2010) 392 in Cambria (US Census Blocks, 2010)
	Race and Ethnicity	Watershed: Caucasian, representing 27.7%. Latinos represent 6.57% in City. 16% are mixed race individuals with the remainder including African American, American Indian, and Asian (US Census Block, 2010) San Simeon: 55.3% Latino; 40% Caucasian; 1.7% Mixed Race; 1.3% Asian; 1.1% American Indian and Alaska Native (US Census Blocks, 2010) Cambria: 91% Caucasian; 5.4% Latino; 2% Mixed Race (US Census Blocks)
	Income	MHI $51,557 (U.S. Census Tracts, 2010) MHI $44,583 in San Simeon (US Census, 2010) MHI $76,271 in Cambria (US Census, 2010)
	Disadvantaged Communities	Yes; San Simeon (Department of Water Resources) 0.0% of individuals below poverty level in Watershed (US Census Tracts, 2010) 0.0 % of individuals below the poverty level in San Simeon (2007-2011 American Community Survey 5-Year Estimates) 5.0% of individuals below poverty level in Cambria (2007-2011 American Community Survey 5-Year Estimates)
	Water Supply	
	Water Management Entities	Cambria CSD, San Simeon CSD (Carollo, 2012)
	Groundwater	Yes; Alluvial; and Arroyo de la Cruz Valley, Piedras Blancas Point, San Simeon Point, San

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		Simeon Valley, and Santa Rosa Valley Basins (Carollo, 2012)
	Surface Water	No public reservoirs (Carollo, 2012).
	Imported Water	None (Carollo, 2012)
	Recycled/Desalinated Water	The CCSD currently operates a wastewater treatment plant at the northern boundary of Cambria. The treated wastewater effluent is percolated into the ground between the San Simeon well field and the Pacific Ocean to create a hydraulic barrier that slows the fresh water underflow in the San Simeon Creek aquifer. This mound of fresh water also prevents seawater intrusion into the up-gradient potable groundwater aquifer, and maintains down-gradient surface flows. (CCSD Master Plan, 2008)
	Key Infiltration Areas	No data available
	Water Budget	Yes; Yates and Van Konyenburg, 1998. *Data limited by age of last water budget calculated*
	Water Uses	
	Beneficial Uses	*Arroyo de Corral* - Municipal and Domestic Supply (MUN), Agricultural Supply (AGR), Ground Water Recharge (GWR), Water Contact Recreation (REC-1), Non-Contact Water Recreation (REC-2), Wildlife Habitat (WILD), Cold Fresh Water Habitat (COLD), Warm Freshwater habitat (WARM), Migration of Aquatic Organisms (MIGR), Spawning, Reproduction, and/or Early Development (SPWN), Threatened, or Endangered Species (RARE), Estuarine Habitat (EST), Freshwater Replenishment (FRESH), and Commercial and Sport Fishing (COMM) *Arroyo de los Chinos* – Municipal and Domestic Supply (MUN), Agricultural Supply (AGR), Ground Water Recharge (GWR), Water Contact Recreation (REC-1), Non-Contact Water Recreation (REC-2), Wildlife Habitat (WILD), Cold Fresh Water Habitat (COLD), Warm Freshwater habitat (WARM), Threatened, or Endangered Species (RARE), Estuarine Habitat (EST), Freshwater Replenishment (FRESH), and Commercial and Sport Fishing (COMM) *Arroyo de la Cruz* - Municipal and Domestic Supply (MUN), Agricultural Supply (AGR),

Industrial Service Supply (IND), Ground Water Recharge (GWR), Water Contact Recreation (REC-1), Non-Contact Water Recreation (REC-2), Wildlife Habitat (WILD), Cold Fresh Water Habitat (COLD), Warm Freshwater habitat (WARM), Migration of Aquatic Organisms (MIGR), Spawning, Reproduction, and/or Early Development (SPWN), Threatened, or Endangered Species (RARE), Freshwater Replenishment (FRESH), and Commercial and Sport Fishing (COMM)

Oak Knoll Creek – Municipal and Domestic Supply (MUN), Agricultural Supply (AGR), Ground Water Recharge (GWR), Water Contact Recreation (REC-1), Non-Contact Water Recreation (REC-2), Wildlife Habitat (WILD), Cold Fresh Water Habitat (COLD), Warm Freshwater habitat (WARM), Threatened, or Endangered Species (RARE), Estuarine Habitat (EST), Freshwater Replenishment (FRESH), and Commercial and Sport Fishing (COMM)

Pico Creek - Municipal and Domestic Supply (MUN), Agricultural Supply (AGR), Ground Water Recharge (GWR), Water Contact Recreation (REC-1), Non-Contact Water Recreation (REC-2), Wildlife Habitat (WILD), Cold Fresh Water Habitat (COLD), Warm Freshwater habitat (WARM), Migration of Aquatic Organisms (MIGR), Spawning, Reproduction, and/or Early Development (SPWN), Preservation of Biological Habitats of Special Significance (BIOL), Threatened, or Endangered Species (RARE), Freshwater Replenishment (FRESH), and Commercial and Sport Fishing (COMM)

San Simeon Creek Estuary - Ground Water Recharge (GWR), Water Contact Recreation (REC-1), Non-Contact Water Recreation (REC-2), Wildlife Habitat (WILD), Cold Fresh Water Habitat (COLD), Migration of Aquatic Organisms (MIGR), Spawning, Reproduction, and/or Early Development (SPWN), Preservation of Biological Habitats of Special Significance (BIOL), Rare, Threatened, or Endangered Species (RARE), Estuarine Habitat (EST), Commercial and Sport Fishing (COMM) and Shellfish Harvesting (SHELL).

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		San Simeon Creek - Municipal & Domestic Supply (MUN), Agricultural Supply (AGR), Ground Water Recharge (GWR), Water Contact Recreation (REC-1), Non-Contact Water Recreation (REC-2), Wildlife Habitat (WILD), Cold Fresh Water Habitat (COLD), Warm Fresh Water Habitat (WARM), Migration of Aquatic Organisms (MIGR), Spawning, Reproduction, and/or Early Development (SPWN), Preservation of Biological Habitats of Special Significance (BIOL), Rare, Threatened, or Endangered Species (RARE), Freshwater Replenishment (FRSH) and Commercial and Sport Fishing (COMM). *Steiner Creek* - Municipal and Domestic Supply (MUN), Agricultural Supply (AGR), Ground Water Recharge (GWR), Water Contact Recreation (REC-1), Non-Contact Water Recreation (REC-2), Wildlife Habitat (WILD), Cold Fresh Water Habitat (COLD), Warm Freshwater habitat (WARM), Migration of Aquatic Organisms (MIGR), Spawning, Reproduction, and/or Early Development (SPWN), Threatened, or Endangered Species (RARE), and Commercial and Sport Fishing (COMM) (CCRWQCB, 2011)
	Other Unique Characteristics	
	Cambria Mercury Mines	No longer operating, partially reclaimed, with annual reports indicating low concentrations of metals and salts continue to leave the site, sometime exceeding receiving water standards (New Times, 2009)
	San Simeon Point Conservation Easement	319 acres held by the California Department of Park and Recreation (National Conservation Easement Database, viewed 2013)
	California Trade Lands Easement	5 acres held by The Nature Conservancy (National Conservation Easement Database, viewed 2013)
	Cambria Pines Easement	1450 acres held by The Nature Conservancy (National Conservation Easement Database, viewed 2013)
	Hearst San Simeon State Historical Monument	▪ Ranch encompasses over 118,000 acres, 77,000 acres in San Luis Obispo County. Three Spanish land grants in the early 1840's

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		were basis for the acquisition of the ranch property including Rancho Piedra Blanca, Rancho San Simeon and Rancho Santa Rosa ▪ Attracts over one million visitors annually ▪ Proposed development of five separate coastal areas for resort recreation and limited residential uses.
	San Simeon Acres	▪ Small commercial village developed to provide tourist and recreation services ▪ Provides food and lodging facilities for Hearst Castle visitors as well as tourists driving Highway One. ▪ Evolved from 1940 sale of the area by W. R. Hearst to facilitate recreational development
	North Coast Shoreline	• Valuable scenic and natural resource • Consists of low marine terraces with accessible beaches and coves, interspersed with rocky shorelines and steep bluffs. Offshore are rocks, reefs, and kelp beds. • The Monterey Bay Marine Sanctuary provides protection for rich offshore marine habitat.
	Monterey Pine Forests	• 2,500 acres surrounding Cambria • 500 acres at Pico Creek • Stands are extremely important as a "gene pool" – genetic variations found there protect some trees from pine pitch canker • Preservation of finer specimen stands recommended through use of open space easements, avoidance by development, and direct purchase. The introduction of hybrid species is discouraged
	North Coast Creeks	• Important fish streams for migration and spawning • Adjacent riparian and wetland areas provide wildlife habitat • Groundwater and surface waters linked, maintenance of creek habitats essential to protect coastal resources • Support number of declining species such as Tidewater Goby, Striped Garter Snake, Western Pond Turtle, Red-legged Frog and Steelhead Trout
	San Simeon Creek Lagoon	• Estuary located within San Simeon State Beach. • Composed of several biotic communities including salt and freshwater marshes,

		grasslands, Monterey pine forest, as well as estuarine habitats. • Supports steelhead trout and other fish species • Major waterfowl feeding and nesting site. Close to 190 bird species reported at lagoon and in adjacent areas
	Hearst San Simeon State Park	One of the oldest units in the Ca State Park System. Coastal bluffs offer scenic views of the ocean and rocky shore. A 3.3 mile trail runs through parts of San Simeon Natural Preserve and the Washburn Campground. The trail includes scenic overlooks, rest-stop benches and interpretive panels with information on wildlife and habitat. • Santa Rosa Creek Preserve – includes valuable riparian forests and coastal wetlands, that provide habitat for endangered Tidewater Goby • San Simeon Natural Preserve – contains vast wetlands, riparian areas, and several undisturbed native plant communities including mina mound topography. The Preserve is a wintering site for monarch butterfly populations. • Pa-nu Cultural Preserve – 13.7 acres with the most significant archeological sites within the San Simeon State Park. The site has been dated to 5850 years before the present. Contains significant evidence documenting prehistoric technology, subsistence practices and social organization over the course of several centuries. • W. R. Hearst Memorial Beach – Dedicated to the County in 1953. Has a 795 foot pier, completed in January 1969. Ownership transferred to State in 1970. The National Oceanic and Atmospheric Administration runs the Coastal Discovery Center at San Simeon Bay. It offers interactive exhibits and education programs which highlight the cultural and natural history of Old San Simeon, California State Parks and the Monterey Bay national Marine Sanctuary (parks.ca.gov)

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	Piedras Blancas Light Station	Located on a rugged windswept point of land six miles north of Hearst Castle, along California's scenic Highway One. First illuminated as an aid to navigation in 1875, the lighthouse is still in operation. Access by guided tours only, operated by U.S. Dept of Interior, Bureau of Land Management (blm.gov).
	Historical Resources	Van Gordon Archaeological Site (Located in San Simeon State Park, 500 San Simeon Creek Road; San Simeon); Hearst Ranch (California 1, San Simeon); The Sebastian Store (442 Slo San Simeon Road, San Simeon) (PLN_DES_HISTORIC_POINTS GIS layer)
	Climate Change Considerations	
		See IRWMP, 2014 Section H, Climate Change *Data is general for County, not watershed specific*

Watershed Codes

Calwater / DWR umber	HA	Hydrologic Area Name	HSA	Hydrologic Sub-Area Name	SWRCB Number	CDF Super Planning	CDF Watershed Name
3310.110202	1	San Carpoforo	1	Breaker Point	310.11	Breaker Point	Arroyo de los Chinos
3310.120001	1	Arroyo de la Cruz	2	Undefined	310.12	Undefined	Upper Arroyo de la Cruz
3310.120002	1	Arroyo de la Cruz	2	Undefined	310.12	Undefined	Middle Arroyo de la Cruz
3310.120003	1	Arroyo de la Cruz	2	Undefined	310.12	Undefined	Lower Arroyo de la Cruz
3310. 120004	1	Arroyo de la Cruz	2	Undefined	310.12	Undefined	Burnett Creek
3310.130101	1	San Simeon	3	San Simeon Creek	310.13	San Simeon Creek	Steiner Creek
3310.130102	1	San Simeon	3	San Simeon Creek	310.13	San Simeon Creek	Lower San Simeon Creek
3310.130103	1	San Simeon	3	San Simeon Creek	310.13	San Simeon Creek	Upper San Simeon Creek
3310.130201	1	San Simeon	3	Oak Knoll	310.13	Oak Knoll	Broken Bridge Creek
3310.130202	1	San Simeon	3	Oak Knoll	310.13	Oak Knoll	Oak Knoll Creek
3310.130203	1	San Simeon	3	Oak Knoll	310.13	Oak Knoll	Arroyo del Corral
3310.130204	1	San Simeon	3	Oak Knoll	310.13	Oak Knoll	Pico Creek

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Source: Excerpt from California Interagency Watershed Map of 1999, Calwater 2.2.1 (CA Resource Agency, 2004 Update)

Major Changes in the Watershed

Clark Colahan's 2011 account of the settling of the San Simeon Creek watershed by his ancestor EA Clark in *On the Banks of San Simeon Creek*, indicates that EA arrived in California in 1850, traveling by way of the Isthmus of Nicaragua and arriving in the spring of 1858, then homesteaded for a decade on San Simeon Creek in San Luis Obispo County. In *On the Banks*, Colahan compiled extensive diary entries which paint a picture of the developing commerce in the watershed related to the natural resources available, extracted or otherwise utilized in settling and developing a means of survival and providing sustenance.

- Coal mining—William Leffingwell discovered outcropping of coal on the beach south of San Simeon Creek in 1863 (Hamilton, 1999)
- Quicksilver (mercury in the form of cinnabar) mining began in mid 1860's
- Dairying began in mid-to late 1860's
- San Simeon - Leffingwell Landing used in the 1860's followed by pier in late 1860's as well as whaling pier in same time period

The general pattern of land use change in SSC watershed follows that of neighboring watersheds wherein the settlement period following division of Spanish land grants brought grazing, small agricultural concerns, mining, water diversion and pumping, followed by more intense dairy farming, irrigated row crops, further land division, road building and more pumping for irrigated agriculture and residential development. As of the early 1990's, water resource availability has been the primary factor in the lack of continued development and sub-division in the watershed (Central Coast Salmon Enhancement, 2011).

Cambria:

- Located within Rancho Santa Rosa, an original Mexican land grant. Established in 1860's to accommodate shipping of mining and agricultural products in the central coast region.
- Once an important service center for pioneer residents of the coastal region. Locally produced products included whale oil, lumber, mercury, gold and dairy products, most of which were exported. Depletion of mineral resources and replacement of coastal shipping by inland transportation reduced Cambria's position of economic importance in the county.
- Continues to provide limited services to nearby agricultural areas. Role as a resort and retirement community grown in importance since 1920's.
- Today visitors come for pleasant natural setting, seashore and numerous recreational opportunities such as art, craft and antique shops and fine restaurants.
- Annual dry-season water shortage long been cause for concern. 1990-1993: mandatory conservation program which reduced consumption by approximately 28% compared to 1989.
- Early 1990's: Cambria CSD spray field operation changed to percolation pond system. Raised water well levels while serving as a hydraulic mound to slow fresh water outflow at ocean boundary.
- All new developments must participate in off-site plumbing fixture retrofit program – conventional plumbing fixtures replaced with low-flow fixtures

San Simeon

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- 1878 – George Hearst, proprietor of Piedras Blancas Rancho built a new 1,000 foot wharf at a cost of $20,000.
- Piedras Blancas Lighthouse was built on the old property of Juan Castro. The light house was 100 feet high, built of brick and iron, and cost $100,000. It contains a Fresnel light of great power (Storke, 1891).
- On this coast there are a number of whaling stations ï¿½ at Monterey, San Simeon, Point San Luis, and Point Concepcion. The whaling business was begun here as early as 1864, and it has proved quite profitable. The least catch during the season was three whale, the greatest twenty-three. The whale hunts, conducted in open boats off these rugged coasts, is exciting but dangerous sport (Storke, 1891).

Watershed Health by Major Tributary

Tributary Name	**Ephemeral / Perennial**	**303d Listed/ TMDLs**	**Pollution Sources** NP (non-point) MP (Major Point)	**Environmental Flows**
Arroyo de Corral	Undetermined	Not assessed	Undetermined	Not assessed
Arroyo de los Chinos	Undetermined	Not assessed	Undetermined	**Lower**: Spring: 0.4 cfs. Summer: 0.22 cfs.
Broken Bridge Creek	Undetermined	Not assessed	Undetermined	Not assessed
Burnett Creek	Undetermined	Not assessed	Undetermined	Not assessed
Arroyo de la Cruz	Undetermined	Escherichia coli (E. coli), Low Dissolved Oxygen	Agriculture, Natural Sources, Grazing-Related Sources	**Lower**: Spring: 2.33 cfs. Summer: 0.71 cfs.
Oak Knoll Creek	Undetermined	Not assessed	Undetermined	**Lower**: Spring: 0.63 cfs. Summer: 0.27 cfs.
Pico Creek	Undetermined	Low Dissolved Oxygen	Grazing-related Sources, Unknown Sources, Natural Sources	Spring: 0.61 cfs. Summer: 0.27 cfs.
San Simeon Creek	Ephemeral	Chloride, Nitrate, Lo Dissolved Oxygen, Sodium	Agriculture, Grazing related sources, Natural Sources, Wastewater –	**Lower**: Spring: 1.6 cfs. Summer: 0.52 cfs. **Middle**: Spring: 1.51 cfs.

			land disposal	Summer: 0.5 cfs **Upper**: Spring: 0.79 cfs. Summer: 0.32 cfs.
Steiner Creek	Undetermined	Not assessed	Undetermined	Not assessed

Watershed Health by Major Groundwater Basin

Groundwater Basin	Estimated Safe Yield	Water Availability Constraints	Drinking Water Standard Exceedance	Water Quality Objective Exceedance
Arroyo de la Cruz Valley	1,244 AFY (Envicom, 1982 / SLO County WMP, 2012)	None (Carollo, 2012)	None (Carollo, 2012)	None (CCRWQCB, 2011)
Piedras Blancas Point	None (Carollo, 2012)	None (Carollo, 2012)	None (Carollo, 2012)	None (CCRWQCB, 2011)
San Simeon Point	None (Carollo, 2012)	None (Carollo, 2012)	None (Carollo, 2012)	None (CCRWQCB, 2011)
San Simeon Valley	1040 AFY (IRWMP, 2011)	The State Water Resources Control Board (State Board) allows a maximum extraction of 1,230 AFY in the San Simeon Valley Groundwater Basin and a maximum dry season extraction of 370 AF (Cambria CSD, 2008).	None (Carollo, 2012)	None (CCRWQCB, 2011)
Santa Rosa Valley	2,260 AFY (SLO	None (Carollo,	None (Carollo,	None

	County WMP, 2012)	2012)	2012)	(CCRWQCB, 2011)
Pico Creek	120 AFY (Cleath, 1986 / SLO County WMP, 2012).	The primary constraints on water availability in the basin include physical limitations and potential water quality issues. (Carollo, 2012)	None (Carollo, 2012)	None (CCRWQCB, 2011)

During January of 2003, CCSD began investigating the process of adjudicating the San Simeon Basin. To date, neither basin has been adjudicated (Cambria Community Services District, 2004).

CCSD Water Rights
Under CCSD's diversion permit for the San Simeon Basin, Permit No. 17287, the following restrictions apply:

- Maximum rate of diversion: 5.0 AF/day (2.5 cubic feet per sec [cfs])
- Maximum annual diversion: 1,230 AF
- Maximum dry season diversion: 370 AF. The dry season is defined as the date surface flow ceases at the Palmer Flats gaging station until October 31 of that year.

(Cambria Community Services District, 2004)

Groundwater supplies can be provided from either the San Simeon or Santa Rosa Creek wells. Both sources have appropriative water rights and, with the completion of water treatment facilities for the Santa Rosa Creek wells, the District's two supplies can be utilized conjunctively to manage groundwater levels in both basins (Kennedy and Jenks, 2000).

Groundwater Quality Description: (Groundwater samples from 31 wells collected from 1955 to 1994 show total dissolved solids (TDS) concentration ranging from 46 to 2,210 mg/l (DWR, 2003). Samples from three public supply wells show a TDS concentration range of 400 to 420 mg/l with an average concentration of 413 mg/l. Manganese concentrations in the downstream regions of the basin have exceeded the MCL, with a range of 0.002 to 1.6 mg/l (Carollo, 2012).

Primary Issues

Issue	***Potential Causes***	***Referenced from***
Loss of riparian vegetation		J. Nelson, pers. comm., 2013
Lack of instream flow	Excessive pumping/diversion	J. Nelson, pers. comm., 2013
Excessive sedimentation		J. Nelson, pers. comm., 2013
Gravel mining		J. Nelson, pers. comm., 2013
Grazing/Cattle		J. Nelson, pers. comm., 2013
Low dissolved oxygen kills fish in		J. Nelson, pers. comm., 2013

the lagoon		
Water pollution	Sewage leaks/overflow, general agriculture/row crops	J. Nelson, pers. comm., 2013
Poaching		J. Nelson, pers. comm., 2013
Sea Water Intrusion		Carollo, 2012
Currently the water supply of San Simeon CSD is at a certified Level III severity rating (resource capacity has been met or exceeded) due to unreliability of the groundwater supply to meet existing demands (SLO County, 2008). As a result, a moratorium on development has been in place since 1991.		SLO County Flood Control and Water Conservation District, 2008
Outdated hydrological studies for area GW basins		Carollo, 2012
Arroyo de la Cruz 303(d) listed for Escherichia coli (E. coli), low dissolved oxygen	Agriculture, natural sources, grazing related sources	Carollo, 2012
Pico Creek 303(d) listed for low dissolved oxygen	Grazing related, natural sources	Carollo, 2012
San Simeon Creek 303(d) listed for chloride, nitrate, low dissolved oxygen, sodium	Agriculture, grazing related and natural sources, wastewater (land disposal)	Carollo, 2012

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Significant Studies in Progress:

The San Simeon Creek Watershed Management Plan was initiated by Greenspace-the Cambria Land Trust in 2011 and subsequently discontinued. A draft unpublished annotated bibliography document was produced.

Water Master Plan for Cambria: In-stream flow management study for San Simeon Creek. Water management strategy, small lot reduction ballot measure

Santa Rosa Creek Area Watersheds

Hydrologic Unit Name	Water Planning Area	Acreage	Flows to	Groundwater Basin(s)	Jurisdictions
Estero Bay 10	Cambria WPA 2	46,997 acres	Pacific Ocean – (Monterey Bay National Marine Sanctuary)	Santa Rosa Valley, Villa Valley	County of San Luis Obispo Town of Cambria, Town of Harmony

Existing Watershed Plans:

Santa Rosa Creek Watershed Management Plan (Greenspace Cambria, 2010)

Cambria forest management plan (Greenspace Cambria, 2002)

Description:

Santa Rosa Creek Area Watershed lies within the southern portion of the California Coast Ranges. The watershed is bounded to the east by the Santa Lucia Mountain Range and to the west by the Pacific Ocean. The grouping of watersheds herein is consistent with the CalWater HUC 10 scale. The watershed contains 2 major sub-watersheds: Santa Rosa Creek, which contains Santa Rosa Creek and Green Valley (Perry Creek) and Villa Creek. Santa Rosa Creek and its tributaries flow mostly unobstructed down steep hill-slopes mantled with shallow soils and sparse shrub vegetation and through agricultural areas and the small town of Cambria before reaching the Pacific Ocean. Villa Creek begins in the Santa Lucia range flowing to the Pacific Ocean and encompassing a majority of the coastal area within the total watershed. The Town of Cambria is near the mouth of Santa Rosa Creek. The urbanized area of Cambria is located within both the Santa Rosa Creek sub-watershed and the Villa Creek sub-watershed. Topography includes steep upland areas and low gradient valley bottoms bordering the creek reaches. Cypress Mountain, the highest peak, lies in the Upper Santa Rosa creek watershed and reaches an elevation of approximately 3,411 ft. At its lowest elevation (sea level), Santa Rosa Creek flows through a lagoon contained by an annually formed sandbar at Moonstone Beach. The dominant land use is agriculture.

Santa Rosa Creek Area Watersheds

Characteristics:

	Physical Setting	
	Rainfall	Average Annual: 15 in. (coastal) - 38 in. (mountains) (NRCS shapefile, 2010)
	Air Temperature	Summer Range (August 2012): 54°-70°F Winter Range (December 2012): 48°-59°F (Cambria, NOAA National Climatic Data Center, viewed 2013)
	Geology Description	Lower Santa Rosa Creek and Villa Creek: composed of steep Franciscan non-infiltrative headwaters; with flat pre Quaternary moderate infiltrative valley – Category #1 Steiner Creek, Upper Green Valley Creek, Upper San Simeon Creek and Upper Santa Rosa Creek: steep Franciscan non-infiltrative headwaters – Category #6 Lower Green Valley Creek and Lower San Simeon Creek: flat Franciscan low infiltrative valleys – Category #10 (Bell, pers. comm., 2013). This watershed is composed of Franciscan mélange: a mix of hard graywacke (sandstone) and weak, sheared argillite (silt/claystone) (Chipping 1987, Dibblee 2007a 2007b). Following the complete subduction of the Farallon Plate beneath the North American Plate, the eventual transition to a transform (strike-slip) plate boundary began about 25 million years ago with the gradual contact between the northwest-moving Pacific Plate and the southeast-moving North American Plate (Atwater and Molnar 1973). This transition marked a geologically brief period of coastal volcanism which locally produced the erosion-resistant Cambria Felsite rocks, as seen today at Scott Rock located east of Cambria near Taylor Creek (Dibblee 2007a). Other volcanic rocks formed during this period include the now highly weathered basalts and hardened tuffs (solidified volcanic ash) of the Obispo Formation that run along a northwest-trending band in the upper watershed. Terrestrial and marine sedimentary rocks formed during this period include a mix of hard, coarse-grained sandstones and weak, fine-grained shales (Greenspace Cambria, 2012)
	Hydrology	
	Stream Gage	Yes; upper watershed - USGS 11142200 (Santa Rosa Creek near Santa Rosa Creek Rd); lower watershed - SLO County San Simeon Station (718); SLO County Santa Rosa Station (716).
	Hydrology Models	Yes; part of the Highway 1 by-pass bridge project, 1999 and updated in 2002 for a pump station evaluation for the west village. The flow from

		that model was used in the design of Ferrasci road bridge. *Data limited by project scope, not watershed level model*
	Peak Flow	3,350 cfs (upper Santa Rosa Creek) 12,000 cfs (lower Santa Rosa Creek), (USGS, viewed August, 2013)
	Base Flow	0 – 5 cfs (USGS, viewed August, 2013)
	Flood Reports	Yes; Cambria Drainage and Flood Control Study, February 2004; Raines, Melton and Carella, Inc.
	Flood Control Structures	Bridges: 1 over Villa Creek on Villa Creek Rd; 1 over Harmony Valley Creek on Old Creamery Road; 6 over Santa Rosa Creek on Santa Rosa Creek Road (3), Burton Drive, Windsor Boulevard and Main Street; 4 over San Simeon Creek on San Simeon Creek Road; 1 over Leffingwell Creek on Moonstone Beach Drive. (PWD Bridges GIS layer) Additional by-pass channel; storm drains; pumping systems along Santa Rose Creek in West Village (SLO County Flood Control and Water Conservation District, 2009) Gravity Pressure Stormdrain System: Diverts residential runoff directly into Santa Rosa Creek (SLO County Flood Control and Water Conservation District, 2009) Dams proposed for San Simeon Creek near Van Gordon tributary, proposed Jack Creek Dam (Cambria Community Services District, 2004).
	Areas of Known Flood Risk	The combination of the area's steep topography, lack of underground drainage facilities, and location of residential parcels below the street grade has resulted in localized poor drainage and/or flooding around some residences, buildings, and roadways. The magnitude of flooding varies by the districts in Cambria and by location in each district. Drainage from a number of uphill lots flows along the edge of street pavement and drains onto lower lots, creating flooding and erosion problems. Drainage problems also exist where curbs are present, but the topography creates conditions where lots adjacent to the roadway are much lower than the roadway surface. SLOCFCWCD has earmarked over $500,000 to fund one of the projects, has obtained funding assistance from the local community totaling $1.1 million and obtained a FEMA HMGP (Hazard Mitigation Grant Program) grant of $3.5 million towards regional flood improvements. Total cost for the unfunded projects is estimated to be $11.0 million (SLO County Flood Control and Water Conservation District, 2009). Villa Creek is a flood-prone natural drainage course that should be maintained in its natural state to protect native vegetation and wildlife habitats (SLO County Flood Control and Water Conservation District, 2009).
	Biological Setting	

Santa Rosa Creek Area Watersheds

Vegetation Cover	Primarily annual non-native grassland with continuous coast live oak woodland, Montane hardwood consisting mainly of coast live oak and black oak woodland, and Closed-Cone Pine-Cypress consisting of Monterey pine. Some coastal scrub and cypress forest present. (1990 vegetation layer) grassland, scrub/shrub, mixed forest, evergreen forest, cultivated crops, woody wetlands, pasture/hay, and emergent herbaceous wetland (DFG, 2005) Willow riparian scrub is present along some coastal drainages in this watershed. *Data limited by age of shapefile.*
Invasive Species	Cape Ivy, Pampass grass (National Marine Fisheries Service, 2007) *Data limited in scope, not representative of entire watershed*
Special Status Wildlife and Plants	Key: FE - Federal endangered, FT - Federal threatened, SE - State endangered, ST - State threatened, SSC - State Species of Special Concern; FP- Fully Protected, SA – Special Animal, CRPR – CA rare plant rank (CNDDB, viewed August, 2013) Locations listed refer to USGS 7.5' quadrangle names. Only the portion overlapping the watershed boundary was considered. *Data limited to observations, not complete inventory*

Species	Status	BURRO MOUNTAIN	CYPRESS MTN	LIME MTN	PEBBLESTONE SHUT-IN	PICO CREEK
Animals						
California red-legged frog	FT		x	x	x	x
Coast Range newt	SSC		x			
fringed myotis	SA					x
monarch butterfly	SA	x				x
prairie falcon	SA (Nesting)				x	x
steelhead - south/central California coast DPS	FT		x		x	x

Santa Rosa Creek Area Watersheds

Species	Status	BURRO MOUNTAIN	CYPRESS MTN	LIME MTN	PEBBLESTONE SHUT-IN	PICO CREEK
tidewater goby	FE					x
two-striped garter snake	SSC				x	x
western pond turtle	SSC		x		x	x
Yuma myotis	SA					x
Plants						
Arroyo de la Cruz manzanita	CRPR 1B.2				x	x
Carmel Valley bush-mallow	CRPR 1B.2		x		x	
Chorro Creek bog thistle	FE; SE; CRPR 1B.2				x	
Cook's triteleia	CRPR 1B.3		x		x	
Eastwood's larkspur	CRPR 1B.2		x			
Hardham's bedstraw	CRPR 1B.3		x		x	
late-flowered mariposa-lily	CRPR 1B.2				x	
Monterey pine	CRPR 1B.1					x
most beautiful jewel-flower	CRPR 1B.2		x	x	x	x
San Luis mariposa-lily	CRPR 1B.2				x	
San Luis Obispo owl's-clover	CRPR 1B.2					x
San Luis Obispo sedge	CRPR 1B.2				x	
San Simeon baccharis	CRPR 1B.2				x	
Santa Lucia bush-mallow	CRPR 1B.2		x		x	x
woodland woollythreads	CRPR 1B.2		x		x	x

Santa Rosa Creek Area Watersheds

Steelhead Streams	Yes; Santa Rosa Creek Upper, Santa Rosa Creek Lower, Lower Perry Creek (DFG, 2005)
Stream Habitat Inventory	Yes; Santa Rosa Creek Steelhead Habitat and Population Survey completed in 2005 by California Department of Fish and Wildlife and California Conservation Corps
Fish Passage Barriers	Unnamed tributary to Santa Rosa Creek, Culvert at Santa Rosa Creek Road crossing, Partial barrier PAD# 712027.00000; Curti Creek, Culvert at Santa Rosa Creek Road crossing, Total barrier PAD# 712044.00000; Unnamed tributary to Santa Rosa Creek, Culvert at Santa Rosa Creek crossing, Total barrier PAD# 712043.00000; North Fork Santa Rosa Creek, Culvert at Santa Rosa Creek Road crossing, Total barrier PAD# 712045.00000; Unnamed tributary, Culvert at Highway 1 crossing, Unknown status PAD# 731784.00000; Fiscalini Creek, Culvert at road crossing, Unknown status PAD# 731365.00000; Perry Creek, Highway 46 bridge with potential passage constraints, Unknown status PAD# 736678.00000 Perry Creek, Culvert at road crossing, Unknown status (No ID #); Green Valley Creek, Highway 46 bridge with potential passage constraints, Unknown status PAD# 736483.00000; Unnamed tributary to Green Valley Creek, Culvert at Highway 46 crossing, Unknown status PAD# 736475.00000; Unnamed tributary to Green Valley Creek, Culvert at Highway 46 crossing, Unknown status PAD# 736538.00000; Unnamed tributary to Green Valley Creek, Culvert at Highway 46 crossing, Unknown status PAD# 736487.00000; Unnamed tributary to Green Valley Creek, Culvert at Highway 46 crossing, Unknown status PAD# 736431.00000; Unnamed tributary to Green Valley Creek, Culvert at Highway 46 crossing, Unknown status PAD# 736457.00000; Unnamed tributary to Green Valley Creek, Culvert at Highway 46 crossing, Unknown status PAD# 736621.00000; Green Valley Creek, Unspecified, Unknown status PAD# 716213.00000; Unnamed tributary to Green Valley Creek, Culvert at Highway 46 crossing, Unknown status PAD# 736625.00000; Green Valley Creek, Culvert at Highway 46 crossing, Unknown status PAD# 736583.00000 (Protected Access Database, viewed 2013)
Designated Critical Habitat	Yes; Steelhead Trout: Santa Rosa Hydrologic Sub-area 331014. Outlet(s) = Santa Rosa Creek (Lat 35.5685, Long –121.1113) upstream to endpoint(s) in: Green Valley Creek (35.5511, –120.9471); Perry Creek (35.5323–121.0491); Santa Rosa Creek (35.5525, –120.9278); Unnamed Tributary (35.5965, –120.9413); Unnamed Tributary (35.5684, –120.9211); Unnamed Tributary (USFWS Critical Habitat Mapper, viewed 2013) California red-legged frog (USFWS Critical Habitat Portal, viewed 2013)
Habitat Conservation Plans	Yes; A Habitat Conservation Plan was envisioned as part of the original request for proposals by the Cambria Community Services District as part of its effort to complete a comprehensive water master plan as well as its existing water supply and need for an evaluation of alternative water sources (Cambria Community Services District, 2004).
Other	San Luis Obispo Coastal Zone, Monterey Bay National Marine Sanctuary

Santa Rosa Creek Area Watersheds

Environmental Resources	Santa Rosa Creek Groundwater Basin, Cambria Monterey Pine Forest (SLO County Flood Control and Water Conservation District, 2007).
Land Use	
Jurisdictions & Local Communities	County of San Luis Obispo, Town of Cambria (portion), Town of Harmony
% Urbanized	2.45% total (0.2% Commercial, 0.25% Public Facilities, 2% residential) (SLO County LUC)
% Agricultural	93.35% (SLO County LUC)
% Other	4.2% total (2.6% rural lands, 0.3% recreation, 1.3% open space)(SLO County LUC)
Planning Areas	Adelaida, North Coast, Estero Planning Areas (SLO County)
Potential growth areas	Hearst Corporation property
Facilities Present	Cambria Wastewater Treatment Plant; CCSD well sites (Santa Rosa Creek)
Commercial Uses	Cambria Pit (Stone – Base Mine by Winsor Construction at Santa Rosa Creek Rd); Bianchi Quarry (Stone – Base Mine by Winsor Construction: North East Cambria); Land Red Rock Pit (Stone Mine by Negranti Construction at Hwy 46W) Recreation and tourism in Cambria; Wineries in Cambria and Harmony; Agriculture – rangeland, orchards, etc., Hearst Ranch
Demographics	
Population	5,941 in watershed (US Census Blocks, 2010) 5,601 in the town of Cambria(US Census Blocks, 2010)
Race and Ethnicity	Watershed: Caucasian, representing 76%. Latinos represent 21%. Asians represent 1.3%. The remaining races each represent less than 4%, including African American, American Indian, and Pacific Islander. (US Census Blocks, 2010) Cambria: Caucasian, representing 75.6%. Latinos represent 20.8%. Mixed Race represents 1.3%. (US Census, 2010)
Income	MHI $51,557 in watershed (US Census Tracts, 2010) MHI $75,747.5 in Cambria (U.S. Census, 2010)
Disadvantaged Communities	No; 1.5% of individuals are below poverty level in watershed (US Census Tracts, 2010) 5% of individuals below poverty level in Cambria (US Census, 2010)
Water Resources	
Water Management Entities	Cambria Community Services District (CCSD)
Groundwater	Yes; Alluvial; Santa Rosa Valley, Villa Valley Use of wells for domestic supplied water (CCSD) from Santa Rosa Creek

Santa Rosa Creek Area Watersheds

		The State Board allows a maximum extraction of 518 AFY in the Santa Rosa Valley Groundwater Basin and a maximum dry season extraction of 260 AF (Carollo, 2012) CCSD – Level III severity declaration for water supplies (CCSD Water Master Plan, 2008)
	Surface Water	No public reservoirs in the watershed. Identified as fully appropriated stream system for entire year according to the SWRCB's Water Code 1205-1207.
	Imported Water	None
	Recycled/ Desalinated Water	CCSD has made an effort over the past 15 years to bring a desalination operation to Santa Rosa/San Simeon. The most recent effort failed in 2012. Proposed water recycling plant for agricultural irrigation (Cambria Community Services District, 2004).
	Key groundwater percolation area(s)	None Identified: Recharge to the basin is largely by percolation of stream flow and, to a lesser extent, from infiltration of precipitation and excess irrigation flow (Ca. Dept. of Water Resources, 2003)
	Water Budget	Yes; Yates and Van Konynenburg, 1998 (Carollo, 2012). *Data limited by age since last report*
	Water Uses	
	Beneficial Uses	*Santa Rosa Creek Estuary* - Ground Water Recharge (GWR), Water Contact Recreation (REC-1), Non-Contact Water Recreation (REC-2), Wildlife Habitat (WILD), Cold Fresh Water Habitat (COLD), Warm Fresh Water Habitat (WARM), Migration of Aquatic Organisms (MIGR), Spawning, Reproduction, and/or Early Development (SPWN), Preservation of Biological Habitats of Special Significance (BIOL), Rare, Threatened, or Endangered Species (RARE), Commercial and Sport Fishing (COMM) and Shellfish Harvesting (SHELL). *Santa Rosa Creek* - Municipal & Domestic Supply (MUN), Agricultural Supply (AGR), Industrial Service Supply (IND), Ground Water Recharge (GWR), Water Contact Recreation (REC-1), Non-Contact Water Recreation (REC-2), Wildlife Habitat (WILD), Cold Fresh Water Habitat (COLD), Warm Fresh Water Habitat (WARM), Migration of Aquatic Organisms (MIGR), Spawning, Reproduction, and/or Early Development (SPWN), Rare, Threatened, or Endangered Species (RARE), Freshwater Replenishment (FRSH) and Commercial and Sport Fishing (COMM). *Green Valley Creek* - Municipal & Domestic Supply (MUN), Agricultural Supply (AGR), Ground Water Recharge (GWR), Water Contact Recreation (REC-1), Non-Contact Water Recreation (REC-2), Wildlife Habitat (WILD), Cold Fresh Water Habitat (COLD), Warm Fresh Water Habitat (WARM), Rare, Threatened, or Endangered Species (RARE) and Commercial and Sport Fishing (COMM).

	Villa Creek - Municipal and Domestic Supply (MUN), Agricultural Supply (AGR), Ground Water Recharge (GWR), Water Contact Recreation (REC-1), Non-Contact Water Recreation (REC-2), Wildlife Habitat (WILD), Cold Fresh Water Habitat (COLD), Migration of Aquatic Organisms (MIGR), Spawning, Reproduction, and/or Early Development (SPWN), Threatened, or Endangered Species (RARE), Estuarine Habitat (EST), Freshwater Replenishment (FRESH), and Commercial and Sport Fishing (COMM) (CCRWQCB, 2011)
Other Unique Characteristics	
Historical Resources	Arthur Beale House (Nitt Witt Ridge, 881 Hillcrest, Cambria); Guthrie-Bianchini House (2251 Center Street, Cambria); The Paul Squibb House (4063 Burton Drive, Cambria); The Bluebird Inn (1880 Main Street, Cambria); Carroll's Blacksmith Shop (Cinnabar, 4121 Burton Drive, Cambria); Heart's Ease (4101 Burton Drive, Cambria); Ian's Restaurant (2150 Center Street, Cambria); Robin's Restaurant (4095 Burton Drive, Cambria); The Brambles Restaurant (4005 Burton Drive, Cambria); Rigdon Hall Restaurant (4022 Burton Drive, Cambria); The Big Red House (370 Chelsea Lane, Cambria); The Bucket of Blood Saloon (Painted Sky Recording Studios, 4111 Bridge St, Cambria); Louis Maggetti's House (2261 Center Street, Cambria); Camozzi's (2262 Main Street, Cambria); Soto's Market (2244 Main Street, Cambria); The Leffingwell House (2420 Main Street, Cambria); The Olallieberry Inn (2476 Main Street, Cambria); The Lull House (1880 Main Street, Cambria); The Old Santa Rosa Chapel (2353 Main Street, Cambria); The Thorndyke House (4286 Bridge Street, Cambria); The First Presbyterian Church (4314 Bridge Street, Cambria); The Bank of Cambria (2255 Main Street, Cambria); Fog's End (2735 Main Street, Cambria) (PLN_SDE_PLN_DES_HISTORIC_Points GIS Layer)
Shamel Park	Day use park operated by the County of San Luis Obispo
Estero Bluffs State Park	355 acres consisting of grassland dominated coastal terrace that slopes from Highway One to the Pacific Ocean. The purpose of the park is to preserve and protect a rich, diverse, and scenic area of the Pacific Ocean coast. There are intertidal areas, wetlands, low bluffs and coastal terraces punctuated by a number of perennial and intermittent streams, as well as a pocket cove and beach at Villa Creek. The area provides a natural habitat for a number of endangered species including the snowy plover (slostateparks.com).
Harmony Headlands State Park	Located 2.6 miles south of Harmony. Constant winds and salt spray result in vegetation tolerant of these conditions. The flat coastal terraces, valleys and steep coastal bluffs are home to grasslands and coastal scrub containing plants such as San Luis Obispo morning glory, California buttercup, yarrow and lupine. The area contains diverse and unique habitats supporting rare, endangered and sensitive plant and animal species (slostateparks.com).

Santa Rosa Creek Area Watersheds

Cambria Pines Easement	1450 acres held by The Nature Conservancy (National Conservation Easement Database, 2013)
Hearst Ranch	Hearst Ranch encompasses an impressive variety of habitats and topography - elevations on the Ranch rise from sea level along the coastline to 3,600 feet on some of the peaks along the ridgeline of the Santa Lucia Mountains. Grassland-covered coastal terraces extend to natural sea bluffs, rocky headlands and sandy beaches. Over 1,400 acres of riparian woodland is present on the property. Riparian woodland species include Sycamore and Coast live oak (Ca. Resources Agency, 2004).
Climate Change Considerations	
	In the Santa Rosa Creek watershed, such a rise in sea-level would put new areas at risk of flooding, increase the likelihood and intensity of floods in areas that are already at risk, and accelerate shoreline recession due to erosion (Figure 2-6) (Heberger, et al. 2009). See also IRWMP, 2014 Section H, Climate Change *General County data, not specific to watershed*

Watershed Codes:

CalWater / DWR Number	HA	Hydrologic Area Name	HSA	Hydrologic Sub-area Name	SWRCB Number	CDF Super Planning	CDF Watershed Name
3310.140201	1	Cambria	4	Santa Rosa	310.14	Green Valley Creek	Lower Green Valley Creek
3310.140101	1	Cambria	4	Santa Rosa	310.14	Santa Rosa Creek	Lower Santa Rosa Creek
3310.140202	1	Cambria	4	Santa Rosa	310.14	Green Valley Creek	Upper Green Valley Creek
3310.140102	1	Cambria	4	Santa Rosa	310.14	Santa Rosa Creek	Upper Santa Rosa Creek
3308.000603	0	Undefined	0	Undefined	308.00	Undefined	Villa Creek

Source: Excerpt from California Interagency Watershed Map of 1999, Calwater 2.2.1 (CA Resource Agency, 2004 Update)

Major Changes in the Watershed

- The first recorded accounts of Santa Rosa Creek valley are those made during the Portola Expedition where, in September 1769, the party encountered a “canyon… and arroyo surrounded with hills of pine”. On numerous instances, the expedition party noted flowing streams, both along what is now known as the mainstem Santa Rosa Creek and from many of its “springs”, or tributaries. Few other records of this area’s natural resources were made for

several decades despite the establishment of Mission San Miguel (1779) near present-day Paso Robles and the growing use of the Santa Rosa and San Simeon watershed areas for timber and wild game to support the Spanish population throughout the southern Coast Range region.

- 1840 – Don Julian Estrada granted possession of Rancho Santa Rosa, 13,200 ac land encompassing a portion of western half of watershed.
- In the early 1800's, the area of Cambria was established with rapid growth occurring between 1860 and 1880. The town of Cambria was established in 1866. Rapid urban population growth began in the 1950's with the population rowing from 788 in 1950 to 6,624 in 2009. Existing vegetation cover was cleared for land use activities which led to the widespread formation of erosion features and channel incision. Scrub/shrub vegetation cover would not begin to recover until the late 1900's.
- There was a severe drought in 1863-1864 which killed off a large portion of the livestock.
- Logging began in the watershed in 1779, with the peak of activity occurring between the late 1800's and the early 1900's. In 1916, logging declined steeply following the removal of old growth timber. The last saw mill in the area closed in 1971.
- In 1840 Cattle Ranching began in the watershed and continued to build through current day.
- In 1840, Don Julian Estrada was granted possession of Rancho Santa Rosa – a 13,200-ac land holding encompassing a portion of the western half of the watershed.
- In 1862, Mercury was discovered in the region. In 1874, Oceanic mine began production with activities increasing in 1916 associated with WWI.
- In the early 1870's the Estrada land was sold to George Hearst who converted the land to agricultural uses. This included the draining of a wetland area that extended from the Perry and Green Valley creek confluence north towards Santa Rosa Creek. This created an artificial stream course for lower Perry Creek which remains today.
- In the late 1800's, gullies were filled in to accommodate agricultural land uses.
- In 1939, Highway 1 and Santa Rosa Road were improved. IN 1964, the Highway 1 bypass was constructed around downtown Cambria.
- In 1974, Highway 46 was constructed through Green Valley.
- Floods occurred in the region in 1914, 1956, 1969, and 1995.
- 2001 –building moratorium based on limited water availability established
- 2005 - San Luis Obispo County stream crossing inventory and fish passage evaluation**,** Fiscalini streambank stabilization
- 2006 - Burton Street Bridge Barrier removal
- 2007-08 - Steelhead enhancement, bank stabilization, and educational signs downstream of Highway 1 Bridge
- 2010 - Non-native eucalyptus tree removal downstream of Highway 1
- 2011 - Ferrasci Road barrier removal

Watershed Health by Major Tributary

Tributary Name	**Ephemeral / Perennial**	**303d Listed/ TMDLs**	**Pollution Sources** NP (non-point) MP (Major Point)	**Environmental Flows**

Green Valley Creek	Undetermined	Not assessed	n/a	Not assessed
Santa Rosa Creek	Undetermined	Temperature, water	Water Diversions, Urban Runoff, Agriculture, Disturbed Sites (Land Dev.), Grazing Related sources	Lower: Spring: 2.5 cfs. Summer 0.75 cfs. Upper: Spring: 2.5 cfs. Summer: 0.35 cfs
Villa Creek	Undetermined	Not assessed	None	Lower: Spring: 1.03 cfs. Summer: 0.38 cfs.

Watershed Health by Groundwater Basin

Groundwater Basin	Estimated Safe Yield	Water Availability Constraints	Drinking Water Standard Exceedance	Water Quality Objective Exceedance
Santa Rosa Valley	2,260 AFY (Cambria County Water District, 1976; Carollo, 2012)	Sea Water Intrusion (DWR, 1975) Wide seasonal fluctuation in groundwater availability (Carollo, 2012)	Yes; see description below.	None, CCRWQB, 2011
Villa Valley	1,000 AFY (DWR 1958; Carollo, 2012))	Physical limitations and water quality issues (Carollo, 2012)	None (Carollo, 2012)	None, CCRWQB, 2011

Groundwater Quality Description: Chloride content increased more than ten times from 80 ppm in 1955 to 933 ppm in 1975. Background chloride concentrations typically ranged from 30 to 270 ppm. One well had a concentration of 1,925 ppm in November 1961. The Santa Rosa Creek management plan also reports corrosivity effects by water supplies and natural or industrial influenced balance of hydrogen, carbon and oxygen in the water which is affected by temperature and other factors.

Groundwater is found in alluvial deposits with an average specific yield of 17 percent. Groundwater is unconfined and generally flows westward. (Ca. Dept of Water Resources, 2003)

Santa Rosa Creek Area Watersheds

Holocene-aged alluvial deposits consist of unconsolidated sand, clay, silt, and gravel of primarily fluvial origin. Commonly, the deposits are about 100 feet thick beneath the center of the valley and more than 120 feet thick at the coast (Ca. Dept. of Water Resources, 2003)

Primary Issues

Issue	***Potential Causes***	***Referenced from***
Surface flow quantity	Extraction and diversions	Greenspace Cambria, 2012
Surface Water Temperature – Santa Rosa Creek 303(d) listed	Limited riparian cover	Greenspace Cambria, 2012
Low dissolved oxygen in lagoon	Low instream flows	Greenspace Cambria, 2012
Fine sediment in lower reaches	Historical land clearing	Greenspace Cambria, 2012
Fish Passage Barriers	Infrastructure changes over time	Greenspace Cambria, 2012
Non-native invasive species	n/a	Greenspace Cambria, 2012
Sedimentation	Grazing/Cattle	National Marine Fisheries Service, 2007.
Water Quantity	Groundwater extraction, low summer flow	National Marine Fisheries Service, 2007
GW basin seawater intrusion		Ca DWR, 2003
GW quality - chloride		Ca DWR, 2003
Outdated basin studies – Villa Valley basin		Carollo, 2012

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Significant Studies in Progress:

Lower Santa Rosa Creek Enhancement Plan

Water quality monitoring snapshot days (ongoing, annual), Cambria Community Services District.

Cayucos Creek – Whale Rock Area Watershed

Hydrologic Unit Name	Water Planning Area	Acreage	Flows to	Groundwater Basin(s)	Jurisdictions
Estero Bay 10	Cayucos WPA 3	54,974 acres	Pacific Ocean / Estero Bay	Cayucos Valley, Old Valley, Toro Valley & Morro Valley	County of San Luis Obispo, Cayucos, Morro Bay (ptn) Los Padres National Forest

Description:

The Cayucos Creek Area Watershed(s) lies within the southern portion of the California Coast Range. The watershed is bounded to the west by Pacific Ocean and the east by the Santa Lucia Mountain Range. Consistent with the CalWater HUC 10 grouping scale, the watershed area contains four major drainages: Cayucos Creek, Old Creek, Toro Creek and Morro Creek, the latter of which borders and shares some attributes with the Morro Bay watershed. The headwaters of the watershed are in Santa Lucia Range, reaching a maximum elevation of approximately 2,345 feet with the lowest elevation at around at sea level, draining in to the Pacific Ocean. Whale Rock reservoir is located in the Cayucos Creek drainage approximately ½ mile east of the community of Cayucos. The dominant land use in the watershed is Agriculture with the sea side town of Cayucos providing an urban core area with tourist oriented opportunities.

Existing Watershed Plans:

None to date

Cayucos Creek – Whale Rock Area Watersheds

Characteristics:

	Physical Setting	
	Rainfall	Average Annual: 16 in (coast) - 32 in. (mountains) (NRCS shapefile, 2010)
	Air Temperature	Summer Range (August 1990-2012): 54°-67°F Winter Range (December 1990-2012): 43°-62°F (Morro Bay, *outside of watershed*, NOAA National Climatic Data Center, viewed 2013)
	Geology Description	Cayucos Creek and Cottontail Creek are steep Franciscan non-infiltrative headwaters with flat pre-Quaternary moderate infiltrative valleys – Category #1. Torro Creek sub-watershed is steep Franciscan non-infiltrative – Category #2. Old Creek is moderately steep to steep pre-Quaternary non-infiltrative material – Category #9. The Morro Creek sub watershed consists of steep pre-Quaternary non-infiltrative headwaters and a flat Franciscan low infiltrative valley – Category #4 Whale Rock Reservoir is composed of flat Franciscan low infiltrative valley – Category #10 (Bell, pers. comm., 2013). Groundwater is found in Pleistocene and Holocene alluvium and terrace deposits. The specific yield is estimated at 15 percent. Alluvium consists of unconsolidated sand, clay, silt, and gravel. The deposits are often about 100 feet thick near the center of the valley and more than 120 feet thick at the coast. Stream-terrace deposits are primarily unconsolidated deposits of marine origin. They are generally less than 10 feet thick. (Chipping, 1987)
	Hydrology	
	Stream Gage	Yes; USGS 11142100 (Toro Creek at Toro Creek Road, viewed August 2013) Yes, Morro Creek installed in 1970. (SLO County Water)
	Hydrology Models	None to date.
	Peak Flow	4,600 cfs, Jan. 1973 (USGS, 1970-78, viewed August 2013)
	Base Flow	5.74 cfs (USGS, 1970-78, viewed August 2013)
	Flood Reports	Yes, SLO County Flood Control and Water Conservation District, 2009
	Flood Control Structures	Bridges: 3 over Toro Creek on Toro Creek Road; 2 over Old Creek on Santa Rita Road and Cabrillo Street; 1 over Cottontail Creek on Cottontail Creek Road; 1 over Willow Creek on Ocean Boulevard; 4 over Cayucos Creek on

Cayucos Creek – Whale Rock Area Watersheds

		Ocean Avenue, Cayucos Creek Road and Picachio Drive (2); 1 over Little Cayucos Creek on Ash Street (PWD Bridges GIS Layer) Pipelines; levees; pump station; stormdrain; inlets; outfall structures; diversion pipe (SLO County Flood Control and Water Conservation District, 2009).
	Areas of Flood Risk	Toro, Old, Cayucos, Little Cayucos Creeks are flood-prone natural drainage courses that should be maintained in their natural state to protect native vegetation and wildlife habitats. A lack of suitable conveyance facilities for stormwater runoff has led to frequent flooding problems in the coastal community of Cayucos, including serious flooding adjacent to Cayucos Creek. (SLO County Flood Control and Water Conservation District, 2009) Serious flooding occurs in the floodplain of Cayucos Creek west of HWY 1, bounded by the mobile home park to the North and Cayucos Drive to the South: Flooding occurs during storm events due to flows overtopping Cayucos Creek, west of highway 1, creating inability for local drainage to enter creek and dissipate. (SLO County Flood Control and Water Conservation District, 2009)
	Biological Setting	
	Vegetation Cover	Primarily non-native annual grassland with coast live oak woodland, coastal scrub consisting mainly of chamise and California sagebrush, some mixed evergreen forest, and coastal dune. (SLO County vegetation shapefile, 1990) Many drainages are partially lined with willow riparian scrub near the coast. *Data limited by age of shapefile*
	Invasive Species	No data available
	Special Status Wildlife and Plants	*Key*: FE - Federal endangered, FT - Federal threatened, SE - State endangered, ST - State threatened, SSC - State Species of Special Concern; FP- Fully Protected, SA – Special Animal, CRPR – CA rare plant rank (CNDDB, viewed August, 2013) Locations listed refer to USGS 7.5' quadrangle names. Only the portion overlapping the watershed boundary was considered. *Data limited to observations, not complete inventory*

Cayucos Creek – Whale Rock Area Watersheds

Common Name	Status	BURNETT PEAK	BURRO MOUNTAIN	LIME MTN	PEBBLESTONE SHUT-IN	PIEDRAS BLANCAS	SAN SIMEON
Animals							
California red-legged frog	FT			x	x	x	x
ferruginous hawk	SA (Wintering)						x
foothill yellow-legged frog	SSC						x
fringed myotis	SA						x
long-legged myotis	SA						x
monarch butterfly	SA	x	x			x	x
pallid bat	SSC						x
prairie falcon	SA (Nesting)	x			x		x
steelhead - south/central California coast DPS	FT				x	x	x
tidewater goby	FE					x	x
Townsend's big-eared bat	SSC	x					x
tufted puffin	SSC					x	
two-striped garter snake	SSC				x		x
western pond turtle	SSC				x	x	x
Plants							
adobe sanicle	SR; CRPR 1B.1					x	
Arroyo de la Cruz manzanita	CRPR 1B.2				x	x	x
Arroyo de la Cruz mariposa-lily	CRPR 1B.2					x	
bristlecone fir	CRPR 1B.3	x					x
Cambria morning-glory	CRPR 4.2					x	
Carmel Valley bush-mallow	CRPR 1B.2				x		

Cayucos Creek – Whale Rock Area Watersheds

Common Name	Status	BURNETT PEAK	BURRO MOUNTAIN	LIME MTN	PEBBLESTONE SHUT-IN	PIEDRAS BLANCAS	SAN SIMEON
Chorro Creek bog thistle	FE; SE; CRPR 1B.2				x		
compact cobwebby thistle	CRPR 1B.2					x	x
Cook's triteleia	CRPR 1B.3	x			x		
Dudley's lousewort	SR; CRPR 1B.2					x	x
dwarf goldenstar	SR; CRPR 1B.2					x	
Hardham's bedstraw	CRPR 1B.3	x			x		x
Hearsts' ceanothus	SR; CRPR 1B.2					x	x
Hearsts' manzanita	SE; CRPR 1B.2					x	x
Hickman's onion	CRPR 1B.2					x	x
late-flowered mariposa-lily	CRPR 1B.2				x		
maritime ceanothus	SR; CRPR 1B.2					x	x
marsh microseris	CRPR 1B.2					x	
Monterey pine	CRPR 1B.1						x
Monterey spineflower	FT; CRPR 1B.2						x
most beautiful jewel-flower	CRPR 1B.2			x	x	x	x
Palmer's monardella	CRPR 1B.2	x				x	
perennial goldfields	CRPR 1B.2					x	
pink Johnny-nip	CRPR 1B.1					x	
San Luis mariposa-lily	CRPR 1B.2				x		
San Luis Obispo owl's-clover	CRPR 1B.2					x	x
San Luis Obispo sedge	CRPR 1B.2	x			x	x	x

Cayucos Creek – Whale Rock Area Watersheds

Common Name	Status	BURNETT PEAK	BURRO MOUNTAIN	LIME MTN	PEBBLESTONE SHUT-IN	PIEDRAS BLANCAS	SAN SIMEON
San Simeon baccharis	CRPR 1B.2				x	x	
Santa Lucia bush-mallow	CRPR 1B.2				x		
Toro manzanita	CRPR 1B.2	x					
woodland woollythreads	CRPR 1B.2				x	x	

Steelhead Streams	Yes; Cayucos Creek, Old Creek, Cottontail Creek, Toro Creek, Morro Creek (Carollo, 2012).
Stream Habitat Inventory	Yes; USFW, 1994 *Data limited by age of study*
Fish Passage Barriers	Morro Creek: Crossing at Morro Creek Ranch, Cerro Alto Campground on Highway 41, Highway 41 culvert, Dam, Natural bedrock falls (National Marine Fisheries Service, 2007). Old Creek: Whale Rock Dam/Reservoir very close to mouth (National Marine Fisheries Service, 2007). Toro Creek: Toro Creek Rd.-2 barriers coming from Highway 41 side, Flashboard dams-1 on Borg property on Highway 41 side, 1 location unknown (National Marine Fisheries Service, 2007)
Designated Critical Habitat	Yes; Steelhead Trout; California red-legged frog (USFWS Critical Habitat Portal, 2013)
Habitat Conservation Plans	Yes; Morro Bay Estuary Comprehensive Conservation and Management Plan, Chorro and Morro Groundwater Basin Management Plan
Other Environmental Resources	San Luis Obispo Coastal Zone, Cayucos Beach, Cayucos State Beach, Critical Coastal Area, Whale Rock Reservoir (SLO County Flood Control and Water Conservation District, 2007)
Land Use	
Jurisdictions and Local Communities	County of San Luis Obispo, Town of Cayucos, Portion of Morro Bay
% Urbanized	6% (3% in City of Morro Bay, 0.8% in City of Atascadero city limits, 0.04% Cayucos Commercial, 0.03% Public Facilities, 2.5% Residential) (SLO County LUC)

Cayucos Creek – Whale Rock Area Watersheds

	% Agricultural	68% Agriculture (row crops, vineyards, orchards and rangeland) (SLO County LUC)
	% Other	26% (11% open space - Coastal and surrounding Whale Rock Reservoir, 1.6% Recreation - beaches, Morro Strand State Beach, whale rock reservoir, Cerro Alto campground, 13% rural lands) (SLO County LUC)
	Planning Areas	Adelaida, Estero, Salinas River Planning Areas
	Potential growth areas	Cayucos
	Facilities Present	Whale Rock Reservoir, Cayucos Area Water Organization; Cayucos Water Treatment Plant (Whale Rock Reservoir water treatment)
	Commercial Uses	Industrial facilities: (Whale Rock Pit -Negranti Construction, Guerra Quarry - Weyrick Companies, Standard Oil Company Tank Farm, Chevron); agriculture; tourism; retail outlets; hotels; restaurants; fishing
	Demographics	
	Population	9,795 in watershed 2,592 in the community of Cayucos (U.S. Census, 2010).
	Race and Ethnicity	Caucasian, representing 81.3%. Latinos represent 13% in City. Mixed Race representing 2%. The remaining races each represent less than 3%, including African American (0.3%), American Indian (0.6%), Pacific Islander (0.1%), and Asian (2.4%) (U.S. Census Blocks, 2010). Cayucos: Caucasian, representing 91.3%. Asians representing 2.1%. Mixed Race representing 2.4%. The remaining races each represent less than including African American (0.2%), American Indian and Alaska Native (0.5%), Pacific Islander (0.3%). (US Census, 2010)
	Income	MHI $49,312 in watershed (U.S. Census Tracts, 2010) MHI $59,130 in Cayucos (US Census, 2010)
	Disadvantaged Communities	No; 18.3% of individuals are below poverty level in watershed (U.S. Census Tract, 2010). 11% of individuals are below poverty level in Cayucos (US Census, 2010)
	Water Supply	
	Water Management Entities	Yes; Cayucos Area Water Organization, which consists of San Luis Obispo County Services 10A (Southern Cayucos), Paso Robles Beach Water Association, the Cayucos Cemetery District and Morro Rock Mutual Water Company (Boyle, 2007)
	Groundwater	Yes; Alluvial; Cayucos Valley, Old Valley, Toro Valley & Morro Valley Basins Cayucos Area Water Organization well located in Old Valley Creek – downstream from Whale Rock Reservoir.
	Surface Water	Yes; Whale Rock Reservoir (San Luis Obispo 22,283 AFY, Cal Poly 13,707 AFY, California Men's Colony 4,570 AFY, Paso Robles Beach Water Association 222 AFY, County Service Area 10A 190 AFY, Cayucos-Morro Bay Cemetery District 18 AFY, Mainini Ranch 50 AFY, Ogle 14 AFY) (SLOCountyWater.org)

Cayucos Creek – Whale Rock Area Watersheds

	Imported Water	Yes; agreements with City of SLO for transfer of 25 to 90 AFY from Nacimiento Water Project (Carollo, 2012)
	Recycled / Desalinated Water	None
	Key groundwater percolation area(s)	No data on key areas identified Basin recharge comes primarily from seepage of surface flows in creeks, deep percolation of precipitation, and residential/agricultural return flows. Old Valley basin recharge is augmented by dam underflow and seepage from reservoir releases. (Carollo, 2012)
	Water budget	None to date
	Water Uses	
	Beneficial Uses	*Cayucos Creek* - Municipal and Domestic Supply (MUN), Agricultural Supply (AGR), Ground Water Recharge (GWR), Water Contact Recreation (REC-1), Non-Contact Water Recreation (REC-2), Wildlife Habitat (WILD), Cold Fresh Water Habitat (COLD), Warm Freshwater habitat (WARM), Migration of Aquatic Organisms (MIGR), Spawning, Reproduction, and/or Early Development (SPWN), Preservation of Biological Habitats of Special Significance (BIOL), Threatened, or Endangered Species (RARE), Estuarine Habitat (EST), Freshwater Replenishment (FRESH), and Commercial and Sport Fishing (COMM). *Morro Creek* – Municipal and Domestic Supply (MUN), Agricultural Supply (AGR), Ground Water Recharge (GWR), Freshwater Replenishment (FRSH), Water Contact Recreation (REC-1), Non-Contact Water Recreation (REC-2), Commercial and Sport Fishing (COMM), Warm Fresh Water Habitat (WARM), Cold Fresh Water Habitat (COLD) , Wildlife Habitat (WILD), Rare, Threatened, or Endangered Species (RARE), Migration of Aquatic Organisms (MIGR), Spawning, Reproduction, and/or Early Development (SPWN) (CCRWQCB, 2011)
	Other Unique Characteristics	
	Whale Rock Reservoir	Whale Rock Reservoir is located on Old Creek Road approximately one-half mile east of the community of Cayucos. The project was planned, designed, and constructed under the supervision of the State Department of Water Resources. Construction took place between October 1958 and April 1961. The reservoir is jointly owned by the City of San Luis Obispo (55.05%), the California Men's Colony (CMC) (11.24%), and Cal Poly (33.71%). These three agencies, with the addition of a representative from the Department of Water Resources, form the Whale Rock Commission, which is responsible for operational policy and administration of the reservoir and related facilities. Day-to-day operation is provided by the City of San Luis Obispo.

Cayucos Creek – Whale Rock Area Watersheds

		In April 1996, the downstream water rights agreement was amended and replaced with a new agreement, establishing water entitlements for adjacent and downstream water users. The downstream water users (Cayucos Area Water Organization or CAWO) affected by this agreement consist of three public water purveyors and the cemetery, plus two other rural/agricultural users, all in the Cayucos area. These agencies are the Paso Robles Beach Water Association, Morro Rock Mutual Water Company, County Service Area 10A, and Cayucos-Morro Bay Cemetery District.
	Historical Resources	Captain James Cass House (222 Ocean Ave., Cayucos); Cayucos Pier (PLN_DES_HISTORIC_POINTS GIS Layer)
	Los Padres National Park	Provides a diverse wildlife habitat with 23 threatened and endangered animals. The Forest has one endangered plant, two threatened plant species and 71 sensitive plant species. Management of riparian vegetation focuses on supporting fish and wildlife populations. There are over 870,000 acres of livestock grazing allotments in the Forest. Prehistoric and historic Native American sites, properties related to the practice of Indian and non-Indian religion, historic properties and districts are also in the Park. The Big Sur Coast is on of the outstanding features of the Los Padres National Forest. Several popular recreation facilities along the coast that attract visitors year-round. Land acquisitions in this area from 1992 to the present included a total of almost 9,300 acres. The Forest acquired the 1,226-acre Brazil Ranch in the Bixby Creek through a partnership with the Trust for Public Land.
	San Luis Obispo Coastal Zone	Spanning 118 miles of coastline with numerous wide sandy beaches, sheltered bays, and vista pints offering scenic views of the Pacific Ocean. - The coastal zone of San Luis Obispo County is known throughout the state for its beauty and diversity. The north coast is characterized by the rugged headlands to Big Sur. The rocky shoreline along the Hearst Ranch is highly valued for offshore views of marine mammals as well as scenic cliffs and rocky points. The beach, sandspit, and extensive wetlands of Morro Bay form a unique setting for wetland habitat study.
	Cayucos State Beach	Park operated by the State of California. Known for its fishing pier, beautiful beach and historical buildings. Buildings left over from the prospering old town still stand as a variety of shops such as restaurants, antique stores, and specialty items. The sandy beach offers mild weather, watersports such as surfing and swimming and tidepooling. There are picnic tables, play equipment, restrooms, and outside showers available. The pier is lit for night fishing.
	Hardie Park, Norma Rose Park (undeveloped), Paul Andrew Park	Group Day-Use facilities operated by the County of San Luis Obispo.

Cayucos Creek – Whale Rock Area Watersheds

	Climate Change Considerations	
		See IRWMP, 2014 Section H, Climate Change *Data is general for County, not Watershed specific*

Watershed Codes

CalWater / DWR Number	HA	Hydrologic Area Name	HSA	Hydrologic Sub-Area Name	SWRCB Number	CDF Super Planning	CDF Watershed Name
3310.160000	-	Cambria	-	Cayucos	3310.16	Unidentified	Cayucos Creek
3310.170001	1	Cambria	7	Old	3310.17	Undefined	Cottontail Creek
3310.170002	1	Cambria	7	Old	3310.17	Undefined	Whale Rock Reservoir
3310.170003	1	Cambria	7	Old	3310.17	Undefined	Old Creek
3310.180000	8	Cambria	1	Toro	3310.18	Unidentified	Toro Creek

Major Changes in the Watershed

- Prehistorically the local area was inhabited by the Chumash people, who settled the coastal San Luis Obispo area approximately 10,000 to 11,000 BC, including a large village to the South of Cayucos at Morro Creek (Cayucos by the Sea).
- Captain James Cass left his New England home, sailed around the Horn and settled in Cayucos in 1867 on 320 acres of the original Rancho Moro Y Cayucos Spanish Land Grant of 8,845 acres. He realized the future possibilities of the excellent location as a shipping port of cheese, hides, beef and fresh water (Cayucos by the Sea).
- The Cayucos pier was constructed by Captain James Cass, the founder of Cayucos, in 1872 and was rebuilt and lengthened to 982 feet into deeper water in 1876. The pier was an immediate commercial success with steamships from Los Angeles and San Francisco docking several times per week. The severe drought of the late 1890's weakened Cayucos economically. And while in 1915 the pier received an economic boost when an abalone canning plant was built about half way out, it became less commercially viable through the early 1900's (Cayucos Pier Project).
- Pier became state property in 1920 and over the next 30 years once again became central to the economic health of the community. As residents of the San Joaquin Valley discovered Cayucos and its Mediterranean climate the pier became very popular with sport fishermen and has remained popular for generations. Anglers young and old have

caught a wide variety of fish including: red snapper, smelt, sea trout, halibut, salmon, rock fish, perch, shark and rays. For those who wanted larger catches and bigger fish, in the 1940's, 50's & 60's party boats used Cayucos as a fair-weather anchorage every summer. They took their customers deep water fishing north of Cayucos, loading and unloading fishermen from the pier (Cayucos Pier Project).

Watershed Health by Major Tributary

Tributary Name	**Ephemeral / Perennial**	**303d Listed/ TMDLs**	**Pollution Sources** NP (non-point) MP (Major Point)	**Environmental Flows**
Cayucos Creek (Pacific Ocean Outlet)	Undetermined	Enterococcus	Agriculture	**Lower**: Spring: 0.82 cfs. Summer: 0.32 cfs.
Cottontail Creek	Undetermined	Not assessed	Undetermined	Not assessed
Old Creek	Undetermined	Not assessed	Undetermined	**Lower**: Spring: 1.31 cfs. Summer: 0.45 cfs **Upper**: Spring: 0.83 cfs. Summer 0.33 cfs.
Toro Creek	Undetermined	Fecal Coliform , Low Dissolved Oxygen	Industrial Activities (Oil), Natural Sources, Agriculture	**Lower**: Spring: 1.01 cfs Summer: 0.37 cfs
Morro Creek	Undetermined	No	Undetermined	See instream flow study by Stillwater Sciences (appendix X)
Whale Rock Reservoir	n/a	n/a	n/a	

Cayucos Creek – Whale Rock Area Watersheds

Watershed Health by Major Groundwater Basin

Groundwater Basin	**Estimated Safe Yield** (Carollo, 2012)	**Water Availability Constraints** (Carollo, 2012)	**Drinking Water Standard Exceedance**	**Water Quality Objective Exceedance**(CCRWQB, 2011)
Cayucos Valley	600 AF	Physical limitations and water quality issues. The shallow alluvial deposits are typically more susceptible to drought impacts	*Yes; see description below.	No for basin. No information for sub-basin
Old Valley	505 AF	Physical limitations, water rights and environmental considerations	**Yes; see description below.	No for basin. No information for sub-basin
Toro Valley	532 AF	Physical limitations, water quality	None	No
Morro Valley	1500 AFY	Physical limitations, water quality issues, and water rights	***Yes; see description below.	

Groundwater Quality Description: Toro Valley: Total dissolved solids (TDS) typically range between 400 to 700 mg/L. In the lower basin near Highway 1, petroleum hydrocarbon contamination associated with Chevron marine tracker terminal has been detected in groundwater and remedial activities are ongoing (Carollo, 2012).

*Analysis of groundwater from 32 wells in this basin taken during 1957 through 1993 show TDS content ranging from 346 to 2,462 ppm. Portions of the basin have chloride levels exceeding 100 ppm, indicating seawater intrusion has occurred (Carollo, 2012).

**Analyses of groundwater from 33 wells in this basin taken during 1957 through 1993 show TDS content ranging from 346 to 2,462 ppm. Portions have chloride levels exceeding 100 mg/L. (Carollo, 2012).

*** In the mid-1980's TDS concentrations in groundwater downstream of the narrows near Highway 1 began to exceed 1,000 mg/l seasonally due to sea water intrusion. Measured in 2007, basin TDS concentrations were typically between 400 and 800 mg/l and increasing toward the coast, except for an area beneath agricultural fields in the lower valley where TDS concentrations reached 1000 mg/l, and nitrate concentrations reached 220 mg/l as nitrate (Cleath & Associates 1993a; 2007).

Cayucos Creek – Whale Rock Area Watersheds

Critical Issues

Issue	***Potential Causes***	***Referenced from***
Treat to lagoon	Channelization, pollution	National Marine Fisheries Service, 2007
Loss of riparian width	Agriculture	National Marine Fisheries Service, 2007
Lack of enforcement		National Marine Fisheries Service, 2007
Water quantity	Agricultural and residential extractions	National Marine Fisheries Service, 2007
Erosion and Sedimentation		National Marine Fisheries Service, 2007
Sea Water Intrusion (Cayucos Valley basin)		Carollo, 2012
Nitrates	Agriculture	Carollo, 2012
Outdated Basin study – Cayucos Valley basin		Carollo, 2012
Alluvial water deposits subject to drought impacts		Carollo, 2012
Outdated groundwater basin analysis – Toro Valley		Carollo, 2012
Cayucos Creek 303(d) listed for enterococcus	Agriculture	Carollo, 2012
Toro Creek 303(d) listed for fecal coliform and low dissolved oxygen	Industrial Activities (Oil), Natural Sources, Agriculture	Carollo, 2012

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Cayucos Creek – Whale Rock Area Watersheds

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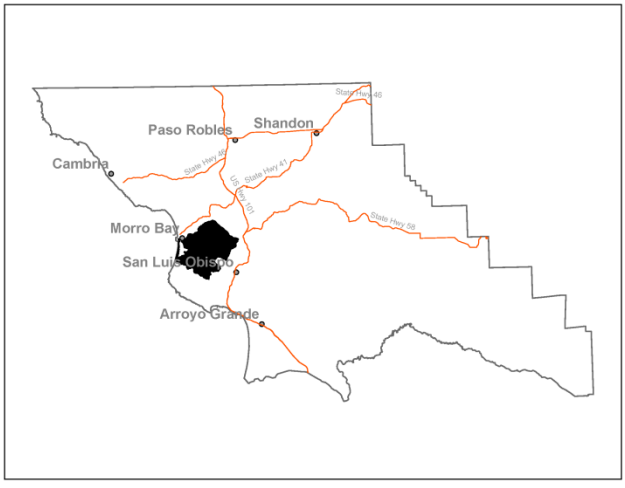
Significant Studies in Progress:

Morro Bay Watershed

Hydrologic Unit Name	Water Planning Area	Acreage	Flows to	Groundwater Basin(s)	Jurisdictions
Estero Bay HU 10	Morro Bay WPA 4 Los Osos WPA 5	46,598 acres	Pacific Ocean via Morro Bay estuary	Los Osos Valley, Chorro Valley	County of San Luis Obispo City of Morro Bay Town of Los Osos Camp San Luis Obispo California Men's Colony California Polytechnical State University U.S. Forest Service CA Department of Parks and Recreation



Description:

The Morro Bay Watershed is located in the central area of coastal San Luis Obispo County. It is composed of two major sub-watersheds that drain into Chorro and Los Osos Creeks. The Chorro Creek sub-watershed accounts for about 60 percent of the total land area draining into the estuary.

Much of the watershed remains in open space that is used primarily for agriculture and a range of public uses, including parks, golf courses, nature preserves, a military base, and university-owned rangeland. The developed portions of the watershed include the community of Los Osos/ Baywood Park, parts of the City of Morro Bay, Cuesta College, Camp San Luis Obispo, the California Men's Colony, and various facilities of the County of San Luis Obispo.

Due to the uniqueness of Morro Bay, the watershed has been studied since the late 1980's with watershed plans from that era being completed and forming the foundation

Watershed Plans:

Morro Bay Comprehensive Conservation Management Plan (MBNEP, 2013)

Morro Bay Watershed

Characteristics:

	Physical Setting	
	Rainfall	16 – 35 inches (NRCS Precipitation 1981 – 2010) 20 – 22 inches Mean Annual (SLO County Water.org)
	Air Temperature	Summer Range (August 1981-2010): 56°- 69° F Winter Range (December 1981-2010): 45°- 65° F At Morro Bay Fire Station, Morro Bay, CA. (NOAA National Climatic Data Center, viewed 2013)
	Geology Description	The Warden Creek and Los Osos Creek sub watersheds consist of steep pre-Quaternary non-infiltrative headwaters and a flat highly infiltrative Quaternary valley – category #12. The Chorro Creek sub watershed consists of steep pre-Quaternary non-infiltrative headwaters and a flat Franciscan low infiltrative valley- category #4. (Bell, personal communication, 2013) Morro Bay was formed during the last 10,000 to 15,000 years. A post-glacial rise in sea level of several hundred feet resulted in a submergence of the confluence of Chorro and Los Osos creeks. The geology of the watershed is highly varied, consisting of complex igneous, sedimentary, and metamorphic rock. Over fifty diverse soils, ranging from fine sands to heavy clays, have been mapped in the area. (US EPA, 2003)
	Hydrology	
	Stream Gage	Yes; No USGS gages identified. County gages at Chorro Creek at Canet Road (1978 – present, active); San Luisito Creek at Highway 1 (1985-present, active); and Los Osos Creek and Los Osos Valley Road (1993 - present, active) (SLO County Water.org, viewed 2013).
	Hydrology Models	Yes; Tetra Tech developed the Chorro Creek sediment model. (MBNEP, 2011) Limited data that is not at the watershed scale.
	Peak Flow	Chorro Creek: 5,956 - 7,490 cfs at Canet Road (MBNEP, 2011) No source identified for Los Osos Creek or Warden Creek. Limited data.
	Base Flow	Chorro Creek: 63 – 76 cfs at Canet Road (MBNEP, 2011) No source identified for Los Osos Creek or Warden Creek. Los Osos Creek regularly goes dry during the summer at its crossing with Los Osos Valley Road (MBNEP, personal communication, 2013). Limited data.
	Flood Reports	Yes; Preliminary Engineering Evaluation, Los Osos/Baywood Park Community Drainage Project for San Luis Obispo County Service Area No. 9J (Engineering Development Associates, December 1997).

Morro Bay Watershed

		The most significant residential flooding problems experienced by the Los Osos and Baywood Park communities are from natural sumps. Primary areas of flooding concern are Los Osos Valley Road in the town of Los Osos, and east of town near its intersection with Cimarron Road (SLO County FCWCD, 2009).
	Biological Setting	
	Vegetation Cover	Primarily non-native grassland with some coast live oak forest, northern coastal salt marsh, willow riparian forest, coastal scrub, morro manzanita, chaparral (chamise, leather oak and pine), beaches and coastal dunes, Serpentine-foothill-pine chaparral-woodland , cypress forest, agricultural land and urban land. (SLO County, vegetation shapefile, 1990) Grassland, coastal scrub, oak woodland, riparian, and wetland (CNPS WHR 1997) Limited spatial data. No alliance level vegetation mapping was available for the entire County.
	Invasive Species	Eucalyptus, African veldt grass, cape ivy, American bullfrog, Sacramento pike minnow, European green crab (MBNEP, Invasive Action Plan, 2010); Several aquatic invertebrates (SLOSEA, viewed 2013).
	Special Status Wildlife and Plants	*Key:* Federal endangered – FE, Federal threatened – FT, State endangered – SE, State threatened – ST, CDFW State Species of Concern – SSC, CRPR – CA rare plant ranking

Common Name	**Status**	**ATASCADERO**	**MORRO BAY NORTH**	**MORRO BAY SOUTH**	**SAN LUIS OBISPO**
Animals					
American badger	SSC			x	
big free-tailed bat	SSC			x	
black legless lizard	SSC		x	x	
burrowing owl	SSC (Burrow sites and some wintering sites)				x
	ST; Fully Protected			**x**	

Morro Bay Watershed

California black rail	**FE; SE; Fully Protected**		**x**	
California clapper rail	SSC (Nesting)			x
California horned lark	Special Animal			x
California linderiella	**FT**		**x**	**x**
California red-legged frog	SSC		x	x
coast horned lizard	Special Animal (Nesting)		x	
Cooper's hawk	Special Animal		x	
globose dune beetle	Special Animal		x	
mimic tryonia (=California brackishwater snail)	Special Animal		x	
monarch butterfly	Special Animal	x	x	
Morro Bay blue butterfly	**FE; SE; Fully Protected**		**x**	
Morro Bay kangaroo rat	**FE**		**x**	
Morro shoulderband (=banded dune) snail	SSC	x	x	x
pallid bat	SSC		x	
San Diego desert woodrat	Special Animal			x
San Luis Obispo pyrg	Special Animal	x	x	
sandy beach tiger beetle	SSC		x	x
silvery legless lizard	**FT**	**x**	**x**	**x**
steelhead - south/central California coast DPS	**FE**		**x**	

Morro Bay Watershed

tidewater goby	SSC				x
Townsend's big-eared bat	SSC (Nesting)				x
tricolored blackbird	SSC				x
western pond turtle	**Fully Protected**				**x**
white-tailed kite	**SR**				**x**
Plants/ Lichen	CRPR 1B.2			x	x
adobe sanicle					
Arroyo de la Cruz manzanita	**ST**			**x**	
beach spectaclepod	CRPR 1B.2		x	x	x
Betty's dudleya	CRPR 1B.1		x	x	x
Blochman's dudleya	CRPR 1B.2			x	
Blochman's leafy daisy	CRPR 1B.3	x	x	x	x
Brewer's spineflower	**FE**			**x**	
California seablite	CRPR 4.2			x	x
Cambria morning-glory	CRPR 1B.2	x			
Carmel Valley bush-mallow	CRPR 2B.2				x
chaparral ragwort	**FE; SE**	**x**	**x**	**x**	**x**
Chorro Creek bog thistle	CRPR 1B.2			x	
coast woolly-heads	CRPR 1B.2			x	
coastal goosefoot	CRPR 1B.1				x
Congdon's tarplant	CRPR 1B.1			x	
Coulter's goldfields	**SR**	**x**			**x**

Cuesta Pass checkerbloom	CRPR 1B.2	x	x		x
Cuesta Ridge thistle	CRPR 1B.1			x	
dacite manzanita	CRPR 1B.2			x	
Diablo Canyon blue grass	CRPR 1B.2				x
dwarf soaproot	CRPR 1B.2			x	x
Eastwood's larkspur	CRPR 1B.2			x	
Hardham's evening-primrose	**FE; SE**			**x**	
Indian Knob mountain-balm	CRPR 1B.2		x	x	x
Jones' layia	**FE; SE**			**x**	
marsh sandwort	CRPR 1B.1				x
mesa horkelia	CRPR 1B.2	x	x	x	
Miles' milk-vetch	**FT**			**x**	**x**
Morro manzanita	CRPR 1B.2	x	x	x	x
most beautiful jewel-flower	CRPR 1B.3			x	x
mouse-gray dudleya	CRPR 1B.2			x	
Oso manzanita	CRPR 1B.2	x	x	x	x
Palmer's monardella	CRPR 1B.2			x	
Pecho manzanita	**FE; SE**			**x**	
salt marsh bird's-beak	CRPR 1B.2				x
San Benito fritillary	CRPR 1B.2		x	x	
San Joaquin spearscale	CRPR 1B.2	x		x	x
San Luis mariposa-lily	CRPR 1B.2		x	x	x

Morro Bay Watershed

	San Luis Obispo owl's-clover	CRPR 1B.2 x x x
	San Luis Obispo sedge	CRPR 1B.2 x
	Santa Lucia manzanita	CRPR 1B.2 x
	Santa Margarita manzanita	
		Limited by the type of data collected in the CA Natural Diversity Database.
	Steelhead Streams	Chorro Creek and Los Osos Creek (NMFS, 2012) Chorro Creek tributaries including Dairy Creek, Pennington Creek, San Bernardo Creek, San Luisito Creek, and 2 unnamed tributaries (NOAA, 2005, p.52574). Walter's Creek (Hardy,M., personal communication, 2013)
	Stream Habitat Inventory	Yes; Completed 2001 for Chorro Creek, Dairy Creek and Pennington Creek as landowner access allowed by California Conservation Corps. (CEMAR, 2008) There are drafts for Pennington and San Luisito Creeks (Hardy, M., personal communication, 2013) Limited data that does not include other major tributaries.
	Fish Passage Barriers	San Luisito Creek, Culvert at Adobe road, Temporary Barrier, PAD # 700065.00000; Rancho El Chorro Diversion Dam with Ladder at Pennington Creek, Temporary Barrier, PAD # 700043.00000; Cuesta College Fish Ladder at Pennington Creek, Temporary Barrier, PAD # 700041.00000; Hwy 1 culvert at Pennington Creek, Partial Barrier, PAD # 700040.00000; El CHorro park Culvert at Dairy Creek, Temporary Barrier, PAD # 700039.00000; El Chorro park Dam at Dairy Creek, Temporary Barrier, PAD # 700038.00000; Hwy 1 Culvert at Dairy Creek, Partial Barrier, , PAD # 700037.00000; Camp San Luis Bridge Pilings at Chorro Creek, Partial Barrier, PAD # 700034.00000; Camp San Luis Bedrock falls at Chorro Creek, Temporary Barrier, PAD # 700033.00000; CMC Pipe crossing at Chorro Creek, Temporary Barrier, PAD # 700032.00000; San Anselmo Creek at Hwy 1 Culvert, Unknown status, PAD # 731130.00000; Chorro Stream Grouted Rock Dam and Culvert at Chorro creek, Temporary Barrier, PAD # 705749.00000; Dairy Bedrock Falls at Dairy Creek, Total Barrier, PAD # 705751.00000; Pennington Creek Boulder Cascade, Total Barrier, PAD # 705752.00000; Bridge Apron with grouted rock pool at Chorro Creek, Unknown Status, PAD # 707007.00000; Bedrock falls upstream of Cal Poly Corrals at Pennington Creek, Temporary Barrier, PAD # 707013.00000; Private Drive on San Bernardo Creek Rd at San Bernardo Creek, Temporary Barrier, PAD # 712310.00000; Private Drive on San Bernardo Creek Rd at San Bernardo Creek, Total Barrier, PAD # 712311.00000; Private Drive on San Bernardo Creek Rd at San Bernardo Creek, Partial Barrier, PAD #

Morro Bay Watershed

		712312.00000; CMC bridge at Chorro Creek, Unknown Status, PAD # 712313.00000; San Luisito Bridge at San Luisito Creek, unknown Status, PAD #712314.00000; Crossing on private property at San Luisito Creek, Unknown Status, PAD #712316.00000; Diversion Dam at San Luisito Creek, Total Barrier, PAD # 712318.00000; Camp SLO Bridge at Dairy Creek, Unknown Status, PAD #712323.00000; Road Crossing, O'sullivan Airfield at Chorro Creek, Unknown Status, PAD #712331.00000; Road Crossing with gauge station at Chorro Creek, Unkown Status, PAD #712333.00000; South Bay Boulevard Bridge at Chorro Creek, Unknown Status, PAD #712335.00000; CMC bridge at Chorro Creek, Unknown Status, PAD #712337.00000; Chorro Creek Dam at Chorro Creek, Total Barrier PAD # 718832.00000; Fish Passage Project at Los Osos Creek, Unassessed, PAD #707127.00000; Los Osos Bedrock Falls at Los Osos Creek, Total Barrier, PAD # 705750.00000. (CDFW Passage Assessment Database, 2013)
	Designated Critical Habitat	Yes; California red-legged frog, Morro shoulderband snail and Four Plant including Morro Manzanita, Indian Knob mountainbalm, Chorro Creek bog thistle and Pismo clarkia, Western snowy plover, Morro kangaroo rat (USFWS Critical Habitat Portal, viewed 2013) (USFWS, 1998); Steelhead trout (NMFS,2005).
	Habitat Conservation Plans	Yes; Morro shoulderband snail (USFWS Critical Habitat Portal, viewed 2013); South-Central California Steelhead Trout Recovery Plan (NMFS, 2012)
	Other Environmental Resources	San Luis Obispo Coastal Zone, Public Coastal Access, Critical Coastal Area, Morro Rock Ecological Preserve, Morro Bay National Estuary, Sweet Springs Ecological Preserve, Chorro Flats, Morro and Chorro Valley Groundwater Basin, Nine Sisters of San Luis Obispo, Elfin Forest, Los Osos Oaks State Reserve, Morro Bay State Park including a Marine Reserve and a Marine Recreational Management Area, Fishery, eelgrass beds, Pismo and Morro clam preserves
	Land Use	
	Jurisdictions & Local Communities	City of Morro Bay, Town of Los Osos.
	% Urbanized	10.3% (4.37% urban, 5.62% residential and less than 1% commercial/office professional)(SLO County LUC)
	% Agricultural	68.2% (SLO County LUC)
	% Other	21.5% (8.46% open space, 7.30% public facility, 3.08% recreation, 2.48% rural lands and less than 1% wetlands habitat)(SLO County LUC)
	Planning Areas	Estero, San Luis Obispo, Salinas River, San Luis Bay Inland
	Potential growth areas	Los Osos (SLO County Estero Planning Area, 2009)
	Facilities Present	Morro Bay Wastewater Treatment Plant with discharge to Ocean;

Morro Bay Watershed

		California Men's Colony and Wastewater Treatment Plant; Cuesta College; Camp San Luis; Chorro Dam
	Commercial Uses	Recreation and tourism at Morro Bay; Homeplace Pit Mine for stone, Beecham Pit, El Chorro Regional Park, and fisheries.
	Demographics	
	Population	26,919 in watershed (US Census Block, 2010) 10,234 in Morro Bay (US Census, 2010) 14,276 in Los Osos (US Census, 2010)
	Race and Ethnicity	Watershed: 64.5% Caucasian (17,376), 18.2% Latino (4907), 9.9% black (2,686), 3.4% Asian (906), 3.7% other (U.S. Census Tract, 2010) Morro Bay: Caucasian, representing 79.4%. Latinos represent 14.9% of the total population in Morro Bay. The remaining races each represent less than 3%, including African American, American Indian, Pacific Islander, and Asian(US Census, 2010). Los Osos: Caucasian, representing 77.7%. Asian persons represent 5.2%. Latinos represent 13.8% of the total population in Los Osos. The remaining races each represent less than 3%, including African American, American Indian, and Pacific Islander. (US Census, 2010).
	Income	MHI $53,461 in watershed.(US Census Tract, 2010) MHI $52,582 in Morro Bay (U.S. Census, 2010) MHI $57,500 in Los Osos (U.S. Census, 2010) Census tract is very large crossing multiple watersheds.
	Disadvantaged Communities	No; 5% of individuals are below poverty level in watershed (U.S. Census Tract, 2010) 13.9% of individuals are below poverty level in Morro Bay (U.S. Census, 2010) 7.1% of individuals are below poverty level in Los Osos (U.S. Census, 2010) Census tract is very large crossing multiple watersheds.
	Water Supply	
	Water Management Entities	City of Morro Bay, Los Osos CSD, Golden State Water Company and S&T Mutual Water Company
	Groundwater	Yes; alluvial, Chorro Valley and Los Osos Valley.
	Surface Water	Chorro Reservoir owned by Camp San Luis Obispo and operated by California Men's Colony; Small reservoirs on agricultural lands.
	Imported Water	Yes; City of Morro Bay has wells in Morro Creek watershed and receives water through the Chorro Valley pipeline of the State Water Project. CA Men's Colony and Cuesta College also receive State Water through the Chorro Valley Turnout. (SLO County State Water Fact Sheet)

Morro Bay Watershed

	Recycled/ Desalinated Water	Yes; City of Morro Bay owns a desalination plant, and plans to consider recycled water.
	Infiltration Zones	No source identified.
	Water Budget	None to date. One is planned for Chorro Creek subwatershed by Trout Unlimited.
	Water Uses	
	Beneficial Uses	*Chorro Creek* – Municipal and Domestic Supply (MUN), Agricultural Supply (AGR), Ground Water Recharge (GWR), Freshwater Replenishment (FRSH), Water Contact Recreation (REC-1), Non-Contact Water Recreation (REC-2), Commercial and Sport Fishing (COMM), Warm Fresh Water Habitat (WARM), Cold Fresh Water Habitat (COLD) , Wildlife Habitat (WILD), Preservation of Biological Habitats of Special Significance (BIOL), Rare, Threatened, or Endangered Species (RARE), Migration of Aquatic Organisms (MIGR), Spawning, Reproduction, and/or Early Development (SPWN). *Los Osos Creek* – Municipal and Domestic Supply (MUN), Agricultural Supply (AGR), Ground Water Recharge (GWR), Freshwater Replenishment (FRSH), Water Contact Recreation (REC-1), Non-Contact Water Recreation (REC-2), Commercial and Sport Fishing (COMM), Warm Fresh Water Habitat (WARM), Cold Fresh Water Habitat (COLD) , Wildlife Habitat (WILD), Rare, Threatened, or Endangered Species (RARE), Migration of Aquatic Organisms (MIGR), Spawning, Reproduction, and/or Early Development (SPWN). *Morro Bay Estuary* – Water Contact Recreation (REC-1), Non-Contact Water Recreation (REC-2), Commercial and Sport Fishing (COMM), Cold Fresh Water Habitat (COLD), Estuarine Habitat (EST), Wildlife Habitat (WILD), Preservation of Biological Habitats of Special Significance (BIOL), Rare, Threatened, or Endangered Species (RARE), Migration of Aquatic Organisms (MIGR), Spawning, Reproduction, and/or Early Development (SPWN), Shellfish Harvesting (SHELL)(RWQCB, 2011)
	Other Unique Characteristics	
	Historical Resources	Morro Rock State Historic Landmark (State Parks, viewed 2013).
	Archeological Resources	There were Chumash towns called Petpatsu, Wexetmimu, Tipexpa and Chitqawi at the time of European settlement (SB Museum of Natural History, viewed 2013). Limited data.
	Nine Sisters	The Nine Sisters, a line of volcanic plugs, dominate the landscape

Morro Bay Watershed

		from Morro Rock through the City of San Luis Obispo. Morro Rock (576 ft.) is the Pacific terminus, with Black Hill (665 ft.), Cabrillo Peak (911 ft.), Hollister Peak (1,404 ft.) in the Morro Bay watershed.
	Climate Change Considerations	
		State climate change maps show sea level affecting portions of the City of Morro Bay and town of Los Osos with inundation along the State Parks beach and back bay (USGS,Cal-Adapt, viewed 2013). The Morro Bay National Estuary Program and California State Polytechnic University contracted with Battelle–Pacific Northwest Division to enhance an existing circulation and transport model of Morro Bay and to provide estimates of how the bay might respond to sea level rise over the next century (PNWD, 2012). The U.S. Environmental Protection Agency's Climate Ready Water Utilities and Climate Ready Estuaries initiatives coordinated their efforts and engaged water resource stakeholders in a climate change adaptation exercise in Morro Bay, California. Both EPA initiatives focus on addressing climate change and water resource issues with stakeholders that share common interests regarding watershed management (EPA, 2013). See IRWMP, 2014 Section H. Climate Change

Watershed Codes

CalWater / DWR Number	HA	Hydrolgic Area Name	HAS	Hydrologic Sub-Area Name	SWRCB Number	CDF Super Planning	CDF Watershed Name
3310.220002	2	Point Buchon	2	Chorro	310.22	undefined	Morro Bay
3310.220001	2	Point Buchon	2	Chorro	310.22	undefined	San Luisito Creek
3310.220003	2	Point Buchon	2	Chorro	310.22	undefined	Chorro Reservoir
3310.230002	2	Point Buchon	3	Los Osos	310.23	undefined	Mouth of Los Osos Creek
3310.230003	2	Point Buchon	3	Los Osos	310.23	undefined	Warden Lake
3310.230001	2	Point Buchon	3	Los Osos	310.23	undefined	Los Osos Creek
3310.270000	2	Point Buchon	7	Morro Bay	310.27	undefined	undefined

Morro Bay Watershed

Source: Excerpt from California Interagency Watershed Map of 1999, Calwater 2.2.1 (CA Resource Agency, 2004 Update)

Major Changes in the Watershed

- In 1542, Portuguese explorer Juan Rodriguez Cabrillo named Morro Bay's magnificent landmark "El Morro" (Spanish for crown shaped hill).
- In 1772, Mission San Luis Obispo was established bringing ranching to the area.
- In 1928, Camp San Luis Obispo was built by the Army National Guard.
- In 1941, Chorro Reservoir was constructed to store runoff water for expanding Camp San Luis Obispo.
- In 1954, California Men's Colony, a state prison, was opened. (MBNEP, 2001)
- In 1963, Cuesta College was opened.
- In 1972, El Chorro Regional Park was created from land donated by Camp San Luis Obispo.
- In 2001, the first Comprehensive Conservation Management Plan was approved for the Morro Bay National Estuary.

Watershed Health by Major Tributary

Tributary Name	**Ephemeral / Perennial**	**303d Listed/ TMDLs**	**Pollution Sources** NP (non-point) MP (Major Point)	**Environmental Flows**
Chorro Creek	Perennial (Sanford, personal communication, 2013)	Yes on 303d list for E. coli, Fecal Coliform, Nutrients, Sediment. Approved USEPA TMDL for Pathogens and Sediment in 2004 and for Nutrients in 2005. (SWRCB, 2010)	Agriculture, Agricultural Storm Runoff, Channel Erosion, Channelization, Dredging, Erosion/Sedimentation, Habitat Modification, Irrigated Crop Production, Grazing Riparian and/or Upland, Natural, Stream bank Modification/ Destabilization, Major Municipal Point Source, Urban Runoff, Unknown(SWRCB, 2010)	X Cfs (Stillwater Sciences, 2013)

Morro Bay Watershed

Tributary Name	**Ephemeral / Perennial**	**303d Listed/ TMDLs**	**Pollution Sources** NP (non-point) MP (Major Point)	**Environmental Flows**
Dairy Creek	Ephemeral (Sanford, personal communication, 2013)	Yes on 303d list for Fecal Coliform, Low Dissolved Oxygen. Approved USEPA TMDL for Pathogens and Low Dissolved Oxygen in 2004 (SWRCB, 2010)	Confined Animal Feeding Operation, Unknown(SWRCB, 2010)	
Pennington Creek (and tributary Chumash Creek)	Ephemeral (Sanford, personal communication, 2013)	Yes on 303d list for Fecal Coliform. TMDL for estimated date of completion 2021. (SWRCB, 2010)	Unknown (SWRCB, 2010)	
Walters Creek	Ephemeral (Sanford, personal communication, 2013)	Yes on 303d list for Fecal Coliform. TMDL for estimated date of completion 2021. (SWRCB, 2010)	Unknown (SWRCB, 2010)	
San Luisito Creek	Perennial (Sanford, personal communication, 2013)	Yes on 303d list for Fecal Coliform. TMDL for estimated date of completion 2021. (SWRCB, 2010)	Unknown (SWRCB, 2010)	
San Bernardo Creek	Ephemeral (Sanford, personal communication, 2013)	Yes on 303d list for Fecal Coliform. TMDL for estimated date of completion 2021.	Unknown (SWRCB, 2010)	
Los Osos Creek	Ephemeral (Sanford, personal communication, 2013)	Yes on 303d list for Fecal Coliform, Low Dissolved Oxygen, Nitrate, Nutrients,	Agriculture, Agricultural Storm Runoff, Channel Erosion, Channelization,	

Morro Bay Watershed

Tributary Name	Ephemeral / Perennial	303d Listed/ TMDLs	Pollution Sources NP (non-point) MP (Major Point)	Environmental Flows
		Sediment. Approved USEPA TMDL for Fecal Coliform and Sediment in 2004 and for Nitrate, Nutrients in 2005. (SWRCB, 2010) TMDL for estimated date of completion 2021. (SWRCB, 2010)	Dredging, Erosion/Sedimentation, Habitat Modification, Irrigated Crop Production, Grazing Riparian and/or Upland, Removal of Riparian Vegetation, Natural, Stream bank Modification/ Destabilization, Urban Runoff, Unknown(SWRCB, 2010)	
Warden Creek	Ephemeral (Sanford, personal communication, 2013)	Yes on 303d list for Fecal Coliform, Low Dissolved Oxygen, Nitrate. Approved USEPA TMDL for Fecal Coliform in 2004 and for Nitrate in 2005. TMDL estimated date of completion 2021. (SWRCB, 2010)	Agriculture, Grazing Related, Unknown (SWRCB, 2010)	
Morro Bay	NA	Yes on 303d list for Fecal Coliform, Low Dissolved Oxygen, Nitrate, Nutrients, Sediment. Approved USEPA TMDL for Fecal Coliform and Sediment in 2004 and for Nitrate,		

Morro Bay Watershed

Tributary Name	Ephemeral / Perennial	303d Listed/ TMDLs	Pollution Sources NP (non-point) MP (Major Point)	Environmental Flows
		Nutrients in 2005. TMDL for estimated date of completion 2021. (SWRCB, 2010)		

Watershed Health by Major Groundwater Basin

Groundwater Basin	Estimated Safe Yield	Water Availability Constraints	Drinking Water Standard Exceedance	Water Quality Objective Exceedance
Chorro Valley Basin	2,210 AFY(San Luis Obispo County, Master Water Report, 2012)	Physical Limitations, water quality issues, environmental demand, and water rights. (San Luis Obispo County, Master Water Report, 2012)	Yes; see description below. (San Luis Obispo County, Master Water Report, 2012)	No. (RWQCB, Table 3-8, 2011)
Los Osos Valley Basin*	3,200 AFY(San Luis Obispo County, Master Water Report, 2012)	Water quality due to sea water intrusion and nitrate contamination(San Luis Obispo County, Master Water Report, 2012)	Yes; see description below. (San Luis Obispo County, Master Water Report, 2012)	Undetermined. (RWQCB, Table 3-8, 2011)
Morro Valley Basin	1,500 AFY(San Luis Obispo County, Master Water Report, 2012)	Physical Limitations, water quality issues, and water rights. (San Luis Obispo County, Master Water Report, 2012)	No. (San Luis Obispo County, Master Water Report, 2012)	Undetermined. (RWQCB, Table 3-8, 2011)

* A court-mandated group comprised of LOCSD, Golden State Water Company, the County of SLO, and S&T Mutual Water Company released a draft Comprehensive Basin Plan for Management of Groundwater Resources in the Los Osos Basin (August, 2013).

Groundwater Quality Description: Chorro Valley Basin- Nitrate concentrations are a concern for water quality in the lower portion of Chorro Valley basin. Sea water intrusion has been documented

historically and is a potential future concern in the Chorro Flats area, should pumping patterns change significantly. Recent basin TDS concentrations (measured in 2008) were typically between 500 and 700 mg/l (DWR, 1975; Cleath-Harris Geologists, 2009).

Los Osos Valley Basin - TDS concentrations are generally between 200 mg/L and 400 mg/L. Nitrates are the primary constituent of concern in the upper aquifer, with concentrations in excess of the State drinking water standard of 45 mg/L as nitrate throughout the urban area (Cleath & Associates, 2005, 2006a, 2006b).

Lower aquifer displays characteristics of sea water intrusion on the west side of the basin. TDS concentrations also vary significantly by location, and have been reported at up to 950 mg/L in west side supply wells, although average values in the urban area are closer to 500 mg/L. Sea water intrusion is the main concern for lower aquifer water quality (Cleath & Associates, 2005; GSWC, 2009). (SLO County, 2012)

Primary Issues

Issue	Potential Causes	Referenced from
Accelerated sedimentation	Natural, increased impervious area, lack of vegetation due to land management and fire	MBNEP, 2012
Bacterial contamination	Urban runoff, grazing area runoff, waste disposal from boats, domestic and wild animal waste, septic systems	MBNEP, 2012
Elevated nutrient levels	Wastewater treatment effluent from California Men's Colony, cropland runoff, rangeland runoff, and natural	MBNEP, 2012
Toxic pollutants	Historic mining operations, household and agricultural pesticides, detergents, soaps, oils and lubricants from street drainage, and household or commercial cleaning products, non-fouling paints and other chemicals used for boat maintenance, fuel spills, illegal dumping and emerging contaminants	MBNEP, 2012
Scarce freshwater resources	Natural conditions plus use and impacted groundwater water	MBNEP, 2012

	quality	
Preserving biodiversity	species and habitat loss	MBNEP, 2012
Environmentally balanced use	Important human uses necessarily have some impact on natural resources	MBNEP, 2012

The issues described above are in no way an exhaustive list but were identified by entities working in the watershed. Additional research would be needed to flush out all the issues facing the watershed. Issues were vetted by the community to various degrees based on the individual document. There was no countywide vetting process to identify the relative priority of each issue.

Morro Bay Watershed

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