

Pismo Creek Watershed

Hydrologic Unit Name	Water Planning Area	Total Acres	Flows to	Groundwater Basin(s)	Jurisdictions
Estero Bay HU 10	South Coast WPA 7	26,030 acres	Pacific Ocean	Edna Valley; Pismo Creek Valley subbasin	County of San Luis Obispo City of Pismo Beach

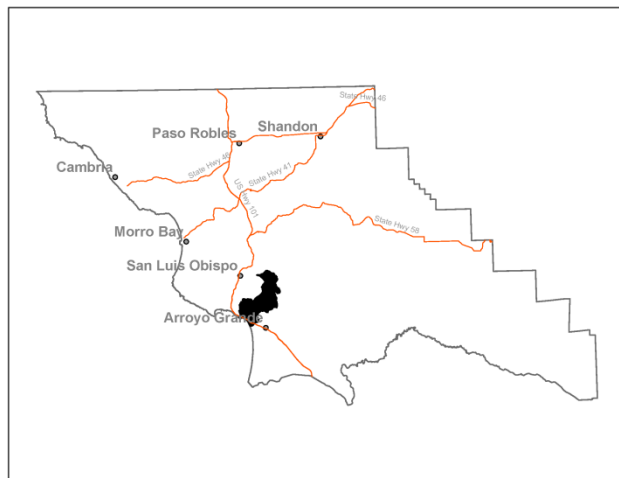


Photo by: N. Smith

Description:

The Pismo Creek Watershed is a coastal basin located in southern San Luis Obispo County. The drainage rises to a maximum elevation of almost 2,865 feet above mean sea level. Pismo Creek flows to the Pacific Ocean where a small estuary forms during the dry season. Pismo Creek watershed has three major tributary basins with their headwaters in the Santa Lucia Mountains: West Corral de Piedra, East Corral de Piedra, and Cañada Verde. A fourth significant tributary, Cuevitas Creek, enters Pismo Creek from the west in lower Price Canyon. The mouth of Pismo Creek is in the dune region known locally as Pismo Beach.

The watershed is dominated by agricultural land uses in its upper reaches including vineyards, ranches and row crops. The urban core of the City of Pismo Beach is adjacent to the Pismo Creek Estuary. Other land uses include a regional landfill, oil exploration and a wastewater treatment plant.



Watershed Plans:

Pismo Creek/ Edna Area Watershed Management Plan (CCSE, 2009)

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Characteristics:

	Physical Setting	
	Rainfall	16 -29 inches (NRCS precipitation shapefile, 2010)
	Air Temperature	<p>Summer Range (August 1981-2010): 54°- 73° F Winter Range (December 1981-2010): 39°- 63° F At Santa Maria Public Airport, CA (NOAA National Climatic Data Center, viewed 2013)</p> <p>Limited data.</p>
	Geology Description	<p>The West Corral de Piedra Creek, East Corral de Piedra Creek, and the Canada Verde Creek consist of moderately infiltrative early to mid-Tertiary headwaters and a flat Quaternary highly infiltrative valley – category #14.</p> <p>Pismo Creek consists of steep moderately infiltrative early to mid-Tertiary headwaters and a flat pre-Quaternary moderately infiltrative valley – category #11 (Bell, personal communication, 2013).</p> <p>The Pismo Creek watershed consists of three distinct geologic blocks separated by the Edna and Huasna fault zones. The upper watershed is underlain by Franciscan metasediments and ultrabasic rocks (mainly serpentines), and upper Cretaceous and early Tertiary sedimentary units. The Edna Valley comprises the middle third of the watershed, with a critical veneer of water-bearing sedimentary rocks typically 100 feet in thickness – ranging up to 300 feet -- overlying Franciscan and consolidated-sedimentary rocks (Balance Hydrologics, 2008 from Van Vlack, 1991). The Coastal San Luis Range is composed of mainly mid- to late-Miocene (late-Tertiary) consolidated sedimentary rocks of the Monterey and Pismo formations, plus coeval volcanic units of the Obispo formation, forming most of the ridge along the coast. (CCSE, 2009)</p>
	Hydrology	
	Stream Gage	No; Hydrology can be compared to Arroyo Grande Creek which has a USGS and San Luis Obispo County stream gage station. (Balance Hydrologics, 2008)
	Hydrology Models	Yes; A HEC-HMS watershed model for Pismo Creek was developed for the <i>Hydrology and Geology Assessment</i> and looked at peak flows (Balance Hydrologics, 2008).
	Peak Flow	<p>No source identified for measured peak flows.</p> <p>Peak flows (100-year recurrence) can be expected to be on the order of 150 to 200 cfs per square mile and intermediate (1.6-year recurrence) flows can be expected to be on the order of 15 to 90 cfs per square mile, based on the modeling conducted, and</p>

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		calibrated to measured flows in nearby similar watersheds (Balance Hydrologics, 2008).
	Base Flow	September low flows are estimated to have ranged from 0 to 7.5 cfs since 1968. This is equal to approximately 0 to 0.20 cfs per square mile (Balance Hydrologics, 2008).
	Flood Reports	<p>No locally specific source identified. The SLO County Flood Insurance Study was revised in 2012.</p> <p>Pismo Creek Mainstem channelized from Hwy 101 downstream to Pismo Beach; A levee, faced with soil sediment, was constructed along the south over bank of Pismo Creek between river miles 0.8 and 0.5 to protect the wastewater treatment plant. According to a 1997 Federal Emergency Management Agency (FEMA) report, the levee does not confine 100-year flood flows, and could be been washed out during an event of that magnitude; While not designed as a flood control mechanism, the private dam on West Corral de Piedra may function to hold storm water from upper West Corral de Piedra. (CCSE, 2009)</p> <p>Areas of Flood Risk include East Corral de Piedra upstream of intersection of Twin Creeks Way and Mira Cielo Drive and intersection of Twin Creeks Way with Hwy 227; Lower Pismo Creek from Hwy 101 downstream to Pacific Ocean and south to State Parks Campground/Carpenter Creek. (CCSE, 2009)</p>
	Biological Setting	
	Vegetation Cover	<p>Primarily non-native grassland with some coast live oak, mixed chaparral with chamise and buckbrush, mixed evergreen forest, black sage scrub. Some dune scrub, and urban land.(SLO County, vegetation shapefile, 1990)</p> <p>Forest and woodland habitats are most common in the coastal hills and in northern inland hills within this watershed. Riparian and wetland vegetation are present near Pismo Lake and along portions of Pismo Creek. Wetland vegetation is also present in patches along the margins of Pismo Estuary.(Althouse & Meade, Inc, 2013)</p> <p>Limited spatial data. No alliance level vegetation mapping was available for the entire County.</p>
	Invasive Species	<p>Arundo, Cape Ivy (CCSE, 2009)</p> <p>Limited data.</p>
	Special Status Wildlife and Plants	<p>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 (CNDDDB, viewed August, 2013)</p> <p>Locations listed refer to USGS 7.5’ quadrangle names. Only the portion overlapping the watershed boundary was considered.</p>

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Limited by the type of data collected in the CA Natural Diversity Database.

Common Name	Status	ARROYO GRANDE NE	LOPEZ MTN	PISMO BEACH
Animals				
<i>American badger</i>	SSC	x		x
California red-legged frog	FT		x	x
<i>coast horned lizard</i>	SSC			x
<i>Coast Range newt</i>	SSC		x	
<i>foothill yellow-legged frog</i>	SSC		x	
<i>globose dune beetle</i>	SA			x
<i>monarch butterfly</i>	SA			x
<i>prairie falcon</i>	SA (Nesting)	x	x	x
<i>San Luis Obispo pyrg</i>	SA		x	
<i>sandy beach tiger beetle</i>	SA			x
steelhead - south/central California coast DPS	FT	x	x	x
tidewater goby	FE			x
vernal pool fairy shrimp	FT			x
<i>western mastiff bat</i>	SSC			
<i>western pond turtle</i>	SSC	x	x	x
western snowy plover	FT			x
Plants/Lichen				
beach spectaclepod	ST	x		x
<i>black-flowered figwort</i>	CRPR 1B.2	x		x
<i>Blochman's dudleya</i>	CRPR 1B.1			x
<i>Blochman's leafy daisy</i>	CRPR 1B.2			x
<i>Brewer's spineflower</i>	CRPR 1B.3	x	x	x
<i>Cambria morning-glory</i>	CRPR 4.2	x	x	x
<i>chaparral ragwort</i>	CRPR 2B.2		x	

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Common Name	Status	ARROYO GRANDE NE	LOPEZ MTN	PISMO BEACH
Chorro Creek bog thistle	FE; SE		x	x
<i>Congdon's tarplant</i>	CRPR 1B.1	x		x
<i>Cuesta Ridge thistle</i>	CRPR 1B.2		x	
<i>dune larkspur</i>	CRPR 1B.2		x	
<i>dwarf soaproot</i>	CRPR 1B.2		x	
<i>Eastwood's larkspur</i>	CRPR 1B.2	x	x	
<i>Hoover's bent grass</i>	CRPR 1B.2	x	x	x
<i>Hoover's button-celery</i>	CRPR 1B.1			x
Indian Knob mountain-balm	FE; SE			x
<i>Jones' layia</i>	CRPR 1B.2		x	x
<i>La Panza mariposa-lily</i>	CRPR 1B.3			x
marsh sandwort	FE; SE	x		x
<i>mesa horkelia</i>	CRPR 1B.1	x		x
Morro manzanita	FT			x
<i>most beautiful jewel-flower</i>	CRPR 1B.2		x	
<i>mouse-gray dudleya</i>	CRPR 1B.3	x	x	x
<i>Palmer's monardella</i>	CRPR 1B.2		x	
<i>Pecho manzanita</i>	CRPR 1B.2		x	x
Pismo clarkia	FE; SR	x		x
<i>saline clover</i>	CRPR 1B.2			
<i>San Luis mariposa-lily</i>	CRPR 1B.2	x	x	x
<i>San Luis Obispo County lupine</i>	CRPR 1B.2	x		x
<i>San Luis Obispo owl's-clover</i>	CRPR 1B.2	x	x	x
<i>San Luis Obispo sedge</i>	CRPR 1B.2		x	
<i>Santa Lucia manzanita</i>	CRPR 1B.2		x	
<i>Santa Margarita manzanita</i>	CRPR 1B.2	x	x	x

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		ARROYO GRANDE NE	LOPEZ MTN	PISMO BEACH
	Common Name	Status		
	<i>straight-awned spineflower</i>	CRPR 1B.3	x	
	<i>surf thistle</i>	ST	x	x
	Steelhead Streams	Pismo Creek; East and West Corral de Piedra Creeks (NMFS,2005)		
	Stream Habitat Inventory	Yes; Completed 2005 for Pismo Creek and West Corral de Piedra as landowner access allowed by California Department of Fish and Game staff. None completed for other tributaries. (CCSE, 2009)		
	Fish Passage Barriers	<p>Fish Ladder at Railroad Crossing of Pismo Creek: stream mile 5.3, Temporary Barrier, PAD # 700044.00000; Arizona Crossing of Pismo Creek: stream mile 4.6, Temporary Barrier, PAD # 736885.00000; County bridge Crossing of West Corral de Piedra Creek at Righetti Road: stream mile 8.2, Temporary Barrier, PAD # 700080.00000; (San Luis Obispo County Stream Crossing Inventory and Fish Passage Evaluation, 2005)</p> <p>Other potential barriers identified by landowners: Bridge Creek Road Crossing of West Corral de Piedra Creek, stream mile 9.1; Righetti Dam spillway on West Corral de Piedra Creek, stream mile 9.8; West Corral de Piedra Creek at Hwy 227 and Old Edna where boulders may have been placed, stream mile 5.7, PAD # 731304.00000; A concrete stream crossing with two culverts observed on East Corral de Piedra Creek may also be a fish passage barrier. (CCSE, 2009) Bedrock Falls at West Corral de Piedra Creek, Total Barrier, PAD # 700079.00000 (CDFW Passage Assessment Database, 2013)</p>		
	Designated Critical Habitat	Yes; Tidewater goby and Steelhead trout (USFWS Critical Habitat Portal, viewed 2013)		
	Habitat Conservation Plans	None.(USFWS Critical Habitat Portal, viewed 2013)		
	Other Environmental Resources	Coastal Zone		
	Land Use			
	Jurisdictions & Local Communities	County of San Luis Obispo, City of Pismo Beach, Town of Shell Beach		
	% Urbanized	13% (5.44% urban, 6.58% residential, less than 1% of commercial, industrial and public facilities) (SLO County LUC)		

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	% Agricultural	74% (SLO County LUC)
	% Other	13% (12.78% rural lands, less than 1% of recreation open space) (SLO County LUC)
	Planning Areas	San Luis Obispo, San Luis Bay Coastal, San Luis Bay Inland, Los Padres
	Potential growth areas	Los Ranchos/Edna Village area (Specific Plan, 2001); Price Canyon and Los Robles del Mar areas (recent development proposals)
	Facilities Present	Private Dam on West Corral de Piedra Creek; Cold Canyon Landfill; Plains Exploration Oil Field; Pismo Beach Wastewater Treatment Plant with discharge to Ocean; Country Club Wastewater Treatment Plant.
	Commercial Uses	Plains Exploration and Production Company; Recreation and tourism at Pismo Beach; Wineries in Edna Valley; 3 Bar S Ranch/Spreafico Mine for decorative rock, Patchett Pit Mine for sand and gravel (SLO County extractive resources)
	Demographics	
	Population	8,945 (U.S. Census Block, 2010) 7,655 in City of Pismo Beach (US Census, 2010)
	Race and Ethnicity	86% Caucasian, 9% Latinos, 2% Asian, and 2% two or more races. The remaining races each represent less than 1%, including African American, American Indian, Pacific Islander, and other (U.S. Census Block, 2010).
	Income	MHI \$79,171 in watershed.(US Census Tract, 2010) MHI \$65,682 in City (US Census, 2010) Census tract crosses multiple watersheds.
	Disadvantaged Communities	No; 2% of individuals are below poverty level in watershed.(US Census Tract, 2010) 4.9% of individuals are below poverty level in City (US Census, 2010) Census tract crosses multiple watersheds.
	Water Supply	
	Water Management Entities	City of Pismo Beach. No source identified. “The Los Ranchos/Edna Village area obtains water through a central system owned by the California Cities Water Company. Developed parcels within the remainder of the village area obtain water from individual wells or two small mutual water companies.” (Draft Los Ranchos Village Plan, 2013) Limited data identified.
	Groundwater	Yes; alluvial and San Luis Obispo Valley (SLO County, 2012)
	Surface Water	No public reservoirs. There is a private dam on West Corral de Piedra Creek (CCSE, 2009).
	Imported Water	Yes; entitled to 896 AFY from Lake Lopez, 1,100 AFY of State Water and 700 AFY of groundwater from the Arroyo Grande aquifer. (City

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		of Pismo Beach, 2013)
	Recycled/ Desalinated Water	None in the City of Pismo Beach. No source identified.
	Infiltration Zone	The rolling hills of Canada Verde’s tributaries are largely incised into the Paso Robles formation, with limited volumes of recent alluvium. Soils are mapped in this area largely as belonging to hydrologic soil group A and B, indicating that these areas may be especially suitable for ground-water recharge during storms, and also slow release of ground-water to streams during base flow periods. (Balance Hydrologics, 2008) Limited data.
	Water Budget	None to date. One is planned by Central Coast Salmon Enhancement for completion in 2015.
	Water Uses	
	Beneficial Uses	<i>Pismo Creek</i> – Municipal and Domestic Supply (MUN), Agricultural Supply (AGR), Industrial Service Supply (IND), 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). <i>Pismo Creek Estuary</i> – Ground Water Recharge (GWR), 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) (RWCQB, 2011)
	Other Unique Characteristics	
	Historic Resources	The Price House is listed on the National Register of Historic Places (NRHP, viewed 2013). The Tognazzini General Store is identified a historic site by the SLO County (Draft Los Ranchos Village Plan, 2013).
	Archeological Resources	There was a Chumash town called Pismu at the time of European settlement (SB Museum of Natural History, viewed 2013). Limited data.

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	Other	No source identified.
	Climate Change Considerations	
		<p>State climate change maps show sea level affecting portions of the City of Pismo Beach and town of Oceano with inundation areas along lower Pismo Creek and Carpenter Creek particularly between Highway 101 and the ocean (USGS, Cal-Adapt, viewed 2013).</p> <p>See IRWMP, 2014 Section H. Climate Change</p> <p>Limited data and not watershed specific.</p>

Watershed Codes

Calwater / DWR Number	HA	Hydrologic Area Name	HSA	Hydrologic Sub-area Name	SWRCB Number	CDF Super Planning	CDF Watershed Name
3310.260005	2	Point Buchon	6	Pismo	310.26	undefined	West Corral de Piedra Creek
3310.260001	2	Point Buchon	6	Pismo	310.26	undefined	East Corral de Piedra Creek
3310.260002	2	Point Buchon	6	Pismo	310.26	undefined	Canada Verde
3310.260004	2	Point Buchon	6	Pismo	310.26	undefined	Lower Pismo Creek
3310.260003	2	Point Buchon	6	Pismo	310.26	undefined	Upper Pismo Creek
Source: Excerpt from California Interagency Watershed Map of 1999, Calwater 2.2.1 (CA Resource Agency, 2004 Update)							

Major Changes in the Watershed

- In 1772, Mission San Luis Obispo was established bringing ranching to the area.
- The watershed covers portions of three Mexican land grants; the San Miguelito, the Pismo and the Corral de Piedra (Effie McDermott Archives).
- In 1865, Edgar Willis Steele and his brothers purchased 45,000 acres in the Edna Valley and introduced the modern dairy industry to San Luis Obispo County. In 1866, Edgar Steele bought portions of Corral de Piedra, El Pismo, Bolsa de Chamisal and Arroyo Grande ranchos. They operated five dairy farms, each with 150 head of dairy cattle.
- Railroad

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- Prior to 1911, Pismo Creek’s lower drainage included Pismo Lake, and what today is called Meadow Creek. Lower Pismo Creek joined with Arroyo Grande Creek in its lowest reaches and flowed into the ocean.
- In 1953, the Pismo Beach Wastewater Treatment Plant began operation.
- In 1965, Cold Canyon Landfill began accepting non-hazardous waste.
- In the late 1970’s, Plains Exploration & Production started production of the oil field in Price Canyon.

Watershed Health by Major Tributary

Tributary Name	Ephemeral / Perennial	303d Listed/ TMDLs	Pollution Sources	Environmental Flows
Pismo Creek Mainstem	Perennial	Yes on 303d list for Chloride, E. coli, Fecal Coliform, Low Dissolved Oxygen, and Sodium. TMDL estimated date of completion 2021. (Central Coast RWQCB, 2011)	Agriculture, grazing-related, natural sources, resource extraction, petroleum activities, transient encampments (Central Coast RWQCB, 2011)	Table 3 of Instream Flow Assessment (Stillwater Sciences, 2013)
West Corral de Piedra	Ephemeral?	No.	Undetermined.	Table 3 of Instream Flow Assessment (Stillwater Sciences, 2013)
East Corral de Piedra	Ephemeral?	No.	Undetermined.	No source identified.
Canada Verde	Perennial?	No.	Undetermined.	No source identified.

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Watershed Health by Major Groundwater Basin

Groundwater Basin	Estimated Safe Yield	Water Availability Constraints	Drinking Water Standard Exceedance	Water Quality Objective Exceedance,
San Luis Obispo Valley – Pismo Creek Valley Subbasin	200 AFY, although this is before any consideration for environmental habitat demand (Fugro, 2009). (SLO County, Master Water Report, 2012)	Physical limitations and environmental demand. The shallow alluvial deposits are typically more susceptible to drought impacts. (SLO County, Master Water Report, 2012)	Yes; see description below. (SLO County, Master Water Report, 2012)	No for basin. No objective for subbasin. (RWQCB, 2011)
San Luis Obispo Valley – Edna Valley Subbasin	4,000 AFY (DWR, 1997) (SLO County, Master Water Report, 2012)	Physical limitations and environmental demand (SLO County, Master Water Report, 2012)	No. (SLO County, Master Water Report, 2012)	No for basin. No objective for subbasin. (RWQCB, 2011)

Groundwater Quality Description: The general mineral character of groundwater in the Edna Valley subbasin is magnesium-calcium bicarbonate with a TDS range of 630-780 mg/l (average 690 mg/l), based on public water company testing during 2008. This is consistent with surface water samples collected in 2007 from tributaries to Pismo Creek in the Edna Valley, where the water was magnesium-calcium bicarbonate with 500-800 mg/ TDS (Balance Hydrologics, 2008; GSWC, 2009).

Results of six groundwater samples collected from Pismo Creek Valley subbasin wells in 1999 indicate magnesium bicarbonate and magnesium sulfate-bicarbonate are the dominant water types, with a median TDS of 620 mg/l. One well exceeded the State drinking water standards for TDS and sulfate, and most of the wells also had iron and/or manganese concentrations above the drinking water standards (Fugro, 2009). (SLO County Public Works Master Water Report, 2012)

Primary Issues

Issue	Potential Causes	Referenced from
Surface Water Quality - Temperature	Lack of riparian canopy	CCSE, 2009
Surface Water Quality - Nutrients and Dissolved Oxygen	Agriculture, increased runoff due to development	CCAMP
Ocean Water Quality – Fecal	Birds, domestic animal waste,	Kitts, 2009

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Issue	Potential Causes	Referenced from
coliform	faulty septic systems, homeless encampments	
Surface flow Quantity	Natural, groundwater diversions, impoundment	CCSE, 2009
Groundwater Quantity	Physical limitations, production	SLO County Master Water Report, 2012
Fish Passage Barriers	Multiple sites inaccessible to fish traffic	CCSE, 2009
Erosion and Sedimentation	Drought/storm years weaken banks, agricultural practices	CCSE, 2009
Flood Management	Development in floodplains	CCSE, 2009

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.

Bibliography

Althouse and Meade, Inc. (2013) Published and unpublished field notes.

Balance Hydrologics. (2008). *Hydrology and Geology Assessment of the Pismo Creek Watershed*. San Luis Obispo, CA.: Author.

Bell, E. (. (2013). Based on Tetra Tech and Stillwater Sciences-2011 Development and Implementation of Hydromodification Control Methodology, Watershed Characterization Part 1: Watershed Characterization Part 1, Precipitation and Landscape.

California Conservation Corps. (March 2005). *San Luis Obispo County Stream Crossing Inventory and Fish Passage Evaluation*. Greenspace the Cambria Land Trust .

California Department of Fish and Game. (2013). *California Natural Diversity Database*. Retrieved from http://imaps.dfg.ca.gov/viewers/cnddb_quickviewer/app.asp

California Department of Fish and Wildlife. (2013). *California Natural Diversity Database*. Retrieved from California Department of Fish and Wildlife-Biogeographic Data: <http://www.dfg.ca.gov/biogeodata/cnddb/>

California Department of Fish and Wildlife. (2013). *Passage Assessment Database BIOS public viewer*. Retrieved from <https://nrm.dfg.ca.gov/PAD/Default.aspx>

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Central Coast Regional Quality Control Board. (2012, March 15). *Total Maximum Daily Load for Fecal Indicator Bacteria for the Santa Maria Watershed Santa Barbara, San Luis Obispo and Ventura Counties*. Retrieved from http://www.swrcb.ca.gov/rwqcb3/water_issues/programs/tmdl/docs/santa_maria/fib/index.shtml

Central Coast Regional Water Quality Control Board. (2011). *Water Quality Control Plan for the Central Coast Basin*. Retrieved Table 3-8, from http://www.swrcb.ca.gov/rwqcb3/publications_forms/publications/basin_plan/index.shtml.

Central Coast Salmon Enhancement. (2009). *Pismo Creek/Edna Area Watershed Management Plan*. CCSE.

Central Coast Salmon Enhancement. (2013). *Pismo Creek Estuary Restoration Plan*.

City of Pismo Beach. (June 1, 2013). *Consumer Confidence Report*.

County of San Luis Obispo. (2013). *Los Ranchos/Edna Village Plan Public Review Draft*.

Department of Water Resources. (2003). *Master Water Plan*.

Kitts, C. e. (2010). *Pismo Beach Fecal Contamination Source Identification Study*.

Marine Research Specialists. (2012). *Excelaron (Mankins) Conditional Use Permit Huasna Valley Oil Exploration and Production Project Final Environmental Impact Report*. Author.

McDermott, E. (2009). Personal Archives. Pismo Beach: Central Coast Salmon Enhancement in Pismo Creek/Edna Area Watershed Management Plan.

National Marine Fisheries Service, Southwest Regional Office. (2012, Sept). *South-Central California Steelhead Recovery Plan, Public Review Draft*. Retrieved 2013, from http://swr.nmfs.noaa.gov/recovery/SCCC_Steelhead/Cover,%20ToC,%20Executive%20Summary%20through%20Chapter%208_Sept%2026,%202012.pdf

National Marine Fisheries Services, S. R. (2009, July). *Southern California Steelhead Recovery Plan, Public Draft*. Retrieved from http://swr.nmfs.noaa.gov/recovery/So_Cal/Southern_California_Steelhead_Public_Draft_Recovery_Plan.pdf

National Oceanic and Atmospheric Administration. (2013). Retrieved 2013, from National Climatic Data Center: <http://www.ncdc.noaa.gov>

National Register of Historic Places. (2013). *NPS Focus*. Retrieved 2013, from National Register of Historic Places: <http://nrhp.focus.nps.gov/natregsearchresult.do?fullresult=true&recordid=1>

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Natural Resource Conservation Service. (2010). Precipitation 1981-2010 GIS Data [computer files] Using: ESRI ArcMap GIS Version 9.3.1.

Regional Water Quality Control Board. (n.d.). *Central Coast Basin Plan*.

San Luis Obispo County . (2001). *Los Ranchos/ Edna Village Specific Plan*. County Planning Department.

San Luis Obispo County. (1990). Vegetation GIS Data. Using: ESRI ArcMap GIS Version 9.3.1. San Luis Obispo, CA.

San Luis Obispo County. (2003). Huasna-Lopez Area Plan, 2003.

San Luis Obispo County. (2012). *Master Water Report*.

San Luis Obispo County Planning and Building Geographic Technology and Design. (n.d.). *County Land Use Classifications*.

San Luis Obispo County Planning and Building. (n.d.). *Geographic Technology and Design-Extractive Resources*.

San Luis Obispo County Water Resources-Division of Public Works. (n.d.). Retrieved 2013, from SLOCountyWater.org: <http://www.slocountywater.org>

Santa Barbara Museum of Natural History. (2013). *Chumash Towns at the Time of European Settlement*. Retrieved from Santa Barbara Museum of Natural History, The Chumash Region and Beyond: <http://www.sbnature.org/research/anthro/chumash/dirmap.htm>

State Water Resources Control Board. (2010). *2010 Integrated Report (Clean Water Act Section 303(d) List/ 305(b) Report*. http://www.swrcb.ca.gov/water_issues/programs/tmdl/integrated2010.shtml.

Stillwater Sciences & Kear Groundwater. (2012). *Santa Maria River Instream Flow Study: flow recommendations for steelhead passage*. Sacramento, CA: Santa Barbara, CA for CA Ocean Protection Council, Oakland, CA & CA Dept of Fish and Game.

Stillwater Sciences and Kear Groundwater, California Ocean Protection Council, California Department of Fish and Game. (2012). *Santa Maria River Instream Flow Study: flow recommendations for steelhead passage*. Santa Barbara/Oakland/Sacramento.

Twitchell Management Authority & MNS Engineers Inc. (n.d.). *Twitchell Project Manual*. http://www.cityofsantamariaxweb.com/Twitchell/Manual/01.Twitchell_Project_Manual_April_23_2010.pdf.

U.S. Census . (2010). Census Tract GIS Data.

U.S. Census. (2010). Census Block GIS Data.

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U.S. Census Bureau. (2010). *American Factfinder, Community Facts*. Retrieved 2013, from <http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml>

U.S. Fish and Wildlife Service. (2013). *Critical Habitat Portal*. Retrieved from <http://criticalhabitat.fws.gov/crithab/>

U.S. Geologic Survey. (2013). *National Water Information System: Web Interface Peak Streamflow for the Nation*. <http://nwis.waterdata.usgs.gov/usa/nwis/peak>.

U.S. Geological Survey. (1998, February). *Floods in Cuyama Valley, California February 1998 Water Fact Sheet 162-00*. Retrieved 2013, from <http://pubs.usgs.gov/fs/fs-162-00/pdf/fs16200.pdf>

U.S. Geological Survey and Pacific Institute. (n.d.). *Sea Level Rise: Threatened Areas Map*. Retrieved September 2013, from Cal-Adapt: <http://cal-adapt.org/sealevel/>