

Appendix C.2 South County Sub-region Watersheds

- 6. Irish Hills Coastal Watersheds**
- 7. San Luis Obispo Creek Watershed**
- 8. Pismo Creek Watershed**
- 9. Arroyo Grande Creek Watershed**
- 10. Santa Maria River Valley Watershed**
- 11. Nipomo-Suey Creeks Watersheds**
- 12. Huasna River Watershed**
- 13. Alamo Creek Watershed**
- 14. Cuyama River Watershed**

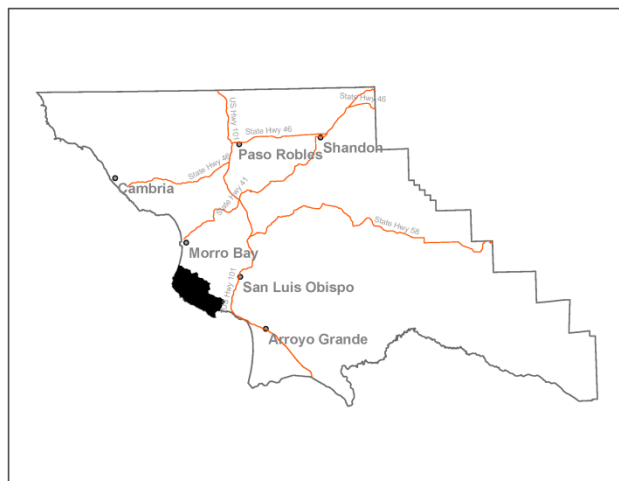
Irish Hills Coastal Watersheds

Hydrologic Unit Name	Water Planning Area	Acreage	Flows to	Groundwater Basin(s)	Jurisdictions
Estero Bay HU 10	San Luis Obispo/Avila WPA 6	27,922 acres	Pacific Ocean	None	County of San Luis Obispo CA Department of Parks and Recreation



Description:

The Irish Hills Coastal Watersheds are located in the San Luis Range, along the remote San Luis Obispo County coastline between the communities of Los Osos and Avila Beach. The drainages rise to a maximum elevation of 1,819 feet above sea level at Saddle Peak. The major creeks flowing to the Pacific Ocean and with their headwaters in the Coastal Range Mountains are Hazard Canyon, Islay Creek, Coon Creek, Diablo Creek, Irish Creek, Rattlesnake Creek, Hanford Creek and Wild Cherry Canyon.



The watersheds are dominated by grazing lands some in conservation or agricultural easements and public lands. Other land uses include a regional nuclear power plant, passive recreation, natural resource preservation and limited oil drilling.

Watershed Plans:

Irish Hills Coastal Watershed Conservation Plan (Coastal Conservancy, 2001)

Irish Hills Coastal Watersheds

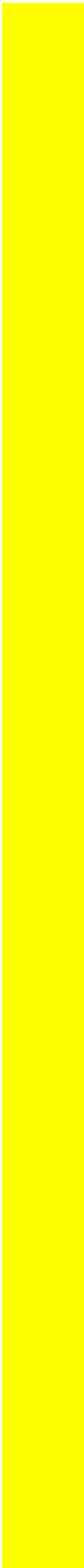
Characteristics:

	Physical Setting	
	Rainfall	17 – 25 inches (NRCS Precipitation 1981-2010) 18 inches Mean Annual (SLO County Water)
	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	<p>The Islay and Coon Creek sub watersheds consists of steep moderately infiltrative early to mid-Tertiary headwaters – category #8.</p> <p>The Diablo Creek and Pecho Creek sub watersheds consists of steep moderately infiltrative early to mid-Tertiary headwaters; flat pre-Q moderately infiltrative valley - category #11. (Bell, Ethan, personal communication, 2013)</p> <p>The wave-cut marine terraces, rocky headlands, and the rugged to rolling mountains and valleys are the result of millions of years of erosion of land that has been uplifted, folded, and tilted. Most of the oldest rocks are derived from the Franciscan Formation that forms the basement of most of the Coast Ranges. The Franciscan Formation is a result of the deformation of ancient sea floor sediments caught in a deep-water trench created by two colliding tectonic plates some 29 million years ago. Overlain on the Franciscan Formation are younger formations of sedimentary rock that are composed of mudstone deposited when the remains of tiny marine organisms such as diatoms and plankton drifted to the bottom and mixed with silt and sand. The mud solidified into thick layers of diatomite, clay porcellanite, dolomite, and chert. These sedimentary rocks and the basement rock itself were worn down again as the range was uplifted, although not uniformly throughout the area. As a result, sedimentary rock formations of many different ages and character occur. A number of faults occur within or in the vicinity. The Rinconada fault is the major northwest-striking fault east of the Indian Knob area. (Coastal Conservancy, 2001)</p>
	Hydrology	
	Stream Gage	None.
	Hydrologic Models	None.
	Peak Flow	No source identified.
	Base Flow	No source identified.

Irish Hills Coastal Watersheds

	Flood Reports	No source identified.																																																												
	Biological Setting																																																													
	Vegetation Cover	<p>Primarily non-native grassland with some coastal scrub, coast live oak forest, blue brush chaparral, chamise and beaches and coastal dunes. (SLO County vegetation shapefile, 1990)</p> <p>Nearshore habitats, Coastal scrub, Maritime Chaparral, grassland, Bishop pine forest, oak woodland (Coastal Conservancy, 2001)</p> <p>Limited spatial data. No alliance level vegetation mapping was available for the entire County.</p>																																																												
	Invasive Species	No source identified.																																																												
	Special Status Wildlife and Plants	<p>Key: Federal endangered – FE, Federal threatened – FT, State endangered – SE, State threatened – ST, CDFW State Species of Concern – SSC, CA rare plant ranking – CRPR (CDFW CNDDDB, August 2013)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;"></th> <th style="width: 10%;"></th> <th style="width: 10%; text-align: center;">MORRO BAY SOUTH</th> <th style="width: 10%; text-align: center;">PISMO BEACH</th> <th style="width: 10%; text-align: center;">PORT SAN LUIS</th> </tr> <tr> <th style="text-align: left;"><i>Common Name</i></th> <th style="text-align: left;">Status</th> <th></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td colspan="5">Animals</td> </tr> <tr> <td><i>American badger</i></td> <td>SSC</td> <td></td> <td style="text-align: center;">x</td> <td></td> </tr> <tr> <td><i>black legless lizard</i></td> <td>SSC</td> <td style="text-align: center;">x</td> <td></td> <td style="text-align: center;">x</td> </tr> <tr> <td>California red-legged frog</td> <td>FT</td> <td></td> <td style="text-align: center;">x</td> <td></td> </tr> <tr> <td><i>coast horned lizard</i></td> <td>SSC</td> <td></td> <td style="text-align: center;">x</td> <td></td> </tr> <tr> <td><i>globose dune beetle</i></td> <td>Special Animal</td> <td></td> <td style="text-align: center;">x</td> <td></td> </tr> <tr> <td><i>monarch butterfly</i></td> <td>Special Animal</td> <td></td> <td style="text-align: center;">x</td> <td></td> </tr> <tr> <td><i>prairie falcon</i></td> <td>Special Animal (Nesting)</td> <td></td> <td style="text-align: center;">x</td> <td></td> </tr> <tr> <td><i>sandy beach tiger beetle</i></td> <td>Special Animal</td> <td></td> <td style="text-align: center;">x</td> <td></td> </tr> <tr> <td>steelhead - south/central California coast DPS</td> <td>FT</td> <td></td> <td style="text-align: center;">x</td> <td></td> </tr> </tbody> </table>			MORRO BAY SOUTH	PISMO BEACH	PORT SAN LUIS	<i>Common Name</i>	Status				Animals					<i>American badger</i>	SSC		x		<i>black legless lizard</i>	SSC	x		x	California red-legged frog	FT		x		<i>coast horned lizard</i>	SSC		x		<i>globose dune beetle</i>	Special Animal		x		<i>monarch butterfly</i>	Special Animal		x		<i>prairie falcon</i>	Special Animal (Nesting)		x		<i>sandy beach tiger beetle</i>	Special Animal		x		steelhead - south/central California coast DPS	FT		x	
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Irish Hills Coastal Watersheds



<i>tidewater goby</i>	FE			x
<i>vernal pool fairy shrimp</i>	FT			x
<i>western pond turtle</i>	SSC			x
<i>western snowy plover</i>	FT			x
Plants/Lichen				
<i>Arroyo de la Cruz manzanita</i>	CRPR 1B.2		x	
<i>beach spectaclepod</i>	ST			x
<i>black-flowered figwort</i>	CRPR 1B.2			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
<i>Cambria morning-glory</i>	CRPR 4.2			x
Chorro Creek bog thistle	FE; SE			x
<i>Congdon's tarplant</i>	CRPR 1B.1			x
<i>Eastwood's larkspur</i>	CRPR 1B.2		x	x
<i>Hoover's bent grass</i>	CRPR 1B.2		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
<i>La Panza mariposa-lily</i>	CRPR 1B.3			x

Irish Hills Coastal Watersheds

	<i>marsh sandwort</i>	FE; SE				x
	<i>mesa horkelia</i>	CRPR 1B.1				x
	Morro manzanita	FT		x	x	x
	<i>most beautiful jewel-flower</i>	CRPR 1B.2				x
	<i>mouse-gray dudleya</i>	CRPR 1B.3				x
	<i>Pecho manzanita</i>	CRPR 1B.2		x	x	x
	Pismo clarkia	FE; SR				x
	<i>San Benito fritillary</i>	CRPR 1B.2		x		
	<i>San Luis mariposa-lily</i>	CRPR 1B.2				x
	<i>San Luis Obispo County lupine</i>	CRPR 1B.2				x
	<i>San Luis Obispo owl's-clover</i>	CRPR 1B.2		x	x	
	<i>San Luis Obispo sedge</i>	CRPR 1B.2		x		
	<i>Santa Margarita manzanita</i>	CRPR 1B.2		x	x	x
	surf thistle	ST				x
	Limited by the type of data included in CA Natural Diversity Database.					
	Steelhead Streams	No streams listed in the Steelhead Recovery Plan (NMFS, 2012). Islay Creek and Coon Creek (USFWS Critical Habitat Mapper, viewed 2013) Diablo Canyon (CEMAR, 2008)				
	Stream Habitat Inventory	None identified.				
	Fish Passage Barriers	Concrete Dam at Islay Creek, Total Barrier, PAD #711911.00000; Islay Falls at Islay Creek, Unknown, PAD #720498.00000 (CDFW Passage Assessment Database, viewed 2013)				
	Designated Critical Habitat	Yes; Steelhead Trout, Morro shoulderband snail, Morro Bay kangaroo rat, Western snowy plover (USFWS Critical Habitat Portal, viewed July 2013)				
	Habitat Conservation	Yes; Morro shoulderband snail (USFWS Critical Habitat Portal, viewed July 2013)				

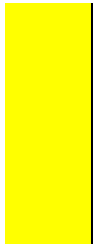
Irish Hills Coastal Watersheds

	Plans	
	Other Environmental Resources	Coastal Zone, Montana de Oro State Park, Irish Hills Limited data.
	Land Use	
	Jurisdictions & Local Communities	County of San Luis Obispo
	% Urbanized	0% (SLO County LUC)
	% Agricultural	42.3% (SLO County LUC)
	% Other	57.7% (4.6% public facility, 27.85% recreation, and 25.26% rural land) (SLO County LUC)
	Planning Areas	San Luis Obispo, San Luis Bay Coastal, San Luis Bay Inland
	Potential growth areas	No source identified.
	Facilities Present	Diablo Canyon Power Plant and Water Treatment System, Private wells and septic systems Limited data.
	Commercial Uses	Diablo Nuclear Power Plant; Montana de Oro State Park; Beecham Red Rock Pit for decomposed granite (SLO County, extractive shapefile)
	Demographics	
	Population	17 (U.S. Census Block, 2010)
	Race and Ethnicity	76.5% Caucasian (13), 17.6% Latino (3), and 5.9% Asian (1) (U.S. Census Block, 2010)
	Income	\$62,829 (U.S. Census Tract, 2010) Census tract covers multiple watersheds.
	Disadvantaged Communities	No; 3% of individual are below poverty (U.S. Census, 2010) Census tract covers multiple watersheds.
	Water Supply	
	Water Management Entity	No source identified.
	Groundwater	Yes; alluvial only.
	Surface Water	No public reservoirs.
	Imported Water	No source identified.

Irish Hills Coastal Watersheds

	Recycled/ Desalinated Water	Yes; Desalinated water is used at the Diablo Canyon Power Plant for cooling and on-site potable drinking water. (Prato, et al., 2002)
	Infiltration Zones	No source identified.
	Water Budget	None to date.
	Water Uses	
	Beneficial Uses	<p><i>Islay and Coon Creek</i> – 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), 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).</p> <p><i>Diablo 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), Rare, Threatened, or Endangered Species (RARE), Spawning, Reproduction, and/or Early Development (SPWN). (RWQCB, 2011)</p>
	Other Unique Characteristics	
	Historic Resources	No source identified.
	Archeological Resources	Human habitation of the watershed dates back over 9,000 years as evidenced by analyses of hundreds of archaeological discoveries including several village sites, numerous thick deposits of refuse mounds, called middens, burial sites, and bedrock mortars and tools. A majority of these findings have been made near the creek mouths on the coastal terraces. The site near the Diablo Canyon Nuclear Power Plant is considered the County's most significant archaeological site. (Coastal Conservancy, 2001) There were Chumash towns called Tsikyiw and Chanu at the time of European settlement (SB Museum of Natural History, viewed 2013).
	Other	No source identified.
	Climate Change Considerations	

Irish Hills Coastal Watersheds



State climate change maps do not show dramatic increased areas of inundation due to sea level rise along the coast (USGS, Cal-Adapt, viewed 2013).

See IRWMP, 2014 Section H. Climate Change

Limited data and not local.

Watershed Codes

CalWater / DWR Number	HA	Hydrologic Area Name	HSA	Hydrologic Sub-area Name	SWRCB Number	CDF Super Planning	CDF Watershed Name
3310.250001	2	Point Buchon	5	Point San Luis	310.25	undefined	Islay Creek
3310.250003	2	Point Buchon	5	Point San Luis	310.25	undefined	Coon Creek
3310.250002	2	Point Buchon	5	Point San Luis	310.25	undefined	Pecho Creek

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

Major Changes in the Watershed

- Human habitation of the watershed dates back over 9,000 years as evidenced by analyses of hundreds of archaeological discoveries including several village sites, numerous thick deposits of refuse mounds, called middens, burial sites, and bedrock mortars and tools. A majority of these findings have been made near the creek mouths on the coastal terraces. The site near the Diablo Canyon Nuclear Power Plant is considered the County's most significant archaeological site.
- Pedro Unamuno, commander of a Manila galleon that sailed along the California coast in 1587, was the first to record the presence of San Luis Bay, noting the protected landing in the curve of the bay where Port San Luis is located today.
- In 1769, the diary of Franciscan Padre Juan Crespi provides the first written account of what is now the Irish Hills. (Coastal Conservancy, 2001)
- In 1772, a mission was established at San Luis Obispo.
- By the early 1840s, the lands in the vicinity of the Irish Hills began to be divided among several great Spanish ranchos which were used for raising livestock for the lucrative hide-and-tallow trade.
- Between 1870 and 1890's, the pier, breakwater, a narrow gauge rail line, hotel and lighthouse were constructed.
- The Southern Pacific Railroad line, completed in 1894, shifted the focus of development and trade from coastal port towns of Port Harford (now called Port Son Luis) and Port Avila, to San Luis Obispo, on the inland rail route.

Irish Hills Coastal Watersheds

- Today the majority of the watershed is still used for cattle grazing. (Coastal Conservancy, 2001)

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Watershed Health by Major Tributary

Tributary Name	Ephemeral / Perennial	303d Listed/ TMDLs	Pollution Sources NP (non-point) MP (Major Point)	Environmental Flows
Islay Creek	No source identified.	Not assessed. (SWRCB, 2010)	Not assessed. (SWRCB, 2010)	X cfs (Stillwater Sciences, 2013)
Coon Creek	No source identified.	No. (SWRCB, 2010)	Undetermined	
Diablo Creek	No source identified.	Not assessed. (SWRCB, 2010)	Not assessed. (SWRCB, 2010)	
Port San Luis	Near-shore	No. (SWRCB, 2010)	Undetermined	

Watershed Health by Major Groundwater Basin

Groundwater Basin	Estimated Safe Yield	Water Availability Constraints	Drinking Water Standard Exceedance	Water Quality Objective Exceedance
Los Osos 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)	No objective for basin. (RWQCB, Table 3-8, 2011)

Groundwater Quality Description: Nitrate is 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 in shallow monitoring wells throughout the urban area (San Luis Obispo County, Master Water Report, 2012 from Cleath & Associates).

Primary Issues

Issue	Potential Causes	Referenced from
Residential development; loss of habitat	Growth inducing roads	Coastal Conservancy, 2001
Agricultural development; loss of habitat		Coastal Conservancy, 2001
Sedimentation and loss of riparian cover	Overgrazing	Coastal Conservancy, 2001

Irish Hills Coastal Watersheds

Issue	Potential Causes	Referenced from
Proliferation of non-native species	Recreational uses	Coastal Conservancy, 2001
Habitat degradation	Recreational uses	Coastal Conservancy, 2001

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.

Irish Hills Coastal Watersheds

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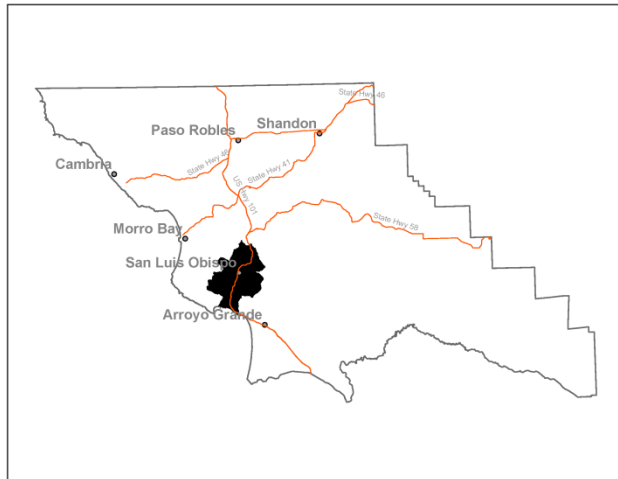
San Luis Obispo Creek Watershed

Hydrologic Unit Name	Water Planning Area	Acreage	Flows to	Groundwater Basin	Jurisdictions
Estero Bay HU 10	San Luis Obispo/Avila WPA 6	53,271 acres	Pacific Ocean	San Luis Obispo Valley	County of San Luis Obispo City of San Luis Obispo Town of Avila Beach Port San Luis Harbor District



Description:

The San Luis Obispo Creek Watershed is a coastal basin located in southern San Luis Obispo County. The drainage rises to a maximum elevation of approximately 2,500 feet above sea level in the Santa Lucia Range. San Luis Obispo Creek flows to the Pacific Ocean and has six major tributary basins: Stenner Creek, Prefumo Creek, Laguna Lake, East Branch San Luis Obispo Creek, Davenport Creek, and See Canyon.



The watershed is dominated by agricultural land uses including ranches and open space. The urban core of the City of San Luis Obispo is at the confluences of several tributaries with the mainstem starting in the upper watershed and bisecting the City. The unincorporated community of Avila Beach is adjacent to the mouth of San Luis Obispo Creek at the Pacific Ocean. Other land uses include the California Polytechnical State University, rural residential, a regional airport and two wastewater treatment plants.

Watershed Plans:

San Luis Obispo Creek Watershed Enhancement Plan (The Land Conservancy of San Luis Obispo County, 2002)

Prefumo Creek Watershed Management Plan. (City of San Luis Obispo, expected 2014)

San Luis Obispo Creek Watershed

Characteristics:

	Physical Setting	
	Rainfall	17 – 33 inches (NRCS Precipitation 1981-2010) 24 – 29 inches, Mean Annual (SLO County Water.org)
	Air Temperature	Summer Range (August 1981-2010): 55° - 77° F Winter Range (December 1981-2010): 43° - 61° F At Cal Poly San Luis Obispo, CA. (NOAA National Climatic Data Center, viewed 2013)
	Geology Description	<p>Stenner Creek consists of steep pre-Quaternary non-infiltrative headwaters and a flat Franciscan low infiltrative valley – category #2.</p> <p>Reservoir Canyon Creek consists of steep moderately infiltrative early to mid-Tertiary headwaters and a flat pre-Quaternary moderately infiltrative valley – category #11.</p> <p>Prefumo Creek consists of steep moderately infiltrative early to mid-Tertiary headwaters; flat youngest Tertiary highly infiltrative valley – category #15. (Bell, personal communication, 2013)</p> <p>East Branch SLO Creek and Davenport Creek consist of flat Franciscan headwaters and flat Quaternary valley.</p> <p>Rock types in the SLO area are mainly comprised of volcanic, metavolcanics and mélanges of serpentinite and greywacke sandstone. These rocks are highly fractured and are part of the Mesozoic aged Franciscan Formation. Intrusive and extrusive volcanic deposits of Tertiary age and marine sedimentary deposits of the Miocene aged Monterey Formation are also found in the area. The most distinctive geomorphological feature of the San Luis Obispo area is the series of Tertiary aged volcanic plugs (remnants of volcanoes) which extend from the City of San Luis Obispo to Morro Bay. Hollister Peak, Bishop Peak, Cerro San Luis Obispo, Islay Hill and Morro Rock are all comprised of these volcanic plugs. (City of SLO, 2010)</p>
	Hydrology	
	Stream Gage	Yes; USGS 11142000 Steiner Creek near San Luis Obispo, CA (no data online for this site, inactive) (USGS NWIS, viewed 2013). Andrews Street at San Luis Obispo Creek (2001-present, active); Stenner Creek at Nipomo Street (2001 -present, active); Elks lodge bridge and San Luis Obispo Creek (2001 -present, active); Laguna Lake outflow at Madonna (2001 -present, active); East Fork at Jespersen Bridge (2001 -present, active) (SLOCountyWater.org, viewed 2013). City of SLO Los Osos Valley Road at San Luis Obispo

San Luis Obispo Creek Watershed

		<p>Creek (2004/5, status unknown) (Otte, personal communication, 2013).</p> <p>Historically, at least two stream gauges existed in the San Luis Obispo Creek Watershed that would have been capable of recording flood peaks. One was located on lower San Luis Obispo Creek near Avila, and the other was located on Upper San Luis Obispo Creek, in San Luis Obispo. Unfortunately, both of these gauges were put out of service in 1992. Since that time, the City of San Luis Obispo has re-installed a gauge on Upper San Luis Obispo Creek. However, there is no gauge record for the 1995 water year (Questa Engineering, County of San Luis Obispo, 2003 p C-19).</p>
	Hydrologic Models	Yes; Questa Engineering for San Luis Obispo Creek Watershed Waterway Management Plan, 2003.
	Peak Flow	19,800 cfs San Luis Obispo Creek above See Canyon (FEMA Flood Insurance Study, 1978); 22,000 cfs San Luis Obispo Creek at Squire Canyon (Questa/Zone 9 Model); "..., the Corps/Nolte/FEMA study used an actual recorded rainfall event (in this case, the January 19, 1973 event) to define a storm that theoretically represented the maximum precipitation possible for a given part of the watershed." (Questa Engineering, County of San Luis Obispo, 2003, pC-28).
	Base Flow	<p>No source identified for measured summer base flows.</p> <p>City of San Luis Obispo Wastewater Treatment Plant is required to discharge a minimum of 2.5 cfs into San Luis Obispo Creek.</p> <p>"A conservative estimate was made by assuming that base flow in the creek during a large storm would be similar to the base flow in the creek that was observed over the week following the storm of March 2, 1983. The average base flow for this time period, omitting days when rainfall occurred, was approximately 14 cms (500 cfs). Divided over the upstream area of 207 km² (80 mi²) this gives an average base flow rate of 0.067 cms/km² (6.3 cfs/mi²), which was then applied to each [of 61 individual] sub-basin [formed for the watershed model]. This base flow rate is significantly higher than the long term average winter-season flow rate in San Luis Obispo creek, and is intended to represent the base flow in the creek during a series of wet storms. It is much greater than any likely winter time releases from the City of San Luis Obispo Water Reclamation Facility, which discharges into San Luis Obispo Creek downstream from the Prado Road Bridge." (Questa Engineering, 2003, pC-8)</p>
	Flood Report	<p>Yes; San Luis Obispo Creek Waterway Management Plan (Questa Engineering, 2003).</p> <p>The City manages several flood by-pass channels along SLO Creek and Laguna Lake for flood control. (Otte, personal communication,</p>

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		<p>2013)</p> <p>Areas of flood risk include Highway 101 near Los Osos Valley Road (LOVR) and extends up Prefumo Creek to Calle Joaquin; San Luis Obispo Creek near Elks Lane; between Marsh Street and Madonna Road; San Luis Obispo Creek above Cuesta Park; across Santa Rosa Street and through a residential neighborhood toward Chorro Street and Old Garden Creek; East Fork of SLO Creek at Buckley Road. (Questa Engineering, 2003, p78-84)</p>
	Biological Setting	
	Vegetation Cover	<p>Primarily non-native grassland with some chaparral (chamise, leather oak, mixed serpentine), coastal scrub, coastal live oak forest, agricultural land and urban land. (SLO County, vegetation shapefile, 1990)</p> <p>SLO Creek is dominated by a willow (<i>Salix spp.</i>) riparian canopy with a mixture of oaks, sycamore, and cottonwood trees making up the rest of the native canopy. The understory consists of blackberry vines, coyotebrush, sage species, coffee berry, toyon, elderberry and a large number of ornamental non-native species (Questa Engineering, 2003).</p> <p>Limited current spatial data. No alliance level vegetation mapping was available for the entire County.</p>
	Invasive Species	<p><i>Arundo donax</i> (Giant Reed), <i>Delairea oderata</i> (Cape Ivy), poison hemlock (<i>Conium maculatum</i>), tree of heaven (<i>Ailanthus altissima</i>), several species of eucalyptus, and castor bean (<i>Ricinus communis</i>). Other various weeds including anise, cocklebur, yellow star thistle, milk thistle and Italian thistle (Land Conservancy, 2002). There are non-native palm trees and myoporum and other ornamental escapee's which have colonized the creek channel. Himalayan blackberry, kikuyu grass, vinca, pampas grass, French and Spanish broom, English ivy, and bullfrogs. (Otte, personal communication, 2013)</p> <p>Limited spatial data.</p>
	Special Status Wildlife and Plants	<p>Key: Federal endangered – FE, Federal threatened – FT, State endangered – SE, State threatened – ST, CDFW State Species of Concern – SSC, CA rare plant ranking – CRPR (CDFW CNDDDB, August 2013)</p>
	<p>Common Name</p> <p>Status</p>	<p style="text-align: center;">ARROYO GRANDE NE</p> <p style="text-align: center;">LOPEZ MTN</p> <p style="text-align: center;">PISMO BEACH</p> <p style="text-align: center;">PORT SAN LUIS</p> <p style="text-align: center;">SAN LUIS OBISPO</p>

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Animals					
<i>American badger</i>	SSC	x		x	x
<i>Atascadero June beetle</i>	Special Animal				x
<i>black legless lizard</i>	SSC			x	
California red-legged frog	FT	x	x	x	x
<i>coast horned lizard</i>	SSC	x		x	
<i>Coast Range newt</i>	SSC		x		x
<i>ferruginous hawk</i>	Special Animal (Wintering)				x
<i>foothill yellow-legged frog</i>	SSC		x		x
<i>globose dune beetle</i>	Special Animal			x	
<i>loggerhead shrike</i>	SSC (Nesting)	x			x
<i>monarch butterfly</i>	Special Animal			x	x
<i>pallid bat</i>	SSC				x
<i>prairie falcon</i>	Special Animal (Nesting)	x	x	x	x
<i>San Luis Obispo pyrg</i>	Special Animal		x		x
<i>sandy beach tiger beetle</i>	Special Animal			x	
<i>silvery legless lizard</i>	SSC		x		
steelhead - south/central California coast DPS	FT	x	x	x	x
tidewater goby	FE			x	
vernal pool fairy shrimp	FT			x	x
<i>western mastiff bat</i>	SSC				x

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<i>western pond turtle</i>	SSC	x	x	x	x
western snowy plover	FT			x	
<i>western yellow-billed cuckoo</i>	Federal Candidate; SE				x
<i>white-tailed kite</i>	Fully Protected		x		x
Plants/Lichen					
adobe sanicle	SR				x
<i>Arroyo de la Cruz manzanita</i>	CRPR 1B.2				x
beach spectaclepod	ST	x		x	
<i>Betty's dudleya</i>	CRPR 1B.2				x
<i>black-flowered figwort</i>	CRPR 1B.2	x		x	
<i>Blochman's dudleya</i>	CRPR 1B.1			x	x
<i>Blochman's leafy daisy</i>	CRPR 1B.2			x	
<i>Brewer's spineflower</i>	CRPR 1B.3	x	x	x	x
<i>Cambria morning-glory</i>	CRPR 4.2	x	x	x	x
<i>chaparral ragwort</i>	CRPR 2B.2		x		x
Chorro Creek bog thistle	FE; SE		x	x	x
<i>Congdon's tarplant</i>	CRPR 1B.1	x		x	x
Cuesta Pass checker-bloom	SR				x
<i>Cuesta Ridge thistle</i>	CRPR 1B.2		x		x
<i>dune larkspur</i>	CRPR 1B.2		x		
<i>dwarf soaproot</i>	CRPR 1B.2		x		x

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<i>Eastwood's larkspur</i>	CRPR 1B.2	x	x		x	x
<i>Hoover's bent grass</i>	CRPR 1B.2	x	x	x	x	
<i>Hoover's button-celery</i>	CRPR 1B.1			x		x
Indian Knob mountain-balm	FE; SE			x		
<i>Jones' layia</i>	CRPR 1B.2		x	x		x
<i>La Panza mariposa-lily</i>	CRPR 1B.3			x		x
marsh sandwort	FE; SE	x		x		
<i>mesa horkelia</i>	CRPR 1B.1	x		x		x
<i>Miles' milk-vetch</i>	CRPR 1B.2					x
Morro manzanita	FT			x	x	x
<i>most beautiful jewel-flower</i>	CRPR 1B.2		x		x	x
<i>mouse-gray dudleya</i>	CRPR 1B.3	x	x	x		x
<i>Palmer's monardella</i>	CRPR 1B.2		x			x
<i>Pecho manzanita</i>	CRPR 1B.2		x	x	x	
Pismo clarkia	FE; SR	x		x		
<i>saline clover</i>	CRPR 1B.2					x
<i>San Benito fritillary</i>	CRPR 1B.2					x
<i>San Luis mariposa-lily</i>	CRPR 1B.2	x	x	x		x
<i>San Luis Obispo owl's-clover</i>	CRPR 1B.2		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		x

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	<i>San Luis Obispo sedge</i> <hr/> <i>Santa Lucia manzanita</i> <hr/> <i>Santa Margarita manzanita</i> <hr/> <i>straight-awned spineflower</i> <hr/> <i>surf thistle</i>	<p>CRPR 1B.2</p> <hr/> <p>CRPR 1B.2</p> <hr/> <p>CRPR 1B.2</p> <hr/> <p>CRPR 1B.3</p> <hr/> <p>ST</p> <hr/>	<p>X</p> <p>X X</p> <p>X X X X X</p> <p>X</p> <p>X X</p>	<p>X</p> <p>X</p> <p>X</p>
	Steelhead Streams	<p>Limited by the type of data collected in the CA Natural Diversity Database.</p> <p>San Luis Obispo Creek, San Miguelito (See Canyon) Creek, Froom Creek, Prefumo Creek, Stenner Creek, Brizzolari Creek, Unnamed tributary (NMFS, 2005). Dry Creek, Acacia Creek, Reservoir Canyon (Otte, personal communication, 2013).</p>		
	Stream Habitat Inventory	<p>Yes; Completed in 1995 by Paul Cleveland on mainstem San Luis Obispo Creek. (Land Conservancy, 2002)</p> <p>Limited data that does not include major tributaries. Last data collected in mid 1990's.</p>		
	Fish Passage Barriers	<p>Cuesta Park Fishway at Concrete Ford on SLO creek, Temporary Barrier, PAD # 700062.00000; Golf cart route on Prefumo Creek, Temporary Barrier, PAD # 700045.00000; Los Osos Valley Road Culvert and ladder on Prefumo Creek, Temporary Barrier, PAD # 700046.00000; Stenner Creek Road Bridge Apron on Stenner Creek, Temporary Barrier, PAD # 700069.00000; Railroad Crossing Culvert at Stenner Creek, Total Barrier, PAD # 700071.00000; Highland Drive Dam at Stenner Creek, Partial Barrier, PAD # 700072.00000; Cheda Reservoir Diversion Dam for Reservoir, Temporary Barrier, PAD # 700073.00000; Stenner Glen Dam at Stenner Creek, Temporary Barrier, PAD # 700074.00000; Cormorant Way Marre Dam and Denil Ladders at SLO Creek, Temporary Barrier, PAD # 700056.00000;</p> <p>Stagecoach rd. bridge apron on SLO creek, Temporary Barrier, PAD # 700057.00000; Reservoir Canyon Dam, Total Barrier, PAD # 700060.00000; End of Oceanair Blvd. Drop structure at Prefumo Creek, Temporary Barrier, PAD # 700049.00000; Rip Rap dam at Laguna Lake Golf Course on Prefumo Creek, Temporary Barrier, PAD # 700051.00000; Concrete Dam at Stenner Creek, Temporary Barrier, PAD # 707022.00000; Hwy 227 Culvert at Davenport Creek, Unknown Status, PAD # 731372.00000; Highland Drive Fish Ladder at Brizzolari Creek, Partial Barrier, PAD # 707004.00000; Blacksmith Road Culvert at Brizzolari Creek, Temporary Barrier, PAD # 707005.00000; Culvert at Poly Canyon rd. on Brizzolari Creek, Temporary Barrier, PAD # 707006.00000; Concrete Spillway at Laguna lake on Prefumo Creek, Unknown Status, PAD #</p>		

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		707014.00000; Rock Weir at Laguna Lake Golf Course, Unknown Status, PAD # 707015.00000; Hwy 101 Culvert at Castro Canyon, Unknown Status, PAD # 731538.00000; Hwy 101 Culvert at SLO creek, Unknown status PAD #731909.00000; Hwy 101 culvert at Stenner Creek, Unknown Status PAD #731962.00000; Hwy 101 culvert at Froom Creek, Unknown Status PAD # 732077.00000; Marsh St. Culvert on SLO creek, Partial Barrier, PAD # 712028.00000; Murray St. on Stenner Creek, Temporary Barrier, PAD # 712030.00000; Stenner Creek Rd. Bridge at Stenner Creek, Partial Barrier, PAD # 712031.00000; Unnamed Cal poly road at Brizzolari Creek, Total Barrier, PAD # 712037.00000; Black Walnut Road at See Canyon Creek, Total Barrier, PAD # 712038.00000; Santa Fe. Rd at Dry Creek, Total Barrier, PAD # 712047.00000; Diversion Weir at Stenner Creek, Unknown Status, PAD # 707023.00000; Black Walnut Road at See Canyon Creek, Partial Barrier, PAD # 712039; Fish Passage Facility at Loomis St. on SLO creek, Temporary Barrier, PAD # 700062. (CDFW Passage Assessment Database, 2013)
	Designated Critical Habitat	Yes; Steelhead Trout and California red-legged frog (USFWS Critical Habitat Portal, viewed 2013)
	Habitat Conservation Plans	None. (USFWS Critical Habitat Portal, viewed 2013)
	Other Environmental Resources	Critical Coastal Area, San Luis Obispo Greenbelt Program, Nine Sisters of San Luis Obispo, Cuesta Ridge Botanical Area, Serpentine outcrops and related endemic species
	Land Use	
	Jurisdictions & Local Communities	City of San Luis Obispo; unincorporated Avila Beach; Avila Beach Community Service District; Port San Luis Harbor District
	% Urbanized	25% (15.27% urban, 2.22% commercial, industrial and public facility, 7.69% residential) (SLO County LUC)
	% Agricultural	49% (SLO County LUC)
	% Other	26% (4.07% open space, 20.3% rural lands, 1.67% recreation)(SLO County LUC)
	Planning Areas	San Luis Obispo, San Luis Bay Inland, San Luis Bay Coastal, Salinas River, Los Padres
	Potential growth areas	Los Ranchos/Edna Village area; Margarita Area; Orcutt Area; Airport Area (City of San Luis Obispo Specific Plans,) and the Dalidio Ranch (County of San Luis Obispo Land Use Ordinance, 2013)
	Facilities Present	San Luis Obispo Wastewater Treatment Plant with discharge to San Luis Obispo Creek; Country Club Wastewater Treatment Plant; Avila Beach Wastewater Treatment Plant with discharge to the ocean; Stenner Creek Water Treatment Plant; San Miguelito Mutual Water Company percolation beds; other private water systems; San Luis Obispo County Regional Airport; San Luis Obispo Tank Farm; former Avila Tank Farm; Harford Pier; Avila Pier.

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	Commercial Uses	Agricultural production, recreation and tourism in City of San Luis Obispo and community of Avila Beach; golf courses; wineries in Edna Valley; regional airport; commercial and sport fishing at Harford Pier in Port San Luis, Froom Ranch Pit for Stone, Alberti Ranch Quarry for stone. (SLO County, extractive resources)
	Demographics	
	Population	56,220 in watershed (US Census Block, 2010) San Luis Obispo: 45,119 in City (US Census, 2010); Avila Beach: 1,627 in Avila Beach (US Census, 2010)
	Race and Ethnicity	Watershed: 42,827 or 76.2% white, 3198 or 5.7% Asian, 1.7% other, 1701 or 3% two or more, 7636 or 13.6% Latino. San Luis Obispo: Caucasian, representing 75.8%. Latinos represent 14.7% of the total population in Grover Beach. The remaining races each represent less than 5%, including African American, American Indian, Pacific Islander, and Asian(US Census, 2010). Avila Beach: Caucasian, representing 88.7%. Latinos represent 6.8% of the total population in Grover Beach. The remaining races each represent less than 2%, including African American, American Indian, Pacific Islander, and Asian(US Census, 2010).
	Income	MHI \$55,352 in watershed (US Census Tract, 2010) MHI \$42,528 in San Luis Obispo (US Census, 2010) Census tracts cross multiple watersheds.
	Disadvantaged Communities	Yes; 7% of individuals are below poverty level in watershed. 31.5% of individuals are below poverty level in San Luis Obispo. Census tracts cross multiple watersheds.
	Water Supply	
	Water Management Entities	City of San Luis Obispo, Avila Beach Community Services District, San Luis Obispo County Flood Control and Water Conservation District, Zone 3 (to CSA 12).
	Groundwater	Yes; alluvial and San Luis Obispo Valley (SLO County, 2012)
	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	Yes; State Water Project and County Service Area 12 (Avila CSD, viewed 2013); South San Luis Water Corporation to Avila Beach (Avila CSD, 2013); from Salinas Reservoir in Santa Margarita; from Whale Rock in Cayucos; from Nacimiento Reservoir near Paso Robles. (City of SLO, 2013)
	Recycled/ Desalinated Water	Yes; Recycled water is produced from San Luis Obispo Wastewater Treatment Plant. At build out, the system will provide its customers approximately 1,000 acre feet per year of recycled water (City of

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		SLO, viewed 2013)
	Infiltration Zones	<p>The alluvial deposits are underlain by hard Franciscan rocks, which are exposed in the lower creek banks and creek bed in the northern part of the City, and by reddish brown siltstones, claystones, and conglomerate of the Paso Robes Formation (older Pleistocene) throughout much of the central and southern part of the City. This weakly to moderately consolidated rock is also exposed in the channel bottom and lower bank slopes along much of the middle reaches of SLO Creek, and along the southern side of Los Osos Valley. Locally it may form a subsurface barrier or retardance layer to water infiltration and groundwater recharge (Questa Engineering, SLO Waterway Management Plan, 2003 p14).</p> <p>Limited data.</p>
	Water Budget	None to date.
	Water Uses	
	Beneficial Uses	<p><i>SLO Creek above W. Marsh St.</i> – 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).</p> <p><i>SLO Creek below W. Marsh St.</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), Migration of Aquatic Organisms (MIGR), Spawning, Reproduction, and/or Early Development (SPWN).</p> <p><i>SLO Creek East Fork</i>– 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), 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).</p> <p><i>Stenner Creek</i> – Municipal and Domestic Supply (MUN), Agricultural</p>

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		<p>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), 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).</p> <p><i>Prefumo Creek</i> – 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), 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).</p> <p><i>SLO 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) (RWQCB, 2011)</p>
	Other Unique Characteristics	
	Historical Resources	A number of buildings in the City of San Luis Obispo are on the National Register of Historic Places. (NRHP, viewed 2013)
	Archeological Resources	At least one Chumash towns named Tsipxatu was in the watershed at European settlement . (SB Natural History Museum, 2013)
	Other	Limited data. No source identified.
	Climate Change Considerations	
		<p>State climate change maps show sea level affecting portions of the town of Avila Beach with inundation along the lower reach of San Luis Obispo Creek (USGS,Cal-Adapt, viewed 2013).</p> <p>See IRWMP, 2014 Section H. Climate Change</p> <p>Limited data and not watershed specific.</p>

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Watershed Codes

Calwater / DWR Number	HA	Hydrologic Area Name	HSA	Hydrologic Sub-area Name	SWRCB Number	CDF Super Planning	CDF Watershed Name
3310.240103	2	Point Buchon	4	San Luis Obispo Creek	310.24	Upper San Luis Obispo Creek	Stenner Lake
3310.240101	2	Point Buchon	4	San Luis Obispo Creek	310.24	Upper San Luis Obispo Creek	Reservoir Canyon
3310.240102	2	Point Buchon	4	San Luis Obispo Creek	310.24	Upper San Luis Obispo Creek	Laguna Lake
3310.240202	2	Point Buchon	4	San Luis Obispo Creek	310.24	Lower San Luis Obispo Creek	Perfumo Canyon
3310.240201	2	Point Buchon	4	San Luis Obispo Creek	310.24	Lower San Luis Obispo Creek	See Canyon
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.
- By 1846 mission lands were transferring to private ownership establishing land grants or ranchos.
- In 1897, Laguna Lake was smaller in size, with open water and a large wetland surrounding it.
- In 1884, Southern Pacific Railroad completed its line from San Francisco to San Luis Obispo.
- In 1897, a large tidal marsh was present to the east of the lagoon [estuary], under present location of western Avila Beach. At that time the lagoon mouth was substantially larger and wider (about 1/3 larger than current size). (SLO WaterwayMP, 2003).
- Damaging floods have occurred in 1868-62, 1884, 1897, 1911, 1948, 1952, 1962, 1969, 1973, 1983, 1995, and 1998. (SLO County FCWCD, 2009)
- In 1911, Stage Coach Dam and Reservoir Canyon Dam were constructed for water supply.
- In 1926, a lightning strike caused fire at the Union Oil Tank Farm sending a stream of burning oil down East Branch Creek to San Luis Obispo Creek and to the ocean.

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- In the 1950's through today numerous sections of creek were straightened removing natural meanders.
- In 1960's Prefumo Creek was rerouted into Laguna Lake which was expanded to outlet under Madonna Road.
- In 1969 the Luigi Marre Land and Cattle Company constructed a dam across the lower SLO Creek to halt saltwater intrusion.
- In early 1970's flood control levees were constructed along various sections of channel.
- In 1977, the San Luis Obispo Creek lagoon is constrained by Avila Bay Drive, similar to its present configuration.
- In 1994, the Avila Beach Golf Course displaced the historic meander loop and sand bar. It appears that the original migration of the bend to the north was natural but golf course construction made significant alterations.
- In 1994, a major fire burned portion of the Upper Stenner, Brizzolari and SLO Creeks west of Cuesta pass.
- The 1995 Flood was reportedly caused by the wettest three month period in 116 years of record.
- In 1996, the Natural Resources Program is formed at the City of San Luis Obispo. Habitat improvements, barrier removal, invasive species control, erosion control, open space protection and acquisition.

Watershed Health by Major Tributary

Tributary Name	Ephemeral / Perennial	303d Listed/ TMDLs	Pollution Sources	Environmental Flows
San Luis Obispo Creek (below Osos Street)	Perennial	Yes on 303d list for Chloride, Chlorpyrifos, Nitrate, Nutrients, Pathogens, Sodium. Approved USEPA TMDLs for Pathogens in 2004, for Nutrients in 2007 and for Nitrates in 2007. TMDL estimated date of completion 2021. (SWRCB, 2010)	Agriculture, Grazing Related, Natural, Major Municipal Point Source, Transient Encampments, Urban Runoff, Upstream Impoundment (SWRCB, 2010)	X Cfs (Stillwater Sciences, 2013)
San Luis Obispo		Yes on 303d list	Unknown (SWRCB,	

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Tributary Name	Ephemeral / Perennial	303d Listed/ TMDLs	Pollution Sources	Environmental Flows
Creek (above Osos Street)		for Fecal Coliform. TMDL estimated date of completion 2021. (SWRCB, 2010)	2010); Pigeons, Transients, Cattle grazing, Natural sources, Urban Runoff (Otte, personal communication, 2013)	
Stenner Creek	Partially Perennial	Yes on 303d list for Fecal Coliform. TMDL estimated date of completion 2021. (SWRCB, 2010)	Agriculture, Grazing Related, Natural, Urban Runoff (SWRCB, 2010)	
Davenport Creek	Ephemeral	No. (SWRCB, 2010)	Undetermined.	
East Fork San Luis Obispo Creek	Ephemeral	No. (SWRCB, 2010)	Undetermined.	
Prefumo Creek	Partially Perennial	Yes on 303d list for Fecal Coliform, Low Dissolved Oxygen, Nitrate, Turbidity. TMDL estimated date of completion 2021. (SWRCB, 2010)	Agriculture, Urban Runoff, Unknown (SWRCB, 2010); Grazing related, Transients (Freddy Otte, 2013, personal communication)	
See Canyon/ San Miguelito Creek	Perennial	No. (SWRCB, 2010)	Undetermined.	

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 Basin	6,000 AFY (SLO County, Master Water Report, 2012)	See sub-basins. (SLO County, Master Water Report, 2012)	See sub-basins. (SLO County, Master Water Report, 2012)	No. (RWQCB, Table 3-8, 2011)
San Luis	2,000 AFY (DWR,	Physical limitations,	Yes; see	No objective for

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Groundwater Basin	Estimated Safe Yield	Water Availability Constraints	Drinking Water Standard Exceedance	Water Quality Objective Exceedance
Obispo Valley – San Luis Valley Subbasin	1997) (SLO County, Master Water Report, 2012)	water quality issues, and environmental demand. (SLO County, Master Water Report, 2012)	description below. (SLO County, Master Water Report, 2012)	sub-basin. (RWQCB, Table 3-8, 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 objective for sub-basin. (RWQCB, Table 3-8, 2011)
San Luis Obispo Valley – Avila Valley Subbasin	No basin yield numbers have been published (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 objective for sub-basin. (RWQCB, Table 3-8, 2011)

Groundwater Quality Description: Water quality problems vary by location within the [San Luis Valley sub-basin, with nitrates, salinity, hardness, and perchloroethylene (PCE) historically being the constituents of greatest concern. PCE contamination was a major issue for two wells used by the City of San Luis Obispo during the period from 1987-91. Two high capacity wells were also shut down in the 1990's due to elevated nitrate concentrations. Hardness and TDS/chloride are more of a concern in the airport area (Cleath, T. S., 1987, 1988; Boyle, 1991). (SLO County Public Works Master Water Report, 2012)

The general mineral character of groundwater in the Edna Valley sub-basin 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). (SLO County Public Works Master Water Report, 2012)

The alluvium [in the Avila Valley sub-basin] extends out to the ocean but the fresh water portion of the alluvium is upstream of the Marre weir at San Luis Bay Estates. Prior to installation of this weir in the early 1970's, seawater intrusion had occurred as far up the valley as the confluence with See Canyon Creek. Since the installation of the weir and with the supplemental flow from the City of San Luis Obispo wastewater treatment plant, there has not been any seawater intrusion documented upstream of the weir. General mineral character in the alluvial groundwater upstream of the Marre weir is sodium-magnesium bicarbonate, with TDS concentrations averaging close to 700 mg/l in the late 1970's (J.M. Montgomery, 1982). (SLO County Public Works Master Water Report, 2012)

San Luis Obispo Creek Watershed

Primary Issues

Issue	Potential Causes	Referenced from
Riparian Vegetation / Buffer Quality (Lack of riparian canopy)	Removal of riparian vegetation by landowners and livestock,	Land Conservancy, 2002
Surface Water Nutrients and Dissolved Oxygen	Agriculture, municipal, lack of riparian canopy	Land Conservancy, 2002
Surface Water Temperature	Lack of riparian canopy	Land Conservancy, 2002
Surface Water Pathogens	Described in TMDL for Pathogens (RWQCB, 2004)	Land Conservancy, 2002
Surface Water Treated Effluent	City of San Luis Obispo's Wastewater Facility discharged	Land Conservancy, 2002
Surface Water Priority Organics	Unknown	Land Conservancy, 2002
Surface Water Quantity	Natural, diversions (permitted and unpermitted), evaporation, and exotic plants	Land Conservancy, 2002
Instream Fish Habitat	Lack of riparian canopy and instream shelter, sedimentation of stream cobble	Land Conservancy, 2002
Fish Passage Barriers	Roads, culverts, other instream structures	Land Conservancy, 2002
Streambank Stability (Erosion)	Development encroachment, channel incision, vegetation removal, overgrazing, agriculture, roads and utility construction	Land Conservancy, 2002 and Questa Engineering, 2003
Upland Erosion and Sedimentation	Vegetation removal, intensified grazing, unpaved roads, and disturbance associated with construction	Land Conservancy, 2002
Exotic Plant Species	None identified.	Land Conservancy, 2002
Non-Native Fish – Carp and Chinook Salmon	None identified.	Land Conservancy, 2002
Debris Accumulation	garbage, residential, commercial and agricultural products	Land Conservancy, 2002
Flooding	Natural, increased impervious areas, encroachment on floodplain	Questa Engineering, 2003

San Luis Obispo Creek Watershed

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.

San Luis Obispo Creek Watershed

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Pismo Creek Watershed

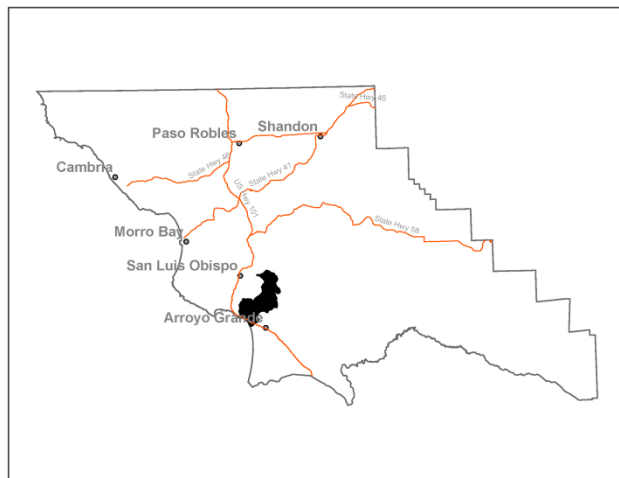
Hydrologic Unit Name	Water Planning Area	Total Acres	Flows to	Groundwater Basin(s)	Jurisdictions
Estero Bay HU 10	South Coast WPA 7	26,030 acres	Pacific Ocean	San Luis Obispo Valley	County of San Luis Obispo City of Pismo Beach



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 and 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)

Pismo Creek Watershed

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	No source identified for measured peak flows. 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

Pismo Creek Watershed

		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, chaparral (ceanothus, buck brush, mixed serpentine), mixed evergreen forest, black sage and urban land.(SLO County, vegetation shapefile, 1990)</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: Federal endangered – FE, Federal threatened – FT, State endangered – SE, State threatened – ST, CDFW State Species of Concern- SSC, CA rare plant ranking – CRPR (CDFW CNDDDB, viewed August 2013)</p>
	<p>Common Name</p> <hr/> <p>Animals</p>	<p>Status</p> <p style="text-align: center;">ARROYO GRANDE NE</p> <p style="text-align: center;">LOPEZ MTN</p> <p style="text-align: center;">PISMO BEACH</p>

Pismo Creek Watershed

<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>	Special Animal			x
<i>monarch butterfly</i>	Special Animal			x
<i>prairie falcon</i>	Special Animal (Nesting)	x	x	x
<i>San Luis Obispo pyrg</i>	Special Animal		x	
<i>sandy beach tiger beetle</i>	Special Animal			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

Pismo Creek Watershed

<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	
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 Creek Watershed

	<i>Pismo clarkia</i> <i>saline clover</i>	FE; SR	x	x
		CRPR 1B.2		
	<i>San Luis</i> <i>mariposa-lily</i>		x	x
		CRPR 1B.2		
	<i>San Luis</i> <i>Obispo</i> <i>County lupine</i>		x	x
		CRPR 1B.2		
	<i>San Luis</i> <i>Obispo owl's-</i> <i>clover</i>		x	x
		CRPR 1B.2		
	<i>San Luis</i> <i>Obispo sedge</i>			x
		CRPR 1B.2		
<i>Santa Lucia</i> <i>manzanita</i>			x	
	CRPR 1B.2			
<i>Santa</i> <i>Margarita</i> <i>manzanita</i>		x	x	
	CRPR 1B.2			
<i>straight-</i> <i>awned</i> <i>spineflower</i>		x		
	CRPR 1B.3			
<i>surf thistle</i>	ST	x	x	
Limited by the type of data collected in the CA Natural Diversity Database.				
	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>		

Pismo Creek Watershed

	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)
	% 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	

Pismo Creek Watershed

	Water Management Entities	<p>City of Pismo Beach. No source identified.</p> <p>“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.”</p> <p>(Draft Los Ranchos Village Plan, 2013)</p> <p>Limited data identified.</p>
	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 of Pismo Beach, 2013)
	Recycled/Desalinated Water	None in the City of Pismo Beach. No source identified.
	Infiltration Zone	<p>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.</p> <p>(Balance Hydrologics, 2008)</p> <p>Limited data.</p>
	Water Budget	None to date. One is planned by Central Coast Salmon Enhancement for completion in 2015.
	Water Uses	
	Beneficial Uses	<p><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).</p> <p><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</p>

Pismo Creek Watershed

		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.
	Other	No source identified.
	Climate Change Considerations	
		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). See IRWMP, 2014 Section H. Climate Change Limited data and 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
3310.260005	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)

Pismo Creek Watershed

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
- 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)	X Cfs (Stillwater Sciences, 2013)
West Corral de Piedra	Ephemeral?	No.	Undetermined.	
East Corral de Piedra	Ephemeral?	No.	Undetermined.	
Canada Verde	Perennial?	No.	Undetermined.	

Pismo Creek Watershed

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

Pismo Creek Watershed

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.

Pismo Creek Watershed

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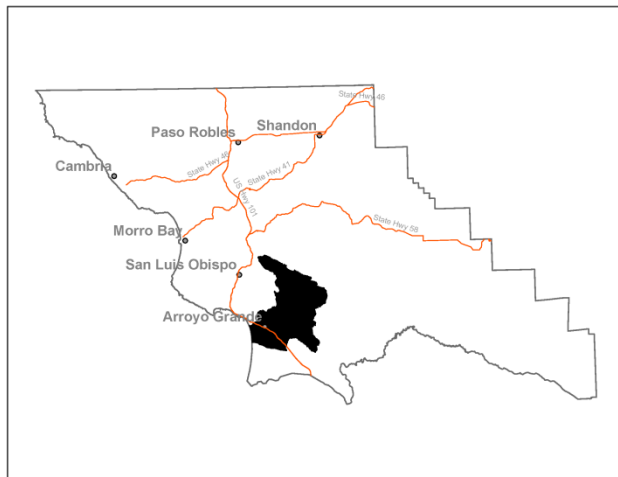
Arroyo Grande Creek Watershed

Hydrologic Unit Name	Water Planning Area	Acreage	Flows to	Groundwater Basin(s)	Jurisdictions
Estero Bay HU 10	South Coast WPA 7	95,998 acres	Pacific Ocean	Santa Maria River Valley; Arroyo Grande Creek; Edna Valley	County of San Luis Obispo City of Arroyo Grande City of Grover Beach Community of Oceano Los Padres National Forest Pismo State Beach



Description:

The Arroyo Grande Creek Watershed is a coastal basin located in southern San Luis Obispo County. The drainage rises to a maximum elevation of approximately 3,100 feet above sea level. The watershed includes the tributaries of Tally Ho (Corbett), Tar Springs and Los Berros Creeks. Meadow Creek is a remnant marsh drainage system that enters Arroyo Grande Creek, just upstream of the confluence with the ocean. Arroyo Grande Creek empties into an estuary adjacent to the Oceano lagoon.



The watershed is dominated by agricultural land uses including vineyards, ranches and row crops. The urban core of the City of Arroyo Grande is at the confluence of Tally Ho Creek with Arroyo Grande Creek. Other land uses include Lake Lopez Reservoir and a regional airport in Oceano.

Watershed Plans:

Arroyo Grande Creek Watershed Management Plan (CCSE, 2009)

Arroyo Grande Creek Watershed

Characteristics:

	Physical Setting	
Green	Rainfall	15 – 28 inches (NRCS, 2010)
Yellow	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 in watershed.</p>
Green	Geology Description	<p>The Arroyo Grande Creek, Carpenter Creek, Tar Springs Creek, and Vasquez Creek sub watersheds consist of steep moderately infiltrative early to mid-Tertiary headwaters – category # 8.</p> <p>The Wittenberg Creek sub watershed consists of steep pre-Quaternary, non-infiltrative headwaters with steep moderately infiltrative early to mid-Tertiary valley-category # 5.</p> <p>The Los Berros Creek sub watershed consists of steep pre-quaternary non-infiltrative headwaters with a flat highly infiltrative Quaternary valley-category # 3. (Stillwater Sciences, 2013)</p> <p>The Arroyo Grande Creek watershed lies at a structural and geomorphic transition between the north-northwest trending Coast Ranges and the west trending Transverse Ranges and has been described by Nitchman (1988) and Namson and Davis (1990) as an active fold and thrust belt. The lower watershed occurs within a geomorphic province known as the Pismo Basin that is bound on the northeast by the West Huasna Fault Zone and on the southwest by the Santa Maria River Fault Zone. The Wilmar Avenue Fault Zone also dissects the lower watershed, running parallel to the Highway 101 corridor. The lower watershed is primarily underlain by sedimentary and volcanic rocks from the Cenezoic age though portions of the watershed in the vicinity of Lopez Dam are melange and serpentine rocks from the Franciscan Formation. The sedimentary or pyroclastic nature and relatively young age of much of the underlying bedrock material results in the presence of highly erodible, friable material that is unconsolidated and easily weathered. Dune formations and extensive alluvial deposits in the valley floor of the mainstem and tributary channels also results in high erosion potentials. The alluvium primarily consist of unconsolidated, poorly bedded, poorly sorted to sorted sand, gravel, silt, and clay, with cobbles and boulders.(Swanson Hydrology &Geomorphology, 2004)</p> <p>Water supply aquifers are within Holocene alluvial deposits in Arroyo Grande Valley, which is drained by Arroyo Grande Creek. The alluvial deposits reach approximately 100 feet thick (DWR, 2002). Recharge</p>

Arroyo Grande Creek Watershed

		to the subbasin comes primarily from seepage from Arroyo Grande Creek (including Lopez Reservoir releases) and tributaries, deep percolation of precipitation, and residential/agricultural return flows. (Master Water Plan, 2012)
	Hydrology	
	Stream Gage	Yes; USGS 11141280 at Lopez Creek near Arroyo Grande (1967 - present, active) and USGS/County 11141500 Arroyo Grande Creek at the City of Arroyo Grande (1940 – 1986 by USGS 1986 - present by County, active). The County has total of 9 active stream flow gages in the watershed. There are 5 USGS stream gage stations discontinued (Stetson Engineering, 2004).
	Hydrologic Models	Yes; Swanson Hydrology & Geomorphology used a HEC-RAS to study the flood control channel in 2005. The County Public Works Department uses a model to plan.
	Peak Flow	4,620 - 5,400 cfs at USGS 11141500 (1940-1986, change in management to County) (USGS, viewed 2013). The 100 year discharge estimates are 19,500 cfs (Swanson Hydrology & Geomorphology, 2005).
	Base Flow	11 – 19 cfs at USGS 11141500 (1940 – 1986, change in management to County) (USGS viewed 2013) It is unknown whether gage was placed to capture base flows accurately. Many stream gages are installed as alert systems for peak flows.
	Flood Reports	Yes; Arroyo Grande Creek Erosion, Sedimentation and Flood Alternatives Study (Swanson Hydrology & Geomorphology, 2006); Arroyo Grande Creek Channel Waterway Management Plan (Waterways Consulting, 2010) The County manages Zone 1/1A Flood Control and Water Conservation District along the lower Arroyo Grande Creek including the channel and associated levees and flap gates for flood protection. (SLOCountyWater.org, viewed 2013)
	Biological Setting	
	Vegetation Cover	Primarily non-native annual grassland, chaparral (chamise, buck brush, and redshanks), and coast live oak forest with some sage scrub, central coastal scrub, beaches and coastal dune, agricultural land, and urban land. (SLO County vegetation shapefile, 1990) Limited spatial data. No alliance level vegetation mapping was available for the entire County.
	Invasive Species	Largemouth bass, Black Crappie, Green Sunfish, English ivy, Cape ivy, <i>Arundo donax</i> , pampas grass, castor bean, and bullfrog. (CCSE, 2009 and Cindy Cleveland, personal communication, 2013) Limited data and no spatial data.

Arroyo Grande Creek Watershed

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. (CDFW CNDDDB, August viewed 2013)

Common Name	Status	ARROYO GRANDE NE	CALDWELL MESA	LOPEZ MTN	NIPOMO	OCEANO	SANTA MARGARITA LAKE	TAR SPRING RIDGE
Animals								
<i>arroyo chub</i>	SSC							x
California condor	FE; SE						x	x
California red-legged frog	FT	x			x	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>mimic tryonia (=California brackish water snail)</i>	Special Animal					x		
<i>monarch butterfly</i>	Special Animal					x		
<i>Oso Flaco flightless moth</i>	Special Animal					x		
<i>Oso Flaco robber fly</i>	Special Animal					x		
<i>prairie falcon</i>	Special Animal (Nesting)	x	x	x	x	x	x	x
steelhead - south/central California coast DPS	FT	x			x	x		x
<i>western pond turtle</i>	SSC	x				x		

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	<i>San Luis Obispo County lupine</i>	CRPR 1B.2		x			x
	<i>San Luis Obispo monardella</i>	CRPR 1B.2				x	
	<i>San Luis Obispo owl's-clover</i>	CRPR 1B.2		x			
	<i>sand mesa manzanita</i>	CRPR 1B.2				x	
	<i>Santa Lucia manzanita</i>	CRPR 1B.2		x		x	
	<i>Santa Margarita manzanita</i>	CRPR 1B.2		x			x
	<i>straight-awned spineflower</i>	CRPR 1B.3		x			
	<i>umbrella larkspur</i>	CRPR 1B.3				x	x
		Data is limited by the CA Natural Diversity Database.					
	Steelhead Streams	Yes; Arroyo Grande Creek. (NMFS, 2012) Los Berros (CEMAR, 2008). There are rainbow trout populations above Lopez Dam (CEMAR, 2008)					
	Stream Habitat Inventory	Yes; Completed 2004 for Arroyo Grande Creek as landowner access allowed by California Conservation Corps. None completed for other tributaries. (CCSE, 2009)					
		Data limited to mainstem.					
	Fish Passage Barriers	Modify County Stream Gage at stream mile 4.98; Replace Cecchetti Road Culvert at steam mile 8, Temporary Barrier, PAD # 700030.00000; Modify Abandoned Dam at stream mile 9.5; Modify Concrete Dam at stream mile 5.82; Remove Debris at Huasna Road; Modify Los Berros Creek Gage at stream mile 5.6; Replace Los Berros Creek Culvert; Modify Tar Springs Creek Road Crossing at stream mile 0.5; Replace Biddle Park Culvert at stream mile 10.9, Temporary Barrier, PAD # 707002.00000; Hwy 101 culvert at Meadow Creek, Unknown Status, PAD # 732175.00000; Little Falls Natural Falls, Total Barrier, PAD # 735375.00000; Big Falls Canyon, Total Barrier, PAD # 735376.00000; Big falls Canyhon upper falls, Total Barrier, PAD # 735377.00000; Beaver Dam at Arroyo Grande Creek, Temporary Barrier, PAD # 736888.00000; Rip-Rap dam at Arroyo Grande Creek, Unknown Status, PAD # 736890.00000; Concrete dam at Arroyo Grande Creek, Partial Barrier, PAD # 736891.00000; Concrete Grade Control weir at Arroyo Grande Creek, Temporary Barrier, PAD # 736893.00000; Los Berros Creek rd. crossing/ gauging station at Los					

Arroyo Grande Creek Watershed

		berros creek, Temporary Barrier, PAD # 736894.00000; Low Flow Concrete Structure at Branch Mil Rd. on Tar Springs Creek, Total barrier, PAD # 736895.00000; Culvert Replacement at Los Berros Creek, Partial barrier, PAD # 736896.00000; Dam at Lopez drive on Arroyo Grande Creek, Temporary Barrier, PAD # 718830; Road Crossing at Valley Road and Los Berros Creek, Partial Barrier, PAD # 712029. (CDFW Passage Assessment Database, viewed 2013 and CCSE, 2009)
	Designated Critical Habitat	Yes; South-Central California Coast Steelhead Trout , California Condor, California red-legged frog, La Grasiola thistle, Western snowy plover (USFWS Critical Habitat Portal, viewed 2013)
	Habitat Conservation Plans	Yes; In development by County of San Luis Obispo for California red-legged frog and Steelhead trout along mainstem Arroyo Grande Creek. (USFWS Critical Habitat Portal, viewed 2013)
	Other Environmental Resources	Coastal Zone, Lopez Lake, Santa Lucia Wilderness, Los Padres National Forest, Oceano Dunes, Dunes Lakes
	Land Use	
	Jurisdictions and Local Communities	City of Arroyo Grande, City of Grover Beach, Town of Oceano
	% Urbanized	17.6% (6.1% urban and 11.1% residential with less than 1% commercial, industrial and public facilities) (SLO County LUC).
	% Agricultural	45.6% (SLO County LUC)
	% Other	36.8% (17.91% open space, 5.02% recreation, and 13.82% rural lands) (SLO County LUC).
	Planning Areas	San Luis Bay Coastal, San Luis Bay Inland, South County Inland, Huasna-Lopez, Los Padres, San Luis Obispo
	Potential growth areas	City of Arroyo Grande, Oceano, Los Berros Village Area
	Facilities Present	Lopez Dam on Arroyo Grande Creek; Terminal Reservoir and Lopez Water Treatment Plant; Oceano Wastewater Treatment Plant with discharge to Ocean; Oceano Airport; Arroyo Grande Flood Control Channel
	Commercial Uses	Cropland in Cienega Valley; Recreation and tourism at Lake Lopez, City of Arroyo Grande, State Park Beaches and the Oceano Dunes; Grieb Ranch Quarry for dimension stone, Oceano Sand Company Pit for specialty sand.(SLO County, Extractive resources shapefile)
	Demographics	
	Population	47,830 in watershed. 17,249, 36.1% in the City of Arroyo Grande. 13,156, 27.5% in the City of Grover Beach. 7,286, 15.2% in the Community of Oceano (U.S. Census Block, 2010).
	Race and Ethnicity	Watershed: 70% Caucasian (33,490), 22.9% Latino (10,949) 3.2% Asian (1,517), 2.5% 2 or more races/ethnicity (1,213) and 1%

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		<p>Other (77). (U.S. Census Tract, 2010).</p> <p>Arroyo Grande: Caucasian, representing 76.9%. Latinos represent 15.7% of the total population in the watershed. The remaining races each represent less than 4%, including African American, American Indian, Pacific Islander, and Asian(U.S. Census, 2010).</p> <p>Grover Beach: Caucasian, representing 62.3%. Latinos represent 29.2% of the total population in Grover Beach. The remaining races each represent less than 4%, including African American, American Indian, Pacific Islander, and Asian(U.S. Census, 2010).</p> <p>Oceano: Caucasian, representing 47.4%. Latinos represent 47.8% of the total population in Oceano. The remaining races each represent less than 3%, including African American, American Indian, Pacific Islander, and Asian (U.S. Census, 2010).</p>
	Income	<p>MHI \$63,535 in watershed (U.S. Census Tracts, 2010). MHI \$64,900 in Arroyo Grande(U.S. Census, 2010) MHI \$47,708 in Grover Beach (U.S. Census, 2010) MHI \$37,219 in Oceano (U.S. Census, 2010)</p> <p>Census tract covers multiple watersheds.</p>
	Disadvantaged Communities	<p>Yes, Oceano; 5% of individuals are below poverty level in watershed (U.S. Census Tract, 2010). 7.2% of individuals are below poverty level in Arroyo Grande. 14.3% of individuals are below poverty level in Grover Beach. 14.1% of individuals are below poverty level in Oceano. (US Census, 2010)</p> <p>Census tract covers multiple watersheds.</p>
	Water Supply	
	Water Management Entities	<p>Zone 3 Flood Control and Water Conservation District; City of Arroyo Grande; City of Grover Beach; Oceano Community Services District; Northern Cities Management Area participants including City of Pismo Beach, City of Arroyo Grande, City of Grover Beach, Oceano Community Services District, small public water systems, and residential and agricultural overlying users.</p>
	Groundwater	<p>Yes; alluvial, Arroyo Grande Valley and Santa Maria Valley Basins (SLO County, 2012)</p>
	Surface Water	<p>Yes; Lake Lopez is operated for municipal water supply storing 49,400 acre-feet and downstream irrigation water supply. Average annual diversion in 1969 through 1996 was about 4,630 acre-feet (Stetson Engineering, 2004).</p>
	Imported Water	<p>Yes; State Water enters the watershed and serves the Oceano Community Services District which has considered selling its surplus (in surplus years) to surrounding cities.</p>

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	Recycled/ Desalinated Water	No recycled water production. There is the potential at South SLO County Sanitation District.
	Infiltration Zones	Arroyo Grande Creek by releases from Lake Lopez. Other areas undetermined. Limited data.
	Water Budget	Water Balance Study for Northern Cities Area (Todd Engineers, 2007). Limited data.
	Water Uses	
	Beneficial Uses	<p><i>Arroyo Grande Creek</i> – 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), 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).</p> <p><i>Arroyo Grande Estuary</i> – Ground Water Recharge (GWR), Water Contact Recreation (REC-1), Non-Contact Water Recreation (REC-2), Commercial and Sport Fishing (COMM), Wildlife Habitat (WILD), Preservation of Biological Habitats of Special Significance (BIOL), Rare, Threatened, or Endangered Species (RARE), Migration of Aquatic Organisms (MIGR), Shellfish Harvesting (SHELL) (RWQCB, 2011)</p> <p><i>Dunes Lakes</i> – 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), Wildlife Habitat (WILD), Rare, Threatened, or Endangered Species (RARE), Spawning, Reproduction, and/or Early Development (SPWN).</p>
	Other Unique Characteristics	
	Historic Resources	The City of Arroyo Grande has a building on the National Register of Historic Places.
	Archeological Resources	There were Chumash towns called Chimoli, Chiliqin, and Stemeqtatimi at the time of European settlement (SB Museum of Natural History, viewed 2013). Limited data and low priority for this effort.
	Los Padres National Forest	The Los Padres National Forest, Santa Lucia District in the watershed includes one campground, portions of the Santa Lucia Wilderness

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		and general recreation.
	Climate Change Considerations	
		<p>State climate change maps show sea level affecting the City of Grover Beach and town of Oceano with inundation areas along Meadow Creek and the historic Los Berros Creek (USGS, Cal-Adapt, viewed 2013).</p> <p>See IRWMP, 2014 Section H. Climate Change</p> <p>Limited data and not local.</p>

Watershed Codes

CalWater / DWR Number	HA	Hydrologic Area Name	HSA	Hydrologic Sub-area Name	SWRCB Number	CDF Super Planning	CDF Watershed Name
3310.310101	3	Arroyo Grande	1	Oceano	310.31	Lopez Lake	Vasquez Creek
3310.310102	3	Arroyo Grande	1	Oceano	310.31	Lopez Lake	Wittenberg Creek
3310.310103	3	Arroyo Grande	1	Oceano	310.31	Lopez Lake	Arroyo Grande Creek
3310.310104	3	Arroyo Grande	1	Oceano	310.31	Lopez Lake	Clapboard Canyon
3310.310105	3	Arroyo Grande	1	Oceano	310.31	Lopez Lake	Big Falls Canyon
3310.310206	3	Arroyo Grande	1	Oceano	310.31	Grover City	Guaya Canyon
3310.310204	3	Arroyo Grande	1	Oceano	310.31	Grover City	Carpenter Canyon
3310.310201	3	Arroyo Grande	1	Oceano	310.31	Grover City	Tarspring Creek
3310.310205	3	Arroyo Grande	1	Oceano	310.31	Grover City	Cienega Valley
3310.310203	3	Arroyo Grande	1	Oceano	310.31	Grover City	Los Berros Creek
3310.310202	3	Arroyo Grande	1	Oceano	310.31	Grover City	Los Berros Canyon

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

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Major Changes in the Watershed

- Chumash Indians are thought to have lived in the Lopez Valley as long ago as 2000 years. Four major villages were within the Lopez Valley, including the Chmoli and Chojuale villages.
- In 1772, Mission San Luis Obispo was established. Canada del Trigo, now Lopez Canyon, supplied wheat to Mission San Luis Obispo. Soon after the mission's founding, the padres established a garden and plantation on the plain of Arroyo Grande Creek where they raised corn, beans, potatoes and other vegetables.
- In the early 1800's, the first white settlers move to the valley and begin a dairy and prune orchard at the junction of Arroyo Grande and Lopez Creeks.
- Around 1899, over fourteen oil companies bored for oil in areas including Bore Porter Huasna Ranch, Phoenix Canyon, Records Ranch, Rosa Porter Ranch, Mrs. Flora Harloe Huasna Ranch, the upper valleys and in the town of Arroyo Grande.
- Between 1862 - 2000 there were approximately numerous flood years (Honeycutt, 2000)
- In 1929, fire season burned thousands of acres of AG watershed in Lopez, Clapboard, Tar Springs, and Phoenix canyons.
- In 1930, Plowed Hillside Farms washed out with every heavy rain; Corralitas, Corbett, Carpenter, and Oak Park Canyons. Oak Park Canyon pea farmers have to build brush and straw dykes at the head of the slopes. Civilian Conservation Corps (CCC) build drainage ditches and terraces to control runoff near Noyes Road and east of Printz Road. CCC stabilized hills in Carpenter Canyon-Poorman Canyon. (Honeycutt, 2000)
- In 1957, US Forest Service Intensifies fire prevention steps in Los Padres National Service. (Honeycutt)
- Early 1960s, Oceano wastewater treatment plant is constructed.
- In 1961, construction of the flood control channel was finished.
- In 1968, Lopez Dam completed; Dam filled to capacity and spills April 1969.
- In 2001, Flood Zone 1/1A Advisory Committee convenes following March 2001 levee breaches.

Watershed Health by Major Tributary

Tributary Name	Ephemeral / Perennial	303d Listed/ TMDLs	Pollution Sources NP (non-point) MP (Major Point)	Environmental Flows
Arroyo Grande	Perennial (ptn)	Yes; E coli., Fecal coliform TMDL estimated date of completion 2021.	Agriculture, grazing related sources, urban runoff/storm sewers	X cfs (Stillwater Sciences, 2013)
Los Berros	Ephemeral	Yes; Chloride, Nitrate, Sodium TMDL estimated date of completion 2021. (SWRCB, 2010)	Agriculture, grazing related sources, source unknown	X cfs (Stillwater Sciences, 2013)

Arroyo Grande Creek Watershed

Tributary Name	Ephemeral / Perennial	303d Listed/ TMDLs	Pollution Sources NP (non-point) MP (Major Point)	Environmental Flows
Tar Springs	Undetermined	Not assessed.	Undetermined.	X cfs (Stillwater Sciences, 2013)
Corbett Creek	Undetermined	Not assessed.	Undetermined.	X cfs (Stillwater Sciences, 2013)

Watershed Health by Major Groundwater Basin

Groundwater Basin	Estimated Safe Yield	Water Availability Constraints	Drinking Water Standard Exceedance	Water Quality Objective Exceedance
Arroyo Grande Valley Subbasin	No estimated safe yield value reported. (San Luis Obispo County, Master Water Report, 2012)	water quality issues, environmental demand, and water rights The shallow alluvial deposits are typically more susceptible to drought impacts. (San Luis Obispo County, Master Water Report, 2012)	Yes; see description below. (San Luis Obispo County, Master Water Report, 2012)	No. No objective for subbasin. (RWQCB, Basin Plan, Table 3-8, 2011)
Northern Cities Management Area of Santa Maria Valley Basin	4,000 AFY (DWR, 1997)	Water quality, 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. No objective for subbasin. (RWQCB, Basin Plan, Table 3-8, 2011)

*Note: The Santa Maria Valley groundwater basin has been adjudicated. In 2005, the Superior Court of California entered a Stipulated Judgment for a basin-wide groundwater litigation case that defined three basin management areas encompassing approximately 256 square miles. These management areas are the Northern Cities Management Area, the Nipomo Mesa management Area, and the Santa Maria Management Area, which are used herein for planning by the County of San Luis Obispo. The Stipulated Judgment was adopted, with a declaratory judgment and physical solution adjudged and decreed in the Judgment after Trial, dated January 25, 2008. The three DWR subbasins included herein as separate basin components are outside of the adjudicated area.

Groundwater Quality Description: Historical groundwater quality in the Arroyo Grande Valley Subbasin, based on samples collected in the 1980's, shows a progressive deterioration in a downstream direction.

Arroyo Grande Creek Watershed

The general mineral character of groundwater in the valley was calcium-magnesium bicarbonate upstream of the Tar Springs Creek confluence and calcium-magnesium sulfate downstream of the confluence. The downstream section overlies a zone of multiple faults that may contribute highly mineralized water, along with irrigation water returns. With one exception, TDS, sulfate, and chloride concentrations in groundwater samples from wells in the upstream section met drinking water standards and the water was classified as suitable for agricultural irrigation. In the downstream section, TDS from wells typically exceeded 1,500 mg/l (the short term maximum drinking water standard), with sulfate concentrations exceeding the 500 mg/l upper limit for drinking water. The water was also classified as marginal to unsuitable for agricultural irrigation (DWR, 2002).

Northern Cities Management Area: Six of 35 wells tested exceeded the State drinking water standard for nitrate, which has been a concern in the area. In the Arroyo Grande Plain, historical data between 1950 and 1987 indicate that the chemical character was typically either calcium magnesium sulfate or calcium magnesium sulfate-bicarbonate. Approximately three-quarters of the wells sampled on the Arroyo Grande Plain had TDS values between 500-1,500 mg/l, with half the wells reporting sulfate concentrations greater than 250 mg/l (DWR, 2002).

Primary Issues

Issue	Potential Causes	Referenced from
Surface Water Quality - Temperature	Lack of riparian canopy	CCSE, 2009
Surface Water Quality - Nutrients and Dissolved Oxygen	Increase in urban land use	CCSE, 2009
Surface flow Quantity	Natural, groundwater diversions, impoundment	CCSE, 2009
Fish Passage Barriers	Road crossings, culverts, dams and other structures	CCSE, 2009
Erosion and Sedimentation	Natural, "hungry water" from dam release, lowering base flow level of mainstem, increased impervious areas, unvegetated roads and fields	CCSE, 2009
Flood Management	Loss of floodplain and encroachment of development, sedimentation in the flood control channel results in reduced capacity	CCSE, 2009 and Swanson Hydrologic, 2006

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.

Arroyo Grande Creek Watershed

Arroyo Grande Creek Watershed

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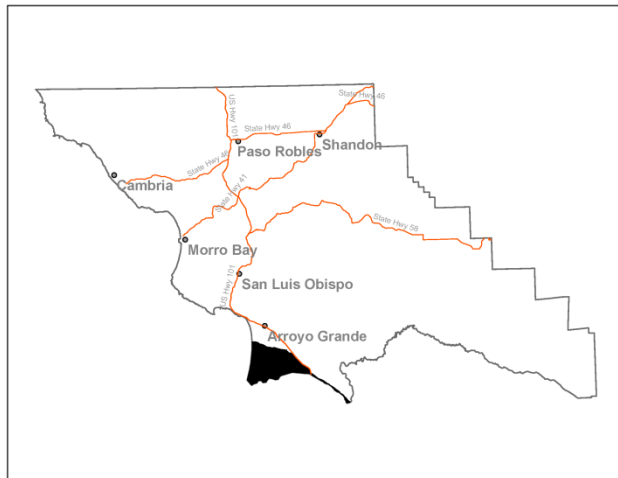
Hydrologic Unit Name	Water Planning Area	Acreage	Flows to	Groundwater Basin(s)	Jurisdictions
Estero Bay & Santa Maria HU 10 & 12	South Coast WPA 7	33,205 acres	Pacific Ocean	Santa Maria Valley	County of San Luis Obispo, Town of Nipomo



Description:

The Santa Maria River Watershed is located in southern San Luis Obispo County and northern Santa Barbara County. The watershed includes the major tributaries of the Cuyama and Sisquoc Rivers as well as a number of smaller tributaries. The Santa Maria River (downstream of the confluence with Cuyama and Sisquoc Rivers) rises to a maximum elevation of approximately 390 feet and flows to the Pacific Ocean. Drainage in the watershed is linked to the soils and geology with a dune lake complex, Black Lake Canyon slough, Oso Flaco Creek and portions of the Santa Maria River within the County of San Luis Obispo.

The watershed is dominated by residential and agricultural land uses including ranches, row crops, greenhouses and orchards. Other land uses include recreation and oil refinery.



Watershed Plans:

Santa Maria River Estuary Enhancement and Management Plan (Dunes Center, 2004)

Santa Maria River Watershed

Characteristics:

	Physical Setting	
	Rainfall	15 – 17 inches (NRCS Precipitation 1981-2010)
	Air Temperature	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)
	Geology Description	<p>Santa Maria River, Black Lake Canyon and Oso Flaco Creek watersheds consist of flat highly infiltrative Quaternary headwaters – category #3. (Bell, personal communication, 2013)</p> <p>The watershed lies at the boundary of two geomorphic regions – the Coast Ranges and the Transverse Ranges – both highly influenced by right-lateral movement along the San Andreas Fault Zone. The lithology of the watershed is characterized as ... young, weakly consolidated marine and some non-marine sedimentary rocks composing the valley bottoms. The ... and Santa Maria valleys are the two principal depositional basins in the watershed and support the watershed’s two main groundwater basins. It has been estimated that each basin has a maximum thickness of sediments reaching 2.0 and 2.9 km, respectively that has been filling continuously over the past 4 million years. (Stillwater Sciences, 2012)</p> <p>The Paso Robles Formation is water bearing (Morro Group, 1996). The watershed is underlain by an ancient sheet of windblown sand (Morro Group, 1996).</p> <p>The Nipomo Mesa west of U.S. 101 is basically its own watershed, having no watercourses entering from outside. With the exception of certain portions of Black Lake Canyon, the Mesa’s undulating terrain creates a series of contiguous, undrained basins having ponding potentials (Lawrance, Fisk & McFarland, Inc 1987).</p>
	Hydrology	
	Stream Gage	<p>No; USGS 11141600 Los Berros C Nr Nipomo Ca (1968-1978, discontinued); USGS 11141000 Santa Maria R A Guadalupe (1941 - 1987, discontinued)</p> <p>Limited water quality data with instantaneous discharge was collected at USGS 350146120352501, Little Oso Flaco Lake Near Guadalupe CA (years unknown, active); USGS 350121120351301 Unnamed Trib To Oso Flaco Creek Near Guadalupe Ca (2008-08-06, active); USGS 350059120351501 Oso Flaco CA Oso Flaco Lake Rd Near Guadalupe Ca (2008-08-06, active); USGS 345945120341301</p>

Santa Maria River Watershed

		<p>Oso Flaco C A Hwy 1 Near Guadalupe Ca (2008-08-06,active); USGS 345955120330901, Oso Flaco C 1.0 Mi Us Of Hwy 1 Near Guadalupe Ca (dates unknown, active); USGS 350001120261101,Nipomo CA Hwy 101 Bridge Ca (1975-02-12,inactive)</p> <p>Limited data for major creeks.</p>
	Hydrologic Models	<p>Yes; for Santa Maria River Estuary (Dunes Center, 2004).</p> <p>Limited data for major creeks.</p>
	Peak Flow	<p>No source identified for Black Lake Canyon.</p> <p>Overall average annual discharge [for Oso Flaco Creek] measured over rain years 2009, 2010, 2011 is 2,062.25 million gallons for Site OFC 20. The highest monthly average flow was 17.46 cfs. (A&M, 2012)</p> <p>Limited data for major creeks.</p>
	Base Flow	<p>No source identified for Black Lake Canyon.</p> <p>Overall average annual discharge [for Oso Flaco Creek] measured over rain years 2009, 2010, 2011 is 2,062.25 million gallons for Site OFC 20. The lowest monthly average flow was 5.12 cfs for Site OFC20. (A&M, 2012).</p> <p>The Guadalupe gage (USGS 11141000) [on the Santa Maria River] record from 1941–1987 reported periods every year of continuous zero discharge, some up to three years in duration (Stillwater Sciences, 2012).</p> <p>Limited data for major creeks.</p>
	Flood Reports	<p>Yes; Nipomo Drainage and Flood Control Study (SLO County, 2004); No sources identified for Black Lake Canyon, Oso Flaco or Santa Maria River areas.</p> <p>The [Nipomo] Mesa’s undulating topography creates numerous depressions, including low spots having no outflow drainage paths, which lead to a high incidence of localized ponding (SLO County FCWCD, 2009).</p> <p>Large portions of the Oso Flaco Creek subwatershed are within the FEMA 100 year flood zone; connecting to the Santa Maria River in large events. Flood risk is localized in the Black Lake Canyon area. (FEMA, Flood Maps)</p> <p>Limited data for major creeks.</p>
	Biological Setting	
	Vegetation Cover	<p>Primarily agricultural land and coastal beaches and dunes with some central coastal scrub (sagebrush and heather goldenbush),</p>

Santa Maria River Watershed

	<p>coast live oak forest, coastal and valley freshwater marsh and urban land. (SLO County, vegetation shapefile, 1990)</p> <p>Grassland, coastal dune scrub/chaparral, riparian/freshwater marsh, cypress/eucalyptus (Morro Group, 1996).</p> <p>Limited spatial data. No alliance level vegetation mapping was available for the entire County.</p>																																																																						
Invasive Species	<p>Eucalyptus, Giant reed, Cape ivy, Perennial pepperweed, Hoary cress, bull thistle, non-native grasslands. (Dunes Center, 2004)</p> <p>Limited data.</p>																																																																						
Special Status Wildlife and Plants	<p>Special status plant taxa observed on or adjacent to the project site: California spineflower, sand almond, Gambel’s watercress, marsh sandwort (Morro Group, 1996). Special status wildlife for which appropriate habitat is present on the project site include silver legless lizard, southwestern pond turtle, California red-legged frog, Cooper’s hawk, sharp-shinned hawk, golden eagle, prairie falcons, Peregrine falcons and monarch butterfly. (Morro Group, 1996)</p> <p>Key: Federal endangered – FE, Federal threatened – FT, State endangered – SE, State threatened – ST, CDFW State Species of Concern- SSC, CA rare plant ranking – CRPR (CDFW CNDDDB, viewed August 2013)</p> <table border="1"> <thead> <tr> <th>Common Name</th> <th>Status</th> <th>GUADALUPE</th> <th>NIPOMO</th> <th>OCEANO</th> <th>POINT SAL</th> <th>SANTA MARIA</th> </tr> </thead> <tbody> <tr> <td>Animals</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><i>American badger</i></td> <td>SSC</td> <td></td> <td></td> <td>x</td> <td></td> <td></td> </tr> <tr> <td><i>arroyo chub</i></td> <td>SSC</td> <td></td> <td></td> <td></td> <td>x</td> <td></td> </tr> <tr> <td><i>burrowing owl</i></td> <td>SSC (Burrow sites and some wintering sites)</td> <td></td> <td></td> <td></td> <td>x</td> <td></td> </tr> <tr> <td>California black rail</td> <td>ST</td> <td></td> <td></td> <td>x</td> <td></td> <td></td> </tr> <tr> <td>California least tern</td> <td>FE; SE</td> <td></td> <td></td> <td>x</td> <td>x</td> <td></td> </tr> <tr> <td>California red-legged frog</td> <td>FT</td> <td>x</td> <td>x</td> <td>x</td> <td></td> <td>x</td> </tr> <tr> <td>California tiger salamander</td> <td>FT; ST</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><i>coast horned lizard</i></td> <td>SSC</td> <td>x</td> <td></td> <td>x</td> <td>x</td> <td>x</td> </tr> </tbody> </table>	Common Name	Status	GUADALUPE	NIPOMO	OCEANO	POINT SAL	SANTA MARIA	Animals							<i>American badger</i>	SSC			x			<i>arroyo chub</i>	SSC				x		<i>burrowing owl</i>	SSC (Burrow sites and some wintering sites)				x		California black rail	ST			x			California least tern	FE; SE			x	x		California red-legged frog	FT	x	x	x		x	California tiger salamander	FT; ST						<i>coast horned lizard</i>	SSC	x		x	x	x
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<i>globose dune beetle</i>	Special Animal		x	
<i>mimic tryonia (=California brackish water snail)</i>	Special Animal		x	
<i>monarch butterfly</i>	Special Animal		x	x
<i>Morro Bay blue butterfly</i>	Special Animal		x	
<i>Oso Flaco flightless moth</i>	Special Animal		x	
<i>Oso Flaco patch butterfly</i>	Special Animal		x	
<i>Oso Flaco robber fly</i>	Special Animal		x	
<i>prairie falcon</i>	Special Animal (Nesting)	x	x	
<i>sandy beach tiger beetle</i>	Special Animal		x	
<i>sharp-shinned hawk</i>	Special Animal (Nesting)	x	x	
<i>silvery legless lizard</i>	SSC	x	x	x
<i>steelhead - south/central California coast DPS</i>	FT		x	x
<i>tidewater goby</i>	FE		x	x
<i>two-striped garter snake</i>	SSC			x
<i>western pond turtle</i>	SSC		x	
<i>western snowy plover</i>	FT		x	x
<i>western spadefoot</i>	SSC	x		x

Santa Maria River Watershed

<i>white sand bear scarab beetle</i>	Special Animal		x	x
Plants				
<i>beach spectacle-pod</i>	ST		x	x
<i>Blochman's leafy daisy</i>	CRPR 1B.2		x	x
<i>California saw-grass</i>	CRPR 2B.2		x	
<i>coast woolly-heads</i>	CRPR 1B.2		x	
<i>coastal goosefoot</i>	CRPR 1B.2	x	x	x
<i>crisp monardella</i>	CRPR 1B.2	x	x	x
<i>Davidson's saltscale</i>	CRPR 1B.2	x		
<i>dune larkspur</i>	CRPR 1B.2		x	x
<i>Gambel's water cress</i>	FE; ST		x	
<i>Hoover's bent grass</i>	CRPR 1B.2		x	
<i>Kellogg's horkelia</i>	CRPR 1B.1		x	
<i>La Graciosa thistle</i>	FE; ST; CRPR 1B.1	x	x	x
<i>marsh sandwort</i>	FE; SE		x	
<i>Miles' milk-vetch</i>	CRPR 1B.2		x	
<i>Nipomo Mesa lupine</i>	FE; SE		x	
<i>Pismo clarkia</i>	FE; SR		x	
<i>San Bernardino aster</i>	CRPR 1B.2		x	
<i>San Luis Obispo monardella</i>	CRPR 1B.2		x	x

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	<i>sand mesa manzanita</i>	CRPR 1B.2	x	x	x	x
	<i>Santa Margarita manzanita</i>	CRPR 1B.2		x	x	
	<i>San Luis Obispo County lupine</i>	CRPR 1B.2		x		
	<i>short-lobed broomrape</i>	CRPR 4.2			x	x
	surf thistle	ST; CPRR 1B.2			x	x
		Limited by the type of data collected in the CA Natural Diversity Database.				
	Steelhead Streams	Santa Maria River (NMFS, 2005)				
	Stream Habitat Inventory	No source identified.				
	Fish Passage Barriers	Road Crossing Unnamed tributary to Santa Maria River, Unknown Status, PAD # 731125; Black Lake Canyon and Hwy 1 Culvert, Unknown Status, PAD # 731671. (CDFW Passage Assessment Database, 2013)				
	Designated Critical Habitat	Yes; La Graciosa thistle (A&M, 2012); Western snowy plover (USFWS Critical Habitat Portal, viewed 2013); Steelhead trout (NMFS, 2005)				
	Habitat Conservation Plans	None. (USFWS Critical Habitat Portal, viewed 2013)				
	Other Environmental Resources	Guadalupe Dunes Complex, Coastal Zone, Oso Flaco Lake Natural Reserve, Nipomo Dunes, Dune Lakes, Black Lake Canyon and wetlands (freshwater marsh, peat bog, riparian)				
	Land Use					
	Jurisdictions & Local Communities	Nipomo Community Services District				
	% Urbanized 33,205.3	27% (22.6% residential, 4.39% commercial, industrial and public facility) (SLO County LUC)				
	% Agricultural	37.2% (SLO County LUC)				
	% Other	35.9% (2.31% open space, 27.48% recreation, 6.07% rural lands) (SLO County LUC)				
	Planning Areas	South County Inland, South County Coastal				
	Potential growth areas	Nipomo Mesa				
	Facilities Present	Private wells and septic systems; small water companies include Rural Water Company, Mesa Dunes Mobile home Estates, La Mesa Water Company, Las Flores Water Company, Troesh Recycling and others.				

Santa Maria River Watershed

		Limited data.
	Commercial Uses	Proposed oil processing facilities, agriculture including greenhouses, row crops, cattle grazing, recreation
		Limited data.
	Demographics	
	Population	13,720 in watershed (U.S. Census Block, 2010)
	Race and Ethnicity	63.9% Caucasian (8,775), 2.5% Asian (349), 30.1% Latino (4,128), 3.5% Other (U.S. Census Block, 2010)
	Income	MHI \$56,538 (U.S. Census Tract, 2010)
		Census tract crosses multiple watersheds.
	Disadvantaged Communities	No; 7% of individuals are below poverty in the watershed.(U.S. Census Tract, 2010)
		Census tract crosses multiple watersheds.
	Water Supply	
	Water Management Entities	Nipomo Community Services District; Rural Water Company; Golden State Water Company; Woodlands Water Company; about 29 small purveyors are on the Nipomo Mesa (LAFCO, 2010)
		Limited data.
	Groundwater	Yes; alluvial and Santa Maria River Valley (SLO County, 2012)
	Surface Water	No public reservoirs.
	Imported Water	Planned; supplemental water from Santa Maria which is blended state water and groundwater (Douglas Wood & Ass., 2009).
	Recycled/ Desalinated Water	Yes; Woodlands Wastewater Treatment Plant for irrigation of golf course; Desalinated water is not currently used but is being explored. (LAFCO, 2010)
	Infiltration Zones	Seepage of river flows through the river bed along the Santa Maria River and along the lower reaches of the Cuyama and Sisquoc Rivers is the primary source of recharge to the Santa Maria Groundwater Basin. Percolation of river flows through unconsolidated, permeable alluvial deposits account for approximately 75-85% of the average annual recharge to the groundwater basin. A significant portion of the groundwater recharge attributable to river bed seepage is due to the operation of the Twitchell Dam. (SLO County & SB County, 1998)
		Limited data.
	Water Budget	None to date. Santa Maria Basin is adjudicated. The Nipomo Valley Sub-basin is part of the Santa Maria Valley Groundwater Basin as defined by DWR but outside of the adjudicated basin area (SLO County, Master Water Plan, 2012).

Santa Maria River Watershed

		Limited data.
	Water Uses	
	Beneficial Uses	<p><i>Dunes Lakes</i> – 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), Wildlife Habitat (WILD), Rare, Threatened, or Endangered Species (RARE), Spawning, Reproduction, and/or Early Development (SPWN).</p> <p><i>Oso Flaco Creek</i> – 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), Wildlife Habitat (WILD), Preservation of Biological Habitats of Special Significance (BIOL), Rare, Threatened, or Endangered Species (RARE), Spawning, Reproduction, and/or Early Development (SPWN).</p> <p><i>Oso Flaco Lake</i>– Municipal and Domestic Supply (MUN), 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), Wildlife Habitat (WILD), Preservation of Biological Habitats of Special Significance (BIOL), Rare, Threatened, or Endangered Species (RARE), Spawning, Reproduction, and/or Early Development (SPWN).</p> <p><i>Santa Maria River</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), Rare, Threatened, or Endangered Species (RARE), Migration of Aquatic Organisms (MIGR),</p> <p><i>Santa Maria River Estuary</i> – 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), 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).(RWQCB, 2011)</p>

Santa Maria River Watershed

	Other Unique Characteristics	
	Historic Resources	No source identified.
	Archeological Resources	There are a number of archaeological sites in the [Nipomo] area which are large but of a low density (Morro Group, 1996). Limited data.
	Other	No source identified.
	Climate Change Considerations	
		State climate change maps show sea level inundation at the Oso Flaco Creek and Santa Maria River Estuaries (USGS, Cal-Adapt, viewed 2013). See IRWMP, 2014 Section H. Climate Change Limited data and not watershed specific.

Watershed Codes

Calwater / DWR Number	HA	Hydrologic Area Name	HSA	Hydrologic Sub-area Name	SWRCB Number	CDF Super Planning Area	CDF Watershed Name
3310.320000	3	Arroyo Grande	2	Nipomo Mesa	310.32	undefined	undefined
3312.100300	1	Guadalupe	0	undefined	312.10	Santa Maria Valley	Santa Maria Valley
Source: Excerpt from California Interagency Watershed Map of 1999, Calwater 2.2.1 (CA Resource Agency, 2004 Update)							

Santa Maria River Watershed

Major Changes in the Watershed

- Nipomo Creek, during the Pliocene Epoch, flowed to the north joining Los Berros Creek and Arroyo Grande Creek. During the Quaternary period of the Holocene Epoch, rapid melting of glaciers caused changes in sea levels and rapid migration of shoreline dunes inland blocking the flow of Nipomo Creek. The blockage created shallow lakes which broke through the dunes of the Nipomo Mesa creating Black Lake Canyon. Further encroachment of sand eventually blocked this direct seaward exit of Nipomo. The subsequent build up of water in Nipomo valley found its weakest point to exit through a southern route becoming a tributary of the Santa Maria watershed (Ardoin/Bishop, 2004)
- 9,000 years. Most of the recorded cultural sites occur on the bluff of the mesa overlooking several creeks and in the foothills near larger tributaries. Sites on the Nipomo Mesa did not support as dense a population as neighboring coastal areas, and represent temporary occupations or small villages (Wheeler, 2005).
- In 1772, a mission was established in San Luis Obispo.
- A portion of the watershed is part of the Rancho Nipomo Mexican Land Grant awarded to Captain William Dana in 1835 bringing cattle and sheep to the area.
- In 1878, the Pacific Coast Railway was granted land.
- The 1890's brought growth to the area with expanding agriculture and an influx of immigrant families to work the land.
- In 1936, Dorothea Lange chronicled the dire poverty of the migrant "pea pickers" in Nipomo, taking the iconic photo of the depression, Migrant Mother.
- The three largest fires of the last half-century were the 1966 Wellman fire, the 2007 Zaca fire, and the 2009 LaBrea fire.
- Between 1980 – 2000, Nipomo experienced dramatic population growth at a total growth rate of 140% (Biorn, 2005).

Santa Maria River Watershed

Watershed Health by Major Tributary

Tributary Name	Ephemeral / Perennial	303d Listed/ TMDLs	Pollution Sources NP (non-point) MP (Major Point)	Environmental Flows
Oso Flaco Creek	Perennial	Yes on 303d list for Ammonia, Chloride, Fecal Coliform, Nitrate, Sediment Toxicity, Sodium, Unknown Toxicity. TMDL estimated date of completion 2013. (SWRCB, 2010)	Agriculture, Natural, Groundwater Loading, Unknown (SWRCB, 2010)	X cfs (Stillwater Sciences, 2013)
Little Oso Flaco Creek	Perennial	Yes on 303d list for Fecal Coliform, Nitrate, Sediment Toxicity, Unknown Toxicity. TMDL estimated date of completion 2013. (SWRCB, 2010)	Agriculture, Groundwater Loading, Unknown (SWRCB, 2010)	cfs
Black Lake Canyon	Isolated	Not assessed. (SWRCB, 2010)	Undetermined.	
Santa Maria River	Ephemeral	Yes on 303d list for Chloride, Chlorpyrifos, DDT, Dieldrin, Endrin, E. coli, Fecal Coliform, Nitrate, Sediment Toxicity, Sodium, Toxaphene, Turbidity, Unknown Toxicity. TMDL estimated date of completion 2013. (SWRCB, 2010)	Agriculture, Natural, Grazing Related, Natural, Onsite Waste-water Systems (Septic), Urban Runoff Unknown(SWRCB, 2010)	

Santa Maria River Watershed

Watershed Health by Major Groundwater Basin

Groundwater Basin	Estimated Safe Yield	Water Availability Constraints	Drinking Water Standard Exceedance	Water Quality Objective Exceedance
Santa Maria Valley – Nipomo Valley Subbasin	No existing yield. (SLO County, Master Water Report, 2012)	Physical limitations and water quality. (SLO County, Master Water Report, 2012)	No. (SLO County, Master Water Report, 2012)	No objective for the basin. (RWQCB, Table 3-8, 2011)
Santa Maria Valley- Nipomo Mesa Management Area	4,800-6,000 AFY (SLO County, Master Water Report, 2012)	Physical limitations, water quality, and water rights. (SLO County, Master Water Report, 2012)	No. (SLO County, Master Water Report, 2012)	Yes. (RWQCB, 2011)

Groundwater Quality Description:

Nipomo Valley subbasin: Water quality is variable across the sub-basin, and the available data set does not distinguish between older alluvial wells and fractured rock wells, although most of the water represented is from the fractured rock reservoirs. Groundwater samples collected from 22 wells between 1962 and 2000 displayed the following characteristics: TDS concentrations ranged from 750 mg/L to 1,300 mg/L; sulfate concentrations between 200 and 340 mg/L; chloride concentrations between 64 and 130 mg/L; and nitrate concentrations from non-detect to 3.4 mg/L. Groundwater is classified as suitable to marginal under water quality guideline for irrigated agriculture (DWR 2002).

Nipomo Mesa Management Area: Water quality varies in general mineral character across the Nipomo Mesa. The median TDS in 35 wells sampled between 1990 and 2000 was approximately 500 mg/L. Nitrate has been detected in excess of the drinking water standard in relatively few wells (DWR 2002; NMMA Technical Group, 2009). According to the database maintained by the California Department of Public Health (CDPH), production wells used for public drinking and industrial use in the NMMA met drinking water quality standards in 2008. One of the ConocoPhillips production wells had a reported value of 1,000 mg/L TDS, the highest reported to the CDPH within the NMMA; the well is used for industrial processing (NMMA Technical Group, 2009). (SLO County, Master Water Report, 2012)

Primary Issues

Issue	Potential Causes	Referenced from
Effects of Cattle grazing Unknown	Limited Study	Dunes Center, 2004
Impaired surface water quality	Grazing, crop land	Dunes Center, 2004; Althouse

Santa Maria River Watershed

Issue	Potential Causes	Referenced from
		and Meade, 2012; RWQCB, 2012 and 2013.
Occurrence of endangered or threatened species on private land and potential for incidental take.	None	Dunes Center, 2004
Lack of data on plant and wildlife species.	Limited study	Dunes Center, 2004
Vegetation in the channel concentrates and diverts flows, and causes erosion and flooding of low-lying areas.	Vegetation in the channel	Dunes Center, 2004
Land use practices on [Santa Maria River] study reach and dune parcels may be incompatible with plan goals.	Limited land available for enhancement	Dunes Center, 2004
Presence of levees that restrict or otherwise modify flows, flow channels and sediment transport corridors.	Levees along Santa Maria River	Dunes Center, 2004
Invasive riparian plant species that establish in the [Santa Maria River] study reach may impede flood flows, interfere with agricultural operations, cause ecological degradation, and spread into adjacent habitats	Invasive riparian plants	Dunes Center, 2004
Sediment accretion in the [Santa Maria River] study reach and erosion along the shoreline.	Twitchell dam changes to sediment transport	Dunes Center, 2004
Run-off from urban areas contributes nitrates and other pollutants into the [Santa Maria River] study reach.	Urban	Dunes Center, 2004
Oso Flaco Lake – DDT and dieldrin	Undetermined, sediment	Davis, 2010

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.

Santa Maria River Watershed

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Nipomo – Suey Creeks Watersheds

Hydrologic Unit Name	Water Planning Area	Acreage	Flows to	Groundwater Basin(s)	Jurisdictions
Santa Maria HU 12	South County WPA 7	36,912 acres	Santa Maria River	Santa Maria Valley	County of San Luis Obispo Community of Nipomo

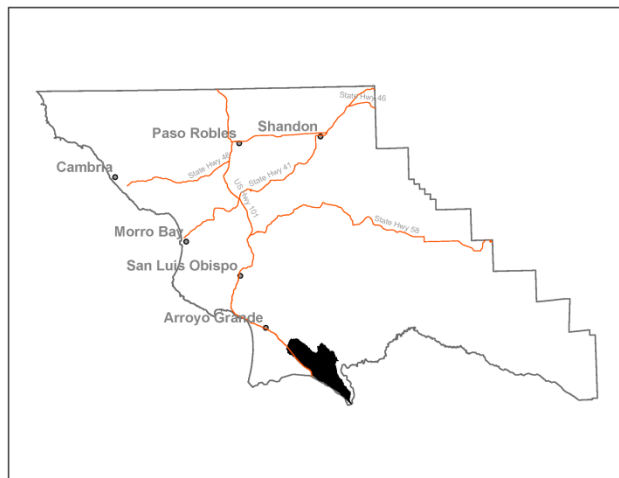


Photo by: N. Smith

Description:

The Nipomo - Suey Watersheds are basins located in southern San Luis Obispo County and northern Santa Barbara County. The watersheds rises to a maximum elevation of approximately 1,800 feet above mean sea level. The area includes two tributary basins to the Santa Maria River with their headwaters in the foothills of the Coast Range: Nipomo Creek and Suey Creek.

The watersheds are dominated by agricultural land uses including ranches, row crops, greenhouses and orchards. Other land uses include residential.



Watershed Plans:

Nipomo Creek Watershed Management Plan (Land Conservancy of San Luis Obispo and CCSE, 2005)

Nipomo – Suey Creeks Watersheds

Characteristics:

Physical Setting	
Rainfall	15 – 20 inches (NRCS Precipitation, 1981-2010) 16-18 inches Mean Annual (SLOCountyWater.org)
Air Temperature	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, ncdc.noaa.gov , viewed 2013) Limited data, not watershed specific.
Geology Description	Nipomo Creek consists of steep pre-Quaternary non-infiltrative headwaters and a flat highly infiltrative Quaternary valley – category #12. Suey Creek consists of moderately infiltrative early to mid-Tertiary headwaters and a flat Quaternary highly infiltrative valley – category #14. (Bell, personal communication, 2013) The bedrock of the watershed is typical of the Monterey and Franciscan formations of the California Coastal Range and is composed primarily of shale, chert, and other mélangé components (Chipping, 1987).
Hydrology	
Stream Gage	No source identified.
Hydrology Models	No source identified.
Peak Flow	8,000 cfs Nipomo at confluence with Santa Maria River (Land Conservancy and CCSE, 2005, pg. 41); No source identified for Suey Creek Limited data based on FEMA study and not stream gage.
Base Flow	800 – 925 acre feet average annual base runoff for Nipomo (DWR, 2002); No source identified for Suey Creek Limited data. It is unknown how this estimate was determined as there is no stream gage.
Flood Reports	Yes; Nipomo Drainage and Flood Control Study (County of SLO, 2004). Areas at risk for flooding are Olde Town Nipomo (Land Conservancy and CCSE, 2005)
Biological Setting	
Vegetation Cover	Primarily agricultural land and non-native grassland with some coast live oak forest (blue oak, coast live oak and valley oak), buck brush chaparral and venturan coastal sage scrub (SLO County, vegetation shapefile,1990)

Nipomo – Suey Creeks Watersheds

	Limited spatial data. No alliance level vegetation mapping was available for the entire County.																																																																						
Invasive Species	Periwinkle (CCSE & Land Conservancy, 2005)																																																																						
	Limited data.																																																																						
Special Status Wildlife and Plants	<p>Based on surveys of the project site and assessment of habitat, the project site supports potential habitat for 14 special status species, [including] American badger, pallid bat, California red-legged frog, coast range newt, southern pacific pond turtle, silvery legless lizard, coast horned lizard, two-striped garter snake, sharp-shinned hawk, burrowing owl, white-tailed kite, southwestern willow flycatcher, prairie falcon and least bell’s vireo (SLO County, DANA EIR, 2012)</p> <p>Key: Federal endangered – FE, Federal threatened – FT, State endangered – SE, State threatened – ST, CDFW State Species of Concern – SSC, CA rare plant ranking – CRPR (CDFW CNDDDB, viewed 2013).</p> <table border="1"> <thead> <tr> <th>Common Name</th> <th>Status</th> <th>NIPOMO</th> <th>OCEANO</th> <th>SANTA MARIA</th> <th>HUASNA PEAK</th> <th>TWITCHELL DAM</th> </tr> </thead> <tbody> <tr> <td>Animals</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><i>American badger</i></td> <td>SSC</td> <td></td> <td>x</td> <td></td> <td>x</td> <td></td> </tr> <tr> <td>California black rail</td> <td>ST; Fully Protected</td> <td></td> <td>x</td> <td></td> <td></td> <td></td> </tr> <tr> <td>California least tern</td> <td>FE; SE</td> <td></td> <td>x</td> <td></td> <td></td> <td></td> </tr> <tr> <td>California red-legged frog</td> <td>FT</td> <td>x</td> <td>x</td> <td>x</td> <td>x</td> <td>x</td> </tr> <tr> <td>California tiger salamander</td> <td>FT; ST</td> <td></td> <td></td> <td></td> <td></td> <td>x</td> </tr> <tr> <td><i>coast horned lizard</i></td> <td>SSC</td> <td></td> <td>x</td> <td>x</td> <td></td> <td></td> </tr> <tr> <td><i>globose dune beetle</i></td> <td>Special Animal</td> <td></td> <td>x</td> <td></td> <td></td> <td></td> </tr> <tr> <td><i>mimic tryonia (=California brackish water snail)</i></td> <td>Special Animal</td> <td></td> <td>x</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Common Name	Status	NIPOMO	OCEANO	SANTA MARIA	HUASNA PEAK	TWITCHELL DAM	Animals							<i>American badger</i>	SSC		x		x		California black rail	ST; Fully Protected		x				California least tern	FE; SE		x				California red-legged frog	FT	x	x	x	x	x	California tiger salamander	FT; ST					x	<i>coast horned lizard</i>	SSC		x	x			<i>globose dune beetle</i>	Special Animal		x				<i>mimic tryonia (=California brackish water snail)</i>	Special Animal		x			
Common Name	Status	NIPOMO	OCEANO	SANTA MARIA	HUASNA PEAK	TWITCHELL DAM																																																																	
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Nipomo – Suey Creeks Watersheds

<i>monarch butterfly</i>	Special Animal	x	x		
<i>Morro Bay blue butterfly</i>	Special Animal	x			
<i>Oso Flaco flightless moth</i>	Special Animal	x			
<i>Oso Flaco patch butterfly</i>	Special Animal	x			
<i>Oso Flaco robber fly</i>	Special Animal	x			
<i>prairie falcon</i>	Special Animal (Nesting)	x		x	x
<i>sandy beach tiger beetle</i>	Special Animal	x			
<i>sharp-shinned hawk</i>	Special Animal (Nesting)	x			
<i>silvery legless lizard</i>	SSC	x			
steelhead - south/central California coast DPS	FT		x	x	
tidewater goby	FE		x		
<i>western pond turtle</i>	SSC	x		x	
western snowy plover	FT		x		
<i>western spadefoot</i>	SSC	x		x	x
<i>white sand bear scarab beetle</i>	Special Animal	x			
Plant/Lichen					
beach spectaclepod	ST		x		
<i>Blochman's leafy daisy</i>	CRPR 1B.2	x			
<i>California saw-grass</i>	CRPR 2B.2	x			

Nipomo – Suey Creeks Watersheds

<i>coast woolly-heads</i>	CRPR 1B.2					x
<i>coastal goosefoot</i>	CRPR 1B.2					x
<i>crisp monardella</i>	CRPR 1B.2					x
<i>dune larkspur</i>	CRPR 1B.2				x	x
Gambel's water cress	FE; ST					x
<i>Hoover's bent grass</i>	CRPR 1B.2					x
<i>Kellogg's horkelia</i>	CRPR 1B.1					x
La Graciosa thistle	FE; ST					x
<i>La Panza mariposa-lily</i>	CRPR 1B.3					
marsh sandwort	FE; SE					x
<i>Miles' milk-vetch</i>	CRPR 1B.2			x		x
Nipomo Mesa lupine	FE; SE					x
Pismo clarkia	FE; SR					x
<i>San Luis Obispo County lupine</i>	CRPR 1B.2				x	
<i>San Luis Obispo monardella</i>	CRPR 1B.2					x
<i>sand mesa manzanita</i>	CRPR 1B.2			x	x	x
<i>Santa Margarita manzanita</i>	CRPR 1B.2			x	x	x
<i>short-lobed broomrape</i>	CRPR 4.2					x
surf thistle	ST					x

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

Nipomo – Suey Creeks Watersheds

	Steelhead Streams	No. Historical information suggests that the Santa Maria River supported a steelhead run in the early 1900's. There is no evidence suggesting this species has been present for several decades. (CCSE & Land Conservancy, 2005 pg 56)
	Stream Habitat Inventory	None. (CEMAR, 2008)
	Fish Passage Barriers	Hwy 166 culvert at Suey Creek, Unknown Status, PAD # 736549.00000 (CDFW Passage Assessment Database, viewed 2013)
	Designated Critical Habitat	None. (USFWS Critical Habitat Portal, viewed 2013)
	Habitat Conservation Plans	None.(USFWS Critical Habitat Portal, viewed 2013)
	Other Environmental Resources	No source identified.
	Land Use	
	Jurisdictions & Local Communities	Town of Nipomo
	% Urbanized	7.3% (6.62% residential and less than 1% commercial, industrial and public facilities)(SLO County LUC)
	% Agricultural	82.7% (SLO County LUC)
	% Other	10% (9.71% rural lands and less than 1% open space and recreation) (SLO County LUC)
	Planning Areas	South County Inland
	Potential growth areas	Olde Town Nipomo, Los Berros Village area
	Facilities Present	Private wells and septic systems Limited data.
	Commercial Uses	Proposed oil processing facilities, Agriculture Limited data.
	Demographics	
	Population	4,160 in watershed (US Census Block, 2010); 16,714 in Nipomo (US Census, 2010)
	Race and Ethnicity	50.2% White (2,088), 44.4% Latino (1,845), 3.2% other in the watershed. (US Census Block, 2010) Caucasian, representing 54.3%. Latinos represent 39.8% of the total population in the watershed. The remaining races each represent less than 3%, including African American, American Indian, Pacific Islander, and Asian(US Census, 2010).
	Income	MHI \$99,115 in watershed. (US Census Tract, 2010) MHI \$61,265 in Nipomo (US Census Tract, 2010). Census tract crosses multiple watersheds.

Nipomo – Suey Creeks Watersheds

	Disadvantaged Communities	No; 4% in watershed (US Census Tract, 2010); 9.6% of individuals are below poverty level in Nipomo (US Census, 2010). Census tract crosses multiple watersheds.
	Water Supply	
	Water Management Entity	Nipomo Community Services District; A large number of other water purveyors exist in the Nipomo Mesa area, but a source was not identified that records which are specifically in the Nipomo and Suey Creeks area. Limited data.
	Groundwater	Yes; alluvial and Santa Maria River Valley (SLO County, 2012)
	Surface Water	No public reservoirs.
	Imported Water	No; planned supplemental water from Santa Maria.
	Recycled/Desalinated Water	No source identified.
	Infiltration Zones	No source identified.
	Water Budget	No source identified.
	Water Uses	
	Beneficial Uses	<i>Nipomo Creek</i> –No beneficial uses identified <i>Suey Creek</i> –No beneficial uses identified. (RWQCB, 2011)
	Other Unique Characteristics	
	Historic Resources	Dana Adobe Limited data.
	Archeological Resources	There was a Chumash town called Nipumu at the time of European settlement (SB Museum of Natural History, viewed 2013). Limited data.
	Other	No source identified.
	Climate Change Considerations	
		See IRWMP, 2014 Section H. Climate Change Limited data and not watershed specific.

Watershed Codes

Nipomo – Suey Creeks Watersheds

Calwater / DWR Number	HA	Hydrologic Area Name	HSA	Hydrologic Sub-area Name	SWRCB Number	CDF Super Planning	CDF Watershed Name
3312.100104	1	Guadalupe	0	undefined	312.10	Nipomo	Nipomo Valley
3312.100102	1	Guadalupe	0	undefined	312.10	Nipomo	Suey Creek
3312.100103	1	Guadalupe	0	undefined	312.10	Nipomo	South of Twitchell Res.
3312.100101	1	Guadalupe	0	undefined	312.10	Santa Maria Valley	Nipomo Creek

Major Changes in the Watershed

- Nipomo Creek, during the Pliocene Epoch, flowed to the north joining Los Berros Creek and Arroyo Grande Creek. During the Quaternary period of the Holocene Epoch, rapid melting of glaciers caused changes in sea levels and rapid migration of shoreline dunes inland blocking the flow of Nipomo Creek. The blockage created shallow lakes which broke through the dunes of the Nipomo Mesa creating Black Lake Canyon. Further encroachment of sand eventually blocked this direct seaward exit of Nipomo. The subsequent build up of water in Nipomo valley found its weakest point to exit through a southern route becoming a tributary of the Santa Maria watershed (Ardoin/Bishop, 2004)
- 9,000 years. Most of the recorded Chumash cultural sites occur on the bluff of the mesa overlooking several creeks and in the foothills near larger tributaries. Sites on the Nipomo Mesa did not support as dense a population as neighboring coastal areas, and represent temporary occupations or small villages (Wheeler, 2005).
- In 1772, a mission was established in San Luis Obispo.
- The watershed is part of the Rancho Nipomo Mexican Land Grant awarded to Captain William Dana in 1835 bringing cattle and sheep to the area.
- In 1878, the Pacific Coast Railway was granted a 14 mile long strip by the Dana Brothers.
- The 1890's brought growth to the area with expanding agriculture and an influx of immigrant families to work the land.
- In 1936, Dorthea Lange chronicled the dire poverty of the migrant "pea pickers" in Nipomo, taking the iconic photo of the depression, Migrant Mother.

Nipomo – Suey Creeks Watersheds

Watershed Health by Major Tributary

Tributary Name	Ephemeral / Perennial	303d Listed/ TMDLs	Pollution Sources NP (non-point) MP (Major Point)	Environmental Flows
Nipomo Creek	Perennial	Yes on 303d list for Fecal Coliform, Nitrate, Unknown Toxicity. TMDL estimated date of completion 2013. (SWRCB, 2010)	Agriculture, Collection System Failure, Grazing Related, Natural, Onsite Wastewater Systems (Septic), Urban Runoff(SWRCB, 2010)	X Cfs (Stillwater Sciences, 2013)
Suey Creek	Unknown.	No. (SWRCB, 2010)	Undetermined. (SWRCB, 2010)	

Watershed Health by Major Groundwater Basin

Groundwater Basin	Estimated Safe Yield	Water Availability Constraints	Drinking Water Standard Exceedance	Water Quality Objective Exceedance
Santa Maria Valley – Nipomo Valley Subbasin	No existing yield. (San Luis Obispo County, Master Water Report, 2012)	Physical limitations and water quality. (San Luis Obispo County, Master Water Report, 2012)	No. (San Luis Obispo County, Master Water Report, 2012)	No objective for subbasin. (RWQCB, Table 3-8, 2011)
Santa Maria Valley- Nipomo Mesa Management Area	4,800-6,000 AFY(San Luis Obispo County, Master Water Report, 2012)	Physical limitations, water quality, and water rights. (San Luis Obispo County, Master Water Report, 2012)	No. (San Luis Obispo County, Master Water Report, 2012)	Yes. (RWQCB, Table 3-8, 2011)

Groundwater Quality Description: Water quality is variable across the [Nipomo Valley] subbasin, and the available data set does not distinguish between older alluvial wells and fractured rock wells, although most of the water represented is from the fractured rock reservoirs. TDS concentrations in groundwater samples collected from in 22 wells between 1962 and 2000 ranged from 750 mg/l to 1,300 mg/l; sulfate concentrations between 200 and 340 mg/l; chloride concentrations between 64 and 130 mg/l; and nitrate concentrations from non-detected to 3.4 mg/l. Groundwater is classified as suitable to marginal under water quality guideline for irrigated agriculture (DWR, 2002). (San Luis Obispo County, Master Water Report, 2012)

Nipomo – Suey Creeks Watersheds

Primary Issues

Issue	Potential Causes	Referenced from
Flooding	Development in 100 year flood hazard zone, improperly sized culverts, lack of maintenance of existing drainage structures	CCSE&LC, WMP, 2005 pg 70 & 71
Habitat Fragmentation	Development	CCSE&LC, WMP, 2005
Surface Water Quality	Erosion, Sedimentation, bacteria from wildlife, domestic animals/livestock and urban areas, nutrients from	CCSE&LC, WMP, 2005 and RWQCB, Santa Maria River Watershed TMDLs, 2012
Invasive Species		CCSE&LC, WMP, 2005 pg 67
Groundwater Quantity	Connection to Santa Maria Groundwater Basin and Nipomo Mesa Management Area	CCSE&LC, WMP, 2005 pg 43 and 89 and NMMA, 2011

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.

Nipomo – Suey Creeks Watersheds

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Nipomo – Suey Creeks Watersheds

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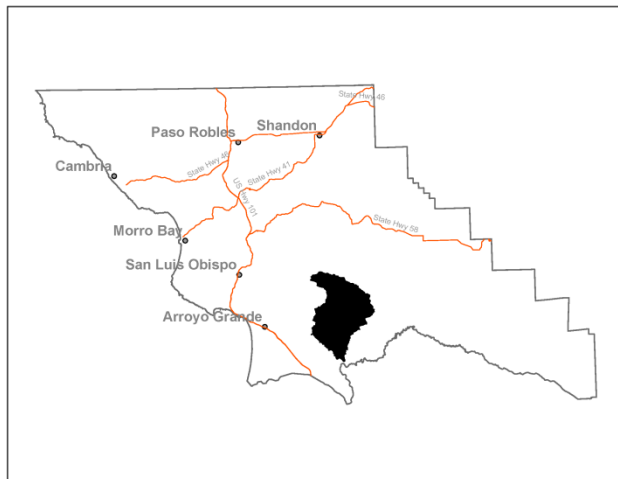
Huasna River Watershed

Hydrologic Unit Name	Water Planning Area	Acreage	Flows to	Groundwater Basin(s)	Jurisdictions
Santa Maria HU 12	Huasna Valley WPA 8	75,122 acres	Cuyama River at Twitchell Reservoir	Huasna Valley	County of San Luis Obispo; Los Padres National Forest



Description:

The Huasna River Watershed is an inland basin located in southern San Luis Obispo County. The drainage rises to a maximum elevation of approximately 3,000 feet above sea level. Huasna River flows to the Cuyama River at Twitchell Dam and has a number of tributary basins with their headwaters in the Santa Lucia and La Panza Mountain Ranges: Huasna Creek, Carrie Creek, Haystack Creek and Arroyo Seco Creek.



Agriculture is the principal land use in the area, ranging from small irrigated farms to large cattle ranches. A substantial portion of the area consists of hilly and mountainous land with chaparral and oak woodlands, suitable only for limited grazing. Other land uses includes oil exploration.

Watershed Plans:

None

Huasna River Watershed

Characteristics:

	Physical Setting	
	Rainfall	18 – 27 inches (NRCS Precipitation,1981-2010)
	Air Temperature	Summer Range (August 1981-2010): 50°- 82° F Winter Range (December 1981-2010): 36°- 66° F At Twitchell Dam (CA-NOAA National Climatic Data Center, viewed 2013)
	Geology Description	<p>The Huasna Creek, Deer Canyon, and Joaquin Canyon sub watersheds consist of steep moderately infiltrative early to mid-Tertiary headwaters – category #8.</p> <p>The Haystack Canyon, Carrie Creek, Lower Arroyo Seco, and Upper Arroyo Seco sub watersheds consist of steep pre-Quaternary non-infiltrative headwaters; steep moderately infiltrative early to mid-Tertiary valley – category #5.</p> <p>The Salt Creek sub watershed consists of steep pre-Quaternary non-infiltrative headwaters – category #13 (Bell, personal communication, 2013)</p> <p>The Huasna River basin contains thick mostly marine sedimentary Tertiary deposits that lay on top of a Jurassic-Cretaceous complex. The Huasna Basin lies between the West Huasna fault zone on the west and the East Huasna fault zone on the east (SLO County, 2012).</p> <p>The principal water bearing unit is Quaternary age alluvium. (DWR,2003)</p>
	Hydrology	
	Stream Gage	No. USGS 11137900 Huasna River near Arroyo Grande, CA (1960-2012, discontinued) and USGS 11138000 Huasna River near Santa Maria, CA (1930-1961, discontinued). (USGS, viewed 2013) Limited data and no current stream gage.
	Hydrology Models	No source identified.
	Peak Flow	10,000 - 11,400cfs at USGS 11138000. (USGS, viewed 2013)
	Base Flow	6.5 – 7.10 cfs at USGS 11138000.(USGS, viewed 2013) It is unknown if these gages were placed to accurately capture base flows. Many gages are placed as alert systems and only capture peak flows.
	Flood Reports	Yes; Floods in Cuyama Valley, California (USGS, 1998). Though normally dry, wetter winters have seen the [Twitchell] reservoir inundate the lower five miles of Huasna Valley ..., rendering areas below the 652-foot elevation unsuitable for permanent

Huasna River Watershed

		<p>buildings. Upstream portions of these watercourses (and other creeks in the planning area) are potential flood hazard areas during intense or prolonged rainfall.(San Luis Obispo County, Huasna-Lopez Area Plan, 2003)</p> <p>Limited data.</p>																																													
	Biological Setting																																														
	Vegetation Cover	<p>Primarily buck brush chaparral, oak woodland (blue oak woodland and coast live oak woodland, coast live oak forest) and foothill pine-oak woodland with some non-native grassland, venturan coastal sage scrub and permanently flooded lucustrine (SLO County vegetation shapefile, 1990)</p> <p>Annual grassland, foothill oak woodland, chaparral and coastal scrub, anthropogenic and ruderal, freshwater marsh wetland (MRS, 2012)</p> <p>Limited spatial data. No alliance level vegetation mapping was available for the entire County.</p>																																													
	Invasive Species	<p>Ripgut brome, wild radish, Russian thistle, Italian thistle, sweet fennel, bull thistle, bur clover, prickly wild lettuce, horseweed? (MRS, 2012)</p> <p>Limited data.</p>																																													
	Special Status Wildlife and Plants	<p>Paniculate tarplant is listed by the California Native Plant Society (CNPS) but is not listed by USFWS or CDFG as threatened or endangered. Well's Manzanita were documented and it is on the CNPS List. (MRS, 2012)</p> <p>Key: Federal endangered – FE, Federal threatened – FT, State endangered – SE, State threatened – ST, CDFW State Species of Concern – SSC, CRPR – CA rare plant ranking (CDFW CNDDDB, viewed August 2013)</p> <table border="1"> <thead> <tr> <th><i>Common Name</i></th> <th>CALDWELL MESA</th> <th>CHIMNEY CANYON</th> <th>HUASNA PEAK</th> <th>LOS MACHOS HILLS</th> <th>NIPOMO</th> <th>POZO SUMMIT</th> <th>SANTA MARGARITA LAKE</th> <th>TAR SPRING RIDGE</th> </tr> </thead> <tbody> <tr> <td>Status</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><i>Animals</i></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><i>American badger</i></td> <td>SSC</td> <td></td> <td>x</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><i>California condor</i></td> <td>FE; SE</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>x</td> <td>x</td> </tr> </tbody> </table>	<i>Common Name</i>	CALDWELL MESA	CHIMNEY CANYON	HUASNA PEAK	LOS MACHOS HILLS	NIPOMO	POZO SUMMIT	SANTA MARGARITA LAKE	TAR SPRING RIDGE	Status									<i>Animals</i>									<i>American badger</i>	SSC		x						<i>California condor</i>	FE; SE						x	x
<i>Common Name</i>	CALDWELL MESA	CHIMNEY CANYON	HUASNA PEAK	LOS MACHOS HILLS	NIPOMO	POZO SUMMIT	SANTA MARGARITA LAKE	TAR SPRING RIDGE																																							
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<i>American badger</i>	SSC		x																																												
<i>California condor</i>	FE; SE						x	x																																							

Huasna River Watershed

	% Urbanized	0% (SLO County LUC)
	% Agricultural	64.4% (SLO County LUC)
	% Other	35.6% (21.46% open space and 14.12% rural lands)(SLO County LUC)
	Planning Areas	South County-Inland, Huasna-Lopez, Los Padres
	Potential growth areas	No source identified.
	Facilities Present	Private wells and septic systems Limited data.
	Commercial Uses	Huasna River Pit – sand and gravel (SLO County Mines); Proposed oil processing facilities, Recreation; agriculture – grazing Limited data.
	Demographics	
	Population	237 (U.S. Census Block, 2010)
	Race and Ethnicity	65.4% Caucasian (155), 11.8% Latinos (28), 3.5% Other, 2.5% mixed race (6) (U.S. Census Block, 2010)
	Income	MHI \$99,115 (U.S. Census Tract, 2010). Census tract is large covering portions of multiple watersheds.
	Disadvantaged Communities	None; 4% of individuals were below poverty level (U.S. Census Tract, 2010). Census tract is large covering portions of multiple watersheds.
	Water Supply	
	Water Management Entities	Twitchell Management Authority Limited data.
	Groundwater	Yes; alluvial and Huasna Valley (SLO County, 2012)
	Surface Water	No public reservoirs. Twitchell Dam recharges the Santa Maria Valley groundwater basin.
	Imported Water	No source identified.
	Recycled/ Desalinated Water	No source identified.
	Infiltration Zones	No source identified.
	Water Budget	None to date.
	Water Uses	
	Beneficial Uses	<i>Huasna River</i> – Municipal and Domestic Supply (MUN), Agricultural Supply (AGR), Ground Water Recharge (GWR), Water Contact Recreation (REC-1), Non-Contact Water Recreation (REC-2),

Huasna River Watershed

		Commercial and Sport Fishing (COMM), Warm Fresh Water Habitat (WARM), Wildlife Habitat (WILD), Rare, Threatened, or Endangered Species (RARE).(RWQCB, 2011)
	Other Unique Characteristics	
	Historic Resources	No source identified.
	Archeological Resources	There was a Chumash town called Wasna at the time of European settlement (SB Museum of Natural History, viewed 2013). Limited data and low priority for this effort.
	Other	No source identified.
	Climate Change Considerations	
		See IRWMP, 2014 Section H. Climate Change Limited data and 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
3312.301301	3	Cuyama Valley	0	undefined	312.30	Bald Mtn.	Haystack Canyon
3312.301302	3	Cuyama Valley	0	undefined	312.30	Bald Mtn.	Carrie Creek
3312.301303	3	Cuyama Valley	0	undefined	312.30	Bald Mtn.	Salt Creek
3312.301304	3	Cuyama Valley	0	undefined	312.30	Bald Mtn.	Joaquin Canyon
3312.301305	3	Cuyama Valley	0	undefined	312.30	Bald Mtn.	Stony Creek
3312.301308	3	Cuyama Valley	0	undefined	312.30	Bald Mtn.	Deer Canyon
3312.301306	3	Cuyama Valley	0	undefined	312.30	Tassajara Hot Springs	Lower Arroyo Seco
3312.301307	3	Cuyama Valley	0	undefined	312.30	Tassajara Hot Springs	Upper Arroyo Seco
3312.301401	3	Cuyama	0	undefined	312.30	Twitchell	Huasna Creek

Huasna River Watershed

		Valley				Reservoir	
3312.301402	3	Cuyama Valley	0	undefined	312.30	Twitchell Reservoir	Lower Twitchell Reservoir
Source: Excerpt from California Interagency Watershed Map of 1999, Calwater 2.2.1 (CA Resource Agency, 2004 Update)							

Major Changes in the Watershed

- The watershed is near the boundary of the areas historically occupied by Obispeno Chumash and the Playanos Salinan (MRS, 2012).
- The area was made part of the Mission San Luis Obispo holdings
- In 1843, title to 22,153 acres of the Huasna Rancho was granted to Isaac Sparks. Upon his death the property was divided among his daughters Flora Harloe, Rosa Porter and Sally Harkness.
- In 1870's the first hunt for oil was conducted in the region.
- In 1899, the first hole was bored for oil by Fredrick Harkness on the Porter Ranch. Other holes were bored in the 1900's on the Records Ranch and Rosa Porter Ranch. Waives of oil exploration occurred in the 1930's and again in the 1950's. (MRS, 2012)
- In 1958, Twitchell Dam and Reservoir was constructed by the Army Corps of Engineers and the Bureau of Reclamation on behalf of the Santa Barbara County Water Agency (TMA, 2010).

Watershed Health by Major Tributary

Tributary Name	Ephemeral / Perennial	303d Listed/ TMDLs	Pollution Sources NP (non-point) MP (Major Point)	Environmental Flows
Huasna River	No source identified.	No. (SWRCB, 2010)	Not assessed. (SWRCB, 2010)	X Cfs (Stillwater Sciences, 2013)
All Other Tribs	No source identified.	Not assessed. (SWRCB, 2010)	Not assessed. (SWRCB, 2010)	

Watershed Health by Major Groundwater Basin

Groundwater Basin	Estimated Safe Yield	Water Availability Constraints	Drinking Water Standard Exceedance	Water Quality Objective Exceedance
Huasna Valley Basin	No existing data. (San Luis Obispo County, Master Water Report, 2012)	Physical Limitations and Water Quality Issues. Shallow alluvial deposits are typically more susceptible to drought impacts	No historical water quality data. (San Luis Obispo County, Master Water Report, 2012)	No objective for the basin. (RWQCB, Table 3-8, 2011)

Huasna River Watershed

than deeper formation aquifers, (San Luis Obispo County, Master Water Report, 2012)

Groundwater Quality Description: No historical water quality data for the alluvial basin has been published in public documents or is available through the STORET Legacy Database. (SLO County, Master Water Report, 2012)

Primary Issues

Issue	Potential Causes	Referenced from
Sedimentation of Twitchell Dam	Natural and upland erosion primarily from Cuyama River.	TWA, 2010

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.

Huasna River Watershed

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Alamo Creek Watershed

Hydrologic Unit Name	Water Planning Area	Acreage	Flows to	Groundwater Basin(s)	Jurisdictions
Santa Maria HU 12	Huasna Valley WPA 8	56,277 acres	Cuyama River at Twitchell Reservoir	Santa Maria River Valley	County of San Luis Obispo U. S. Forest Service

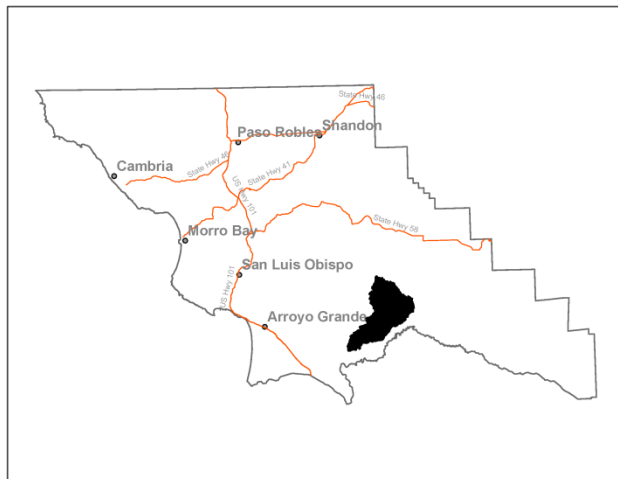


Photo by: N. Smith

Description:

The Alamo Creek Watershed is an inland basin located in southern San Luis Obispo County. The drainage rises to a maximum elevation of approximately 3,800 feet above sea level. Alamo Creek flows to the Cuyama River at Twitchell Reservoir. Major tributary basins with their headwaters in the La Panza Mountain Range: Little Jollo, Sheep, Kennel, Los Machos, and Branch Creeks.

The watershed is dominated by the Los Padres National Forest which permits recreation including camping, hunting, and off-highway vehicle uses. The watershed also has agricultural land uses.



Watershed Plans:

None

Alamo Creek Watershed

Characteristics:

	Physical Setting	
	Rainfall	18 – 25 inches (NRCS, 2010) 17 inches Mean Annual (SLOCountyWater.org, viewed 2013)
	Air Temperature	Summer Range (August 1981-2010): 50° - 82° F Winter Range (December 1981-2010): 36° - 66° F At Twitchell Dam, CA. (NOAA National Climatic Data Center, viewed 2013)
	Geology Description	<p>Alamo Creek, Branch Creek, Kennel Creek, and Sheep Creek sub watersheds are composed of steep moderately infiltrative early to mid-Tertiary headwaters – category #11.</p> <p>Little Jollo Creek sub watershed is composed of moderately steep to steep pre-quaternary non-infiltrative headwaters – category #9. (Stillwater Sciences, personal communication, 2013)</p> <p>The Alamo Creek watershed is characterized by a Middle to Upper Jurassic island-arc ophiolite and an overlying thick forearc of Upper Jurassic and Cretaceous marine sedimentary rocks resembling those on the west side of the Great Valley of CA. Along the south are Paleocene and Eocene strata which consist mainly of submarine-fan deposits which overlie the Mesozoic succession in the Santa Ynez Mountains and southern San Rafael Mountains. Flanking the Stanley Mountain terrane on the northeast of the watershed is the southern part of the Salinia terrane which is defined by ~95 to ~80 million year old granitic plutons that intrude older metasedimentary rocks of unknown origin and overlying Upper Cretaceous and Paleogene marine and nonmarine forearc strata.</p> <p>The Sur-Nacimiento fault zone marks the northeast edge of the Stanley Mountain terrane. The Paleocene rocks unconformably overlie Upper Cretaceous strata in a shallow syncline near the convergence of the Sur-Nacimiento and East Huasna fault zones. This thin Paleogene sequence is unlike any in the adjacent Huasna syncline southwest of the East Huasna fault zone. The limited extent and thinness of the sequence near upper Pine Creek contrast sharply with the widely distributed, thick Paleocene and lower Eocene submarine-fan sequences northeast of the Sur-Nacimiento fault zone. (Vedder, 1991)</p>
	Hydrology	
	Stream Gages	No; USGS 11137400 Alamo Creek near Nipomo CA (1959 - 1978, discontinued); USGS 11137500 Alamo Creek near Santa Maria CA (1943 - 1962, discontinued). (USGS California Water Science Center, viewed 2013) Last data is from late 1970's.

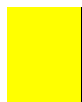
Alamo Creek Watershed

	Hydrologic Models	Yes; There is a USGS HEC-HMS used to calculate reservoir water surface elevation on Twitchell Dam. (TMA, 2010) Hydrologic model does not include entire watershed.														
	Peak Flow	3,120 - 9,020 cfs at USGS 11137400 (USGS, viewed 2013); 2,820 - 3,120 cfs at USGS 11137500 (USGS, viewed 2013) Last data is from late 1970's.														
	Base Flow	0 – 3 cfs at USGS 11137400 (USGS, viewed 2013) ; 3 – 6 cfs at USGS 11137500 (USGS, viewed 2013) It is unknown if these gages were placed to accurately capture base flows. Many gages are placed as alert systems and only capture peak flows.														
	Flood Reports	No sources identified. Though normally dry, wetter winters have seen the [Twitchell] reservoir inundate ...the lower two miles of Alamo Creek, rendering areas below the 652-foot elevation unsuitable for permanent buildings. Upstream portions of these watercourses (and other creeks in the planning area) are potential flood hazard areas during intense or prolonged rainfall. (San Luis Obispo County, Huasna-Lopez Area Plan, 2003) Limited data.														
	Biological Setting															
	Vegetation Cover	Primarily buck brush chaparral (Chamise) and blue oak woodland with some non-native annual grassland, venturan coastal sage scrub, coast live oak forest, semi desert chaparral, central coastal scrub, agricultural land, and permanently flooded lacustrine (San Luis Obispo County vegetation, 1990) Limited current spatial data. No alliance level vegetation mapping was available for the entire County.														
	Invasive Species	No sources identified.														
	Special Status Wildlife and Plants	Key: Federal endangered – FE, Federal threatened – FT, State endangered – SE, State threatened – ST, SSC – State Species of Concern, CRPR – CA rare plant rank. (CNDDDB, viewed August 2013)														
	Species															
	Animals															
	<i>American badger</i>	<table border="1"> <thead> <tr> <th>Status</th> <th>BRANCH MTN</th> <th>CHIMNEY CANYON</th> <th>HUASNA PEAK</th> <th>LA PANZA</th> <th>LOS MACHOS HILLS</th> <th>MIRANDA PINE MTN</th> </tr> </thead> <tbody> <tr> <td>SSC</td> <td></td> <td></td> <td>x</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Status	BRANCH MTN	CHIMNEY CANYON	HUASNA PEAK	LA PANZA	LOS MACHOS HILLS	MIRANDA PINE MTN	SSC			x			
Status	BRANCH MTN	CHIMNEY CANYON	HUASNA PEAK	LA PANZA	LOS MACHOS HILLS	MIRANDA PINE MTN										
SSC			x													

Alamo Creek Watershed

	Race and Ethnicity	63.6% white, 36.4% latino, and 0% other (U.S. Census Block, 2010)
	Income	Approximately \$100,000. (U.S. Census Tract, 2010) Census tract crosses multiple watersheds.
	Disadvantaged Communities	None. Approximately 4%. (U.S. Census Tract, 2010) Census tract crosses multiple watersheds.
	Water Supply	
	Water Management Entity	Twitchell Management Authority; individual wells. (TMA, 2010) No source identified. Limited data.
	Groundwater	Yes; alluvial, Santa Maria Valley (SLO County Master Water Plan, 2012)
	Surface Water	Yes; Twitchell Reservoir supplies about 20,000 AF of recharge to the Santa Maria Groundwater Basin annually. (SMVWCD, 2010)
	Imported Water	No source identified.
	Recycled/ Desalinated Water	No source identified.
	Infiltration Zones	No source identified.
	Water Budget	No source identified.
	Water Uses	
	Beneficial Uses	<i>Alamo Creek</i> – Municipal and Domestic Supply (MUN), Agricultural Supply (AGR), Ground Water Recharge (GWR), 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), Spawning, Reproduction, and/or Early Development (SPWN).(RWQCB, 2011)
	Other Unique Characteristics	
	Historic Resource	No source identified.
	Archeological Resources	There was a Chumash town called Tso at the time of European settlement (SB Museum of Natural History, viewed 2013). Limited data and low priority for this effort.
	Los Padres National Forest	As a part of the Los Padres National Forest, Santa Lucia District the watershed has two campgrounds, an off-highway vehicle area, and is open to general recreation. (Los Padres National Forest Map, 2005)
	Climate Change Considerations	

Alamo Creek Watershed



See IRWMP, 2014 Section H. Climate Change

Limited data and not watershed specific.

Watershed Codes

Cal Water/ DWR Number	HA	Hydrologic Area Name	HSA	Hydrologic Sub-area Name	SWRCB Number	CDF Super Planning	CDF Watershed Name
3312.301206	3	Cuyama Valley	0	undefined	312.30	Stanley Mtn.	Sheep Creek
3312.301207	3	Cuyama Valley	0	undefined	312.30	Stanley Mtn.	Kennel Creek
3312.301205	3	Cuyama Valley	0	undefined	312.30	Stanley Mtn.	Alamo Creek
3312.301204	3	Cuyama Valley	0	undefined	312.30	Stanley Mtn.	Branch Creek
3312.301203	3	Cuyama Valley	0	undefined	312.30	Stanley Mtn.	Little Jollo Creek
3312.301202	3	Cuyama Valley	0	undefined	312.30	Stanley Mtn.	Lower Alamo Creek
3312.301201	3	Cuyama Valley	0	undefined	312.30	Stanley Mtn.	Upper Alamo Creek
3312.301403	3	Cuyama Valley	0	undefined	312.30	Twitchell Reservoir	Upper Twitchell Reservoir

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.
- In 1936, Los Padres National Forest was established.
- In 1958, Twitchell Dam and Reservoir was constructed by the Army Corps of Engineers and the Bureau of Reclamation on behalf of the Santa Barbara County Water Agency. (TMA, 2010)
- In 1997, the Logan Fire burned approximately 49,500 acres, some of which was in the upper watershed. (CDF, Strategic Fire Plan, 2012)
- In 2009, the La Brea Fire burned approximately 336,020 acres of which approximately 15% (50,403 acres) was in the Twitchell Reservoir watersheds. (CDF, Strategic Fire Plan, 2012)

Alamo Creek Watershed

Watershed Health by Major Tributary

Tributary Name	Ephemeral / Perennial	303d Listed/ TMDLs	Pollution Sources NP (non-point) MP (Major Point)	Environmental Flows
Alamo Creek	Perennial	Yes; Fecal Coliform TMDL estimated date of completion 2021. (SWRCB, 2010)	Agriculture, grazing-related, natural sources (SWRCB, 2010)	X cfs (Stillwater Sciences, 2013)
Sheep Creek	No source identified.	Not assessed.	No source identified.	
Kennel Creek	No source identified.	Not assessed.	No source identified.	
Alamo Creek	No source identified.	Not assessed.	No source identified.	
Branch Creek	No source identified.	Not assessed.	No source identified.	
Little Jollo Creek	No source identified.	Not assessed.	No source identified.	

Watershed Health by Major Groundwater Basin

Groundwater Basin	Estimated Safe Yield	Water Availability Constraints	Drinking Water Standard Exceedance	Water Quality Objective Exceedance
Cuyama Valley - Cuyama Valley Basin (portion)	10,667 AFY (San Luis Obispo County, Master Water Report, 2012)	Physical limitations. (San Luis Obispo County, Master Water Report, 2012)	No. (San Luis Obispo County, Master Water Report, 2012)	No. (RWQCB, Table 3-8, 2011)
*Santa Maria Valley - Orcutt Sub-basin	Unknown. (San Luis Obispo County, Master Water Report, 2012)	Unknown. (San Luis Obispo County, Master Water Report, 2012)	Unknown. (San Luis Obispo County, Master Water Report, 2012)	Yes. (RWQCB, Table 3-8, 2011)
*Santa Maria Valley – Santa Maria Management Area (SMVMA) (portion)	124,000 -125,100 AFY of groundwater production in the basin. For the portion of the Santa Maria Valley in San Luis Obispo County, dependable yield,	Water quality and water rights. (San Luis Obispo County, Master Water Report, 2012)	Yes for Sulfate and TDS (San Luis Obispo County, Master Water Report, 2012)	Yes for basin. No objective for management area. (RWQCB, Table 3-8, 2011)

Alamo Creek Watershed

Groundwater Basin	Estimated Safe Yield	Water Availability Constraints	Drinking Water Standard Exceedance	Water Quality Objective Exceedance
	was estimated between 11,100 AFY and 13,000 AFY prior to the formal establishment of the SMVMA (DWR 2002).			

*Note: The Santa Maria Valley Groundwater Basin has been adjudicated. In 2005, the Superior Court of California entered a Judgment for a basin-wide groundwater litigation case that defined three basin management areas. These management areas are the Northern Cities Management Area (NCMA), the Nipomo Mesa Management Area (NMMA), and the Santa Maria Valley Management Area (SMVMA), which are used herein for planning by the County of San Luis Obispo. The Judgment incorporated a Stipulated Settlement which was made binding by the Court on the signatories, with a declaratory judgment and physical solution adjudged and decreed in the Judgment after Trial, dated January 25, 2008.

Groundwater Quality Description: Sulfate and TDS are the primary constituents of concern within the San Luis Obispo County portion of the SMVMA. TDS concentrations collected in four area wells between 1992 and 1998 ranged from approximately 750 mg/L to 1,300 mg/L, with a median of 1,200 mg/L, which exceeds the State drinking water standard upper limit of 1,000 mg/L. All the sulfate concentrations exceeded the recommended drinking water standard of 250 mg/L and some exceeded the upper limit of 500 mg/L. TDS was up to 800 mg/L greater in the alluvial aquifer, when compared to the underlying Paso Robles Formation aquifers. Nitrates are also a concern in several areas of the valley, although the majority of groundwater sample results in the San Luis Obispo County portion of the valley are below the MCL (DWR 2002).

Primary Issues

Issue	Potential Causes	Referenced from
Sedimentation of Twitchell Reservoir	Natural and upland erosion primarily from Cuyama River	TMA, 2010

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.

Alamo Creek Watershed

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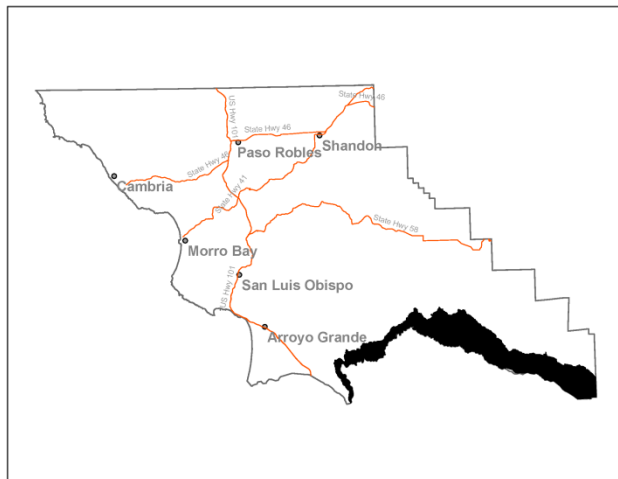
Cuyama River Watershed

Hydrologic Unit Name	Water Planning Area	Acreage	Flows to	Groundwater Basin(s)	Jurisdictions
Santa Maria HU 12	Cuyama Valley WPA 9 Huasna Valley WPA 8	140,408 acres in County; 729,600 acres total	Santa Maria River	Cuyama Valley; Santa Maria Valley	County of San Luis Obispo Los Padres National Forest



Description:

The Cuyama River Watershed starts in Ventura County. The river generally flows in a westerly direction to a point of confluence with the Sisquoc River near the town of Garey where it joins the Santa Maria River. A portion of the northern tributaries are within the southwestern part of San Luis Obispo County. These northern tributaries rise to a maximum elevation of almost 4,950 feet above sea level at Caliente Mountain with their headwaters in the La Panza and Caliente Mountain Ranges.



The watershed is dominated by rural and agricultural land uses including ranches, orchards, vineyards and row crops. Other land uses include oil and gas production, Los Padres National Forest and Bureau of Land Management lands.

Watershed Plans:

None.

Cuyama River Watershed

Characteristics:

	Physical Setting	
	Rainfall	7 – 24 inches in County 7 – 30 inches for entire watershed (NRCS Precip 1981-2010)
	Air Temperature	Summer Range (August 1981-2010): 50°- 82° F Winter Range (December 1981-2010): 36°- 66° F At Twitchell Dam, CA. (NOAA National Climatic Data Center, viewed 2013)
	Geology Description	The Chimney Canyon sub watershed consists of steep pre- quaternary non-infiltrative headwaters and a steep moderately infiltrative early to mid-Tertiary valley – category #5. The Buckhorn Canyon sub watershed consists of moderately steep to steep pre-quaternary non-infiltrative headwaters – category #9. (Bell, personal communication, 2013) The Cuyama Valley was formed by a down faulted block that is bordered on the north by the Morales and Whiterock faults, and on the south by the South Cuyama and Ozena faults. The basin has been filled with continental deposits resulting from the active faults that border the valley to the north and south, and by alluvium deposited by the Cuyama River. These deposits coupled with the semi-arid climate of the region have created a wide distribution of soil types (Roehrdanz, et al, 2009).
	Hydrology	
	Stream Gage	Yes; USGS 11136800 Cuyama River below Buckhorn Canyon (1959- 2007, discontinued); USGS 11138100 Cuyama River below Twitchell Dam (1959-1983, discontinued). Limited data.
	Hydrology Models	Yes; There is a USGS HEC-HMS used to calculate reservoir water surface elevation on Twitchell Dam. (TMA, 2010) Hydrologic model does not include entire watershed.
	Peak Flow	17,800 - 26,200 cubic feet per second occurred at the USGS 11136800 Cuyama River below Buckhorn Canyon, near Santa Maria (TMA, 2010). The Cuyama River is characterized as “flashy” with relatively rapid response to rainfall and little or no flow in its reaches during the summer months. The annual mean flow is approximately 27.8 cfs, however during the 1998 floods flow rates reached 26,200 cfs (SB County Water Agency, 2000).
	Base Flow	Average flow of only 18 cfs at the Cuyama River near Santa Maria River gage just above Twitchell Reservoir (USGS 11137000) for the

Cuyama River Watershed

		period 1941–1962 (Stillwater Sciences, 2012)																																																																																																																																																
		It is unknown if these gages were placed to accurately capture base flows. Many gages are placed as alert systems and only capture peak flows.																																																																																																																																																
	Flood Reports	Yes; Twitchell Project Manual (TMA, 2010); Floods in Cuyama Valley, California (USGS, 1998)																																																																																																																																																
	Biological Setting																																																																																																																																																	
	Vegetation Cover	<p>Primarily sage scrub and salt brush scrub with some chaparral (chamise, semi-desert, buck brush), non-native grassland, blue oak woodland, coast live oak forest, orchard or vineyard and agricultural lands. (SLO County, vegetation shapefile, 1990)</p> <p>Annual grasslands, chaparral and scrub habitats, blue oak woodlands and pinyon-juniper woodlands dominate the area, but rare habitats such as saltbush scrub, alkaline marshes, and riparian forests are also present. (Roehrdanz, et al, 2009)</p> <p>Limited spatial data. No alliance level vegetation mapping was available for the entire County.</p>																																																																																																																																																
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Cuyama River Watershed

Kern primrose sphinx moth	FT	x	x		x	x	x		x	x		x
long-eared owl	SSC											x
longhorn fairy shrimp	FE		x	x					x			x
Nelson's antelope squirrel	ST	x				x					x	
prairie falcon	Special Animal (Nesting)	x	x	x	x	x	x		x	x	x	x
San Joaquin kit fox	FE; ST	x	x			x			x	x		x
San Joaquin whipsnake	SSC											x
silvery legless lizard	SSC									x		
Swainson's hawk	ST					x	x			x		
tricolored blackbird	SSC (Nesting)					x						x
Tulare grasshopper mouse	SSC											x
two-striped garter snake	SSC					x				x		
vernal pool fairy shrimp	FT		x							x		
western pond turtle	SSC									x		x
western spadefoot	SSC											x
Plants												
woven-spored lichen	CALS Listed											x
Blakley's spineflower	CRPR 1B.3									x		x
California jewel-flower	FE; SE; CRPR 1B.1	x				x				x		
Hoover's eriastrum												

Cuyama River Watershed

	Barriers	Status Unknown, PAD # 736548.00000; Alamo Creek Bridge with potential passage constraints, Status Unknown, PAD # 736590.00000; Bridge with potential passage constraints at the Cuyama River, Status unknown, PAD # 736651.00000; Culvert at Hwy 166 and Cuyama River, Status Unknown, PAD #736667.00000; Twitchell Dam at the Cuyama River, Total Barrier, PAD #718831.00000; Road Crossing at the Cuyama River, Partial Barrier, PAD # 723386.00000 (CDFW Passage Assessment Database, 2013).
	Designated Critical Habitat	None. (USFWS Critical Habitat Portal, viewed 2013)
	Habitat Conservation Plans	No source identified.
	Other Environmental Resources	Los Padres National Forest, Carrizo National Monument, The Nature Conservancy has identified the Cuyama Valley as a potential priority region due to its ecological richness, rare plant communities, and its potential to function as a wildlife corridor between the conserved lands of the Carrizo Plain National Monument and Los Padres National Forest.
	Land Use	
	Jurisdictions & Local Communities	County of San Luis Obispo.
	% Urbanized	0% in County (SLO County LUC)
	% Agricultural	44% in County (SLO County LUC)
	% Other	56% (12.47% open space and 43.48% rural lands) in County (SLO County LUC)
	Planning Areas	Shandon-Carrizo, Los Padres, Huasna-Lopez, South County Inland
	Potential growth areas	No source identified.
	Facilities Present	Twitchell Dam Limited data.
	Commercial Uses	Agriculture Limited data.
	Demographics	
	Population	128 (U.S. Census Block, 2010)
	Race and Ethnicity	21.9% Caucasian (28), 76.6% Latino (98), and 0.8% Other. (U.S. Census Block, 2010)
	Income	MHI \$60,676 (U.S. Census Tract 127.02, 2010) Census tracts are very large crossing multiple watersheds.
	Disadvantaged Communities	No; 7% of individuals are below poverty (U.S. Census Tract 127.02, 2010)

Cuyama River Watershed

		Census tracts are very large crossing multiple watersheds.
	Water Supply	
	Water Management Entities	Twitchell Management Authority Limited data.
	Groundwater	Yes; alluvial, Cuyama Valley, Santa Maria Valley (SLO County, 2012)
	Surface Water	Yes; Twitchell Dam recharges the Santa Maria Valley groundwater basin. (TMA, 2010)
	Imported Water	No source identified.
	Recycled/Desalinated Water	No source identified.
	Infiltration Zones	Seepage of river flows through the river bed along the Santa Maria River and along the lower reaches of the Cuyama and Sisquoc Rivers is the primary source of recharge to the Santa Maria Groundwater Basin. Percolation of river flows through unconsolidated, permeable alluvial deposits account for approximately 75-85% of the average annual recharge to the groundwater basin. A significant portion of the groundwater recharge attributable to river bed seepage is due to the operation of the Twitchell Dam. (SLO County & SB County, 1998) Limited data.
	Water Budget	A water budget was developed for the Cuyama Valley that acknowledges limited data (Roehrdanz, et. al, 2009). The County of Santa Barbara and U.S Geological Society is developing the <i>Geohydrology and Water Availability of the Cuyama Valley, California</i> , expected to be completed in 2014. Limited data.
	Water Uses	
	Beneficial Uses	<i>Cuyama River, upstream of Twitchell Reservoir</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), Rare, Threatened, or Endangered Species (RARE), Spawning, Reproduction, and/or Early Development (SPWN). (RWQCB, 2011)
	Other Unique Characteristics	
	Historic Resources	No source identified.

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	Archeological Resources	There were Chumash towns called Wenexe'l and Sxaliwilimu' at the time of European settlement (SB Museum of Natural History, viewed 2013). Limited data and low priority for this effort.
	Other	No source identified.
	Climate Change Considerations	
		See IRWMP, 2014 Section H. Climate Change Limited data and not watershed specific.

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Watershed Codes

Calwater/ DWR Number	HA	Hydrologic Area Name	HSA	Hydrologic Sub-area Name	SWRCB Number	CDF Super Planning Watershed Name	CDF Watershed Name
3312.301006	3	Cuyama Valley	0	undefined	312.30	Gifford Spring	Carrizo Canyon
3312.301009	3	Cuyama Valley	0	undefined	312.30	Gifford Spring	Brown Canyon
3312.301002	3	Cuyama Valley	0	undefined	312.30	Gifford Spring	Moon Canyon
3312.301003	3	Cuyama Valley	0	undefined	312.30	Gifford Spring	Taylor Canyon
3312.301004	3	Cuyama Valley	0	undefined	312.30	Gifford Spring	Miranda Canyon
3312.301007	3	Cuyama Valley	0	undefined	312.30	Gifford Spring	Sycamore Creek
3312.301008	3	Cuyama Valley	0	undefined	312.30	Gifford Spring	Gypsum Canyon
3312.301010	3	Cuyama Valley	0	undefined	312.30	Gifford Spring	Pearson Spring
3312.301101	3	Cuyama Valley	0	undefined	312.30	Porter Peak	Rice Ranch
3312.301105	3	Cuyama Valley	0	undefined	312.30	Porter Peak	Buckhorn Canyon
3312.301106	3	Cuyama Valley	0	undefined	312.30	Porter Peak	Clear Creek
3312.300902	3	Cuyama Valley	0	undefined	312.30	Chalk Mtn.	Lower Aliso Canyon
3312.300905	3	Cuyama Valley	0	undefined	312.30	Chalk Mtn.	Post Canyon
3312.300907	3	Cuyama Valley	0	undefined	312.30	Chalk Mtn.	Lower Schoolhouse Canyon
3312.300908	3	Cuyama Valley	0	undefined	312.30	Chalk Mtn.	Morales Canyon
3312.300909	3	Cuyama Valley	0	undefined	312.30	Chalk Mtn.	Morales Canyon Oil Field
3312.301403	3	Cuyama Valley	0	undefined	312.30	Twitchell Reservoir	Upper Twitchell Reservoir
3312.301404	3	Cuyama Valley	0	undefined	312.30	Twitchell Reservoir	Chimney Canyon
3312.301405	3	Cuyama Valley	0	undefined	312.30	Twitchell Reservoir	Canada de los Coches
3312.301406	3	Cuyama Valley	0	undefined	312.30	Twitchell Reservoir	Mouth of Cuyama River

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Calwater/ DWR Number	HA	Hydrologic Area Name	HSA	Hydrologic Sub-area Name	SWRCB Number	CDF Super Planning Watershed Name	CDF Watershed Name
3312.300804	3	Cuyama Valley	0	undefined	312.30	New Cuyama	Sulfur Canyon
3312.300803	3	Cuyama Valley	0	undefined	312.30	New Cuyama	Padrones Canyon
3312.300802	3	Cuyama Valley	0	undefined	312.30	New Cuyama	Quail Canyon
3312.300805	3	Cuyama Valley	0	undefined	312.30	New Cuyama	New River
3312.300801	3	Cuyama Valley	0	undefined	312.30	New Cuyama	Stubblefield Road

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

Major Changes in the Watershed

- In 1958, Twitchell Dam and Reservoir was constructed by the U.S. Army Corps of Engineers and the Bureau of Reclamation on behalf of the Santa Barbara County Water Agency. (TMA, 2010)

Watershed Health by Major Tributary

Tributary Name	Ephemeral / Perennial	303d Listed/ TMDLs	Pollution Sources NP (non-point) MP (Major Point)	Environmental Flows
Cuyama River (above Twitchell Reservoir)	Ephemeral	Yes on 303d list for Boron, Chloride, Electrical Conductivity, Fecal Coliform, pH, Sodium. TMDL estimated date of completion 2021. (SWRCB, 2010)	Agriculture, grazing-related, municipal point sources, natural , resource extraction (SWRCB, 2010)	X Cfs (Stillwater Sciences, 2013)

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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
Cuyama Valley Basin	9,000 - 13,000 AFY (San Luis Obispo County, Master Water Report, 2012)	Physical Limitations. (San Luis Obispo County, Master Water Report, 2012) DWR identifies it as in "critical condition of overdraft" (Roehrdanz, et al., 2009).	Yes (San Luis Obispo County, Master Water Report, 2012)	No. (RWQCB, Table 3-8, 2011)
Santa Maria Valley Basin	Adjudicated. (San Luis Obispo County, Master Water Report, 2012)			Yes. (RWQCB, Table 3-8, 2011)

*Note: The Santa Maria Valley Groundwater Basin has been adjudicated. In 2005, the Superior Court of California entered a Judgment for a basin-wide groundwater litigation case that defined three basin management areas. These management areas are the Northern Cities Management Area (NCMA), the Nipomo Mesa Management Area (NMMA), and the Santa Maria Valley Management Area (SMVMA), which are used herein for planning by the County of San Luis Obispo. The Judgment incorporated a Stipulated Settlement which was made binding by the Court on the signatories, with a declaratory judgment and physical solution adjudged and decreed in the Judgment after Trial, dated January 25, 2008.

Groundwater Quality Description: Analyses of water from three public supply wells show an average TDS content of 858 mg/L and a range from 755 to 1,000 mg/L. USGS analyses show TDS content as high as 1,750 mg/L. Because of constant cycling and evaporation of irrigation water in the basin, water quality has been deteriorating (DWR 2003; SBCWA 1996; SBCWA 2001). Groundwater near the Caliente Range has high salinity, which has been attributed to seepage out of the basement marine rocks. Nitrate content reached 400 mg/L in some shallow wells (DWR 2003; County of Santa Barbara Planning and Development Department, 1994). (SLO County, 2012)

Primary Issues

Issue	Potential Causes	Referenced from
Sedimentation of Twitchell Reservoir	Natural and upland erosion	TMA, 2010
Groundwater Supplies	Natural, water extraction	Roehrdanz, et al., 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

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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.

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