

Santa Maria River Watershed

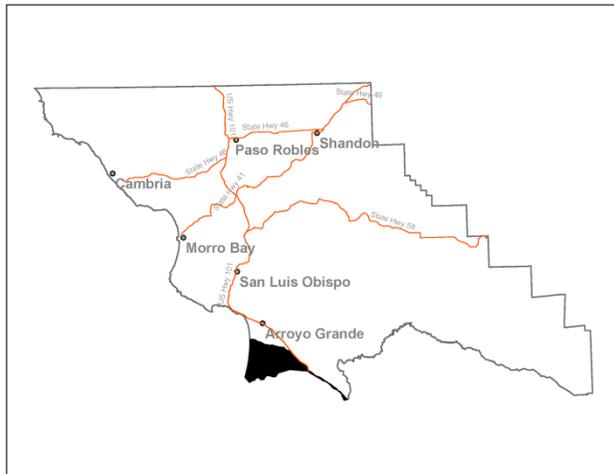
Hydrologic Unit Name	Water Planning Area	Acreage	Flows to	Groundwater Basin(s)	Jurisdictions
Estero Bay & Santa Maria HU 10 & 12	South Coast WPA 7	33,205 acres	Pacific Ocean	Santa Maria Valley	County of San Luis Obispo, Town of Nipomo



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)

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Characteristics:

	Physical Setting	
	Rainfall	15 – 17 inches (NRCS Precipitation 1981-2010)
	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>
	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>

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		<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	Primarily agricultural land and coastal beaches and dunes with

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	<p>some central coastal scrub (sagebrush and heather goldenbush), 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>Dune wetlands and riparian vegetation are present in backdunes and along dune lakes in this watershed. (Althouse and Meade, 2013)</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 include California spineflower, sand almond, Gambel’s watercress, marsh sandwort (Morro Group, 1996). Special status wildlife for which appropriate habitat is present include silver legless lizard, southwestern pond turtle, California red-legged frog, Cooper’s hawk, sharp-shinned hawk, golden eagle, prairie falcons, Peregrine falcon and monarch butterfly. (Morro Group, 1996)</p> <p>Key: FE - Federal endangered, FT - Federal threatened, SE - State endangered, ST - State threatened, SSC - State Species of Special Concern; FP- Fully Protected, SA – Special Animal, CRPR – CA rare plant rank (CNDDDB, viewed August, 2013)</p> <p>Locations listed refer to USGS 7.5’ quadrangle names. Only the portion overlapping the watershed boundary was considered.</p> <p>Limited by the type of data collected in the CA Natural Diversity Database.</p> <table border="1"> <thead> <tr> <th><i>Common Name</i></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 colspan="7" style="text-align: center;">Animals</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, some wintering sites)</td> <td></td> <td></td> <td></td> <td>x</td> <td></td> </tr> <tr> <td><i>California black rail</i></td> <td>ST</td> <td></td> <td></td> <td>x</td> <td></td> <td></td> </tr> <tr> <td><i>California least tern</i></td> <td>FE; SE</td> <td></td> <td></td> <td>x</td> <td>x</td> <td></td> </tr> </tbody> </table>	<i>Common Name</i>	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, some wintering sites)				x		<i>California black rail</i>	ST			x			<i>California least tern</i>	FE; SE			x	x	
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<i>Common Name</i>	Status	GUADALUPE	NIPOMO	OCEANO	POINT SAL	SANTA MARIA
<i>California red-legged frog</i>	FT	x	x	x		x
<i>California tiger salamander</i>	FT; ST					
<i>coast horned lizard</i>	SSC	x		x	x	x
<i>globose dune beetle</i>	SA			x		
<i>mimic tryonia</i> (=California brackish water snail)	SA			x		
<i>monarch butterfly</i>	SA			x		x
<i>Morro Bay blue butterfly</i>	SA			x		
<i>Oso Flaco flightless moth</i>	SA			x		
<i>Oso Flaco patch butterfly</i>	SA			x		
<i>Oso Flaco robber fly</i>	SA			x		
<i>prairie falcon</i>	SA (Nesting)		x	x		
<i>sandy beach tiger beetle</i>	SA			x		
<i>sharp-shinned hawk</i>	SA (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
<i>white sand bear scarab beetle</i>	SA			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	

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Common Name	Status	GUADALUPE	NIPOMO	OCEANO	POINT SAL	SANTA MARIA
<i>crisp monardella</i>	CRPR 1B.2	x		x	x	
<i>Davidson's saltscare</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; CRPR 1B.1	x		x	x	
marsh sandwort	FE; SE			x		
<i>Miles' milk-vetch</i>	CRPR 1B.2		x			
Nipomo Mesa lupine	FE; SE			x		
Pismo clarkia	FE; SR			x		
<i>San Bernardino aster</i>	CRPR 1B.2			x		
<i>San Luis Obispo monardella</i>	CRPR 1B.2			x	x	
<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	

	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	Guadalupe Dunes Complex, Coastal Zone, Oso Flaco Lake Natural

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	Environmental Resources	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. 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.

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	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). 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</p>

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		<p>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>
	Other Unique Characteristics	
	Historic Resources	No source identified.
	Archeological Resources	<p>There are a number of archaeological sites in the [Nipomo] area which are large but of a low density (Morro Group, 1996).</p> <p>Limited data.</p>
	Other	No source identified.
	Climate Change Considerations	
		<p>State climate change maps show sea level inundation at the Oso Flaco Creek and Santa Maria River Estuaries (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 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)

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).

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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
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)	No source identified.
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)	No source identified.
Black Lake Canyon	Isolated	Not assessed. (SWRCB, 2010)	Undetermined.	No source identified.
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)	No source identified.

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Watershed Health by Major Groundwater Basin

Groundwater Basin	Estimated Safe Yield	Water Availability Constraints	Drinking Water Standard Exceedance	Water Quality Objective Exceedance
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)

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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 and Meade, 2012; RWQCB, 2012 and 2013.
Potential for incidental take of endangered or threatened species	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, rural runoff, legacy groundwater	Dunes Center, 2004
DDT and dieldrin	Undetermined, sediment	Davis, 2010 and RWQCB TMDL

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.

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