Attachment 2 to Staff Report

California Environmental Protection Agency
Central Coast Regional Water Quality Control Board

Total Maximum Daily Loads for Nitrogen Compounds in the Santa Ynez River Basin

Santa Barbara County, California

TMDL Project Technical Report

June 2023

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1 PREFACE

The purpose of this report is to present information to support development of a total maximum daily loads (TMDLs) project addressing nutrient-related water quality in streams[1] of the Santa Ynez River basin. Data, information, and narrative contained in this document are a draft work in progress, and thus are subject to revision and change during the course of TMDL development.

TMDLs are water quality improvement plans, and thus a TMDL report is a type of planning document. The California Water Plan characterizes TMDLs as "action plans…to improve water quality." Similarly, The U.S. Environmental Protection Agency (USEPA) states that:

> *"A TMDL serves as a planning tool and potential starting point for restoration or protection activities with the ultimate goal of attaining or maintaining water quality standards."*
> From: U.S. Environmental Protection Agency, Implementing Clean Water Action Section 303(d): Impaired Waters and Total Maximum Daily Loads (TMDLs) – webpage accessed April 2016
> https://www.epa.gov/tmdl

The TMDL approach allows stakeholders to determine how best to reach a TMDL's water quality improvement goals.[2] The State and the Regional Water Quality Control Boards help achieve those goals and regulatory requirements by establishing scientifically-based numeric water quality targets, by providing oversight, support, and money for watershed improvement projects.[3]

Section 303(d) of the federal Clean Water Act requires every state to evaluate its waterbodies and maintain a list of waters that are considered "impaired"[4] either because the water exceeds water quality standards or does not support its designated use. For each impaired water on the Central Coast's portion of the Clean Water Act section 303(d) List, the Central Coast Regional Water Quality Control Board (Central Coast Water Board) must develop and implement a plan to reduce pollutants so that the waterbody is no longer impaired and can be de-listed.

2 TMDL PROJECT LOCATION & WATERSHED DELINEATION

This TMDL project concerns the Santa Ynez River basin. Figure 1 illustrates the Santa Ynez River basin. The River basin is an east-west trending structural depression between hills and mountains of the Transverse Ranges in southern Santa Barbara County. The River basin's drainage encompasses 896 square miles. Major tributaries of the Santa Ynez River are Salsipuedes, Cachuma, Santa Cruz, and Indian creeks (see Figure 1).

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[1] In the context of this TMDL project, "streams" refer to any body of running water (such as a river, creek, brook, slough, canal, ditch, ephemeral drainage) which flows on the earth's surface within the area shown on Figure 1.
[2] See State Water Resources Control Board videos webpage, http://www.waterboards.ca.gov/videos/ : What is a TMDL?
[3] *Ibid*
[4] The U.S. Environmental Protection Agency defines "impaired waters" as waters that are too polluted or otherwise degraded to meet water quality standards.

The first Europeans to visit and name the river were the Spaniards of the Portolá expedition.[5] These explorers camped near the River mouth on August 30, 1769. Expedition member Juan Crespi wrote in his diary that the River at this point was more than 100 yards wide, "full of fresh water," and separated from the ocean by a sand bar. According to the U.S. Geological Survey, historical variants of the River's name were La Purisima River, Rio De Calaguasa, and Rio de San Bernardo, among others.

An early attempt to assess the water resources of this River basin was published by the U.S. Geological Survey in 1951, in Water Supply Paper 1107 entitled "Geology and Water Resources of the Santa Ynez River basin, Santa Barbara County, California." Since the mid-20th century, the natural hydrology of the Santa Ynez River has been modified by dams and reservoirs.

The upper Santa Ynez River basin remains in a relatively natural and undisturbed state within the Los Padres National Forest, with an ecosystem characterized by chamise-redshank chaparral, oak woodlands, and some areas of montane-hardwood conifer woodlands.[6]

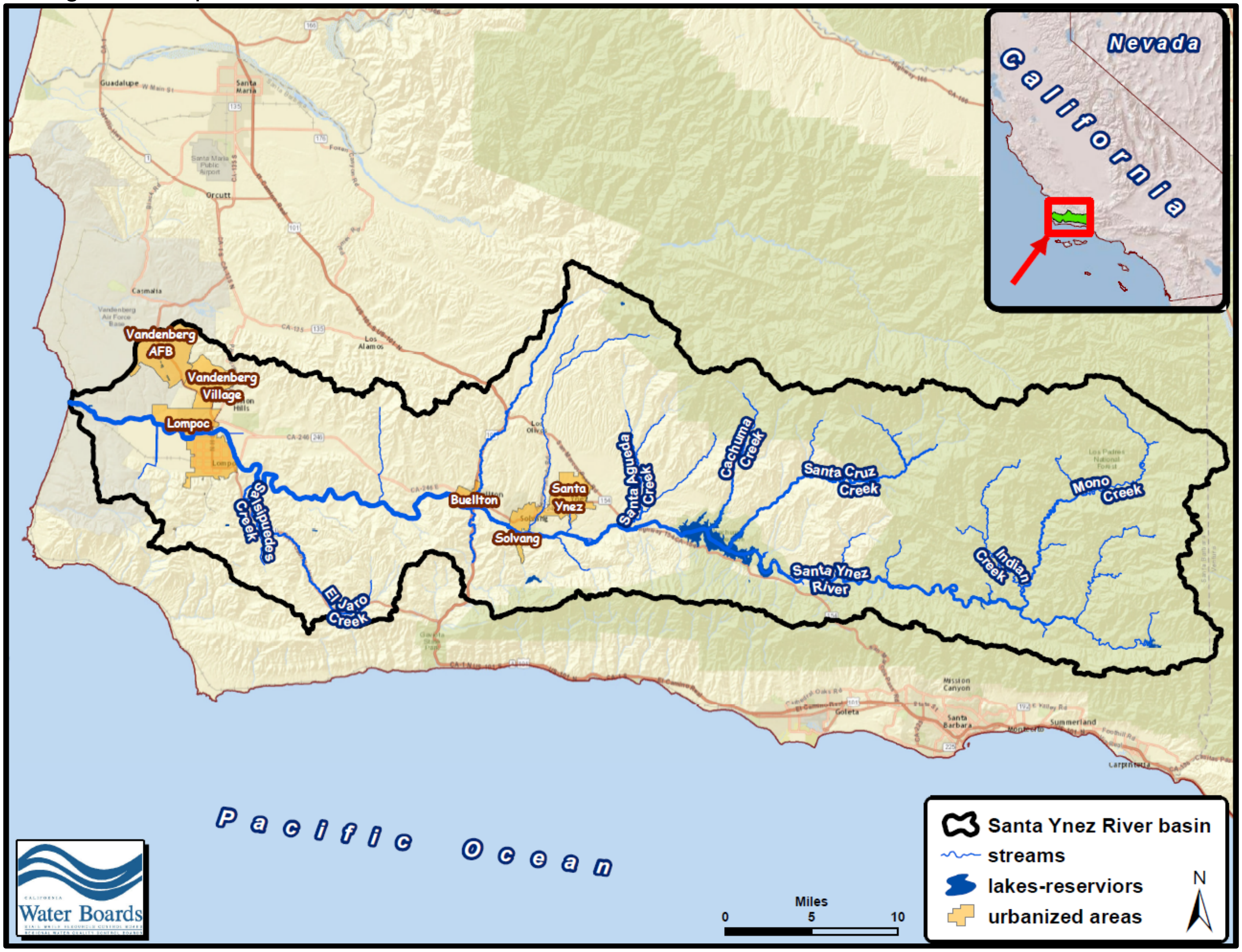
The lower Santa Ynez River basin, below Cachuma Dam, has a more significant human footprint. Landscapes there are characterized by urbanized/developed lands, cultivated cropland and vineyards, coastal oak woodland, and coastal scrub.[7]

[5] The Portolá expedition was the first recorded European land exploration of the present-day state of California during 1769-1770 and led to the founding of the Spanish colony of Alta California.

[6] Source: California Department of Forestry and Fire Protection, 1980 - CALVEG vegetation attributes database.

[7] *Ibid*

Figure 1. Map of the Santa Ynez River basin.



Delineation of watershed drainage boundaries is a necessary part of TMDL development. Drainage boundaries of the conterminous United States are delineated based on the Watershed Boundary Dataset,[8] which contain digital hydrologic unit boundary layers organized based on Hydrologic Unit Codes. Hydrologic Unit Codes (HUCs) were developed by the United States Geological Survey to identify all the drainage basins of the United States.

Watersheds range in all sizes depending on how the drainage area of interest is spatially defined, if drainage areas are nested, and on the nature and focus of a particular hydrologic study. Watersheds within the Santa Ynez River basin can be characterized by a hierarchy as presented in Table 1.

[8] The Watershed Boundary Dataset (WBD) is developed by federal agencies and national associations. The WBD contains watershed boundaries that define the areal extent of surface water drainage to a downstream outlet. WBD watershed boundaries are determined solely upon science-based principles, not favoring any administrative boundaries. The WBD is considered by federal agencies to be the authoritative dataset for hydrologic unit boundaries for the nation.

Table 1. Watershed hierarchy (basins, watersheds, subwatersheds) for the Santa Ynez River basin.

Hydrologic Unit	Approx. Drainage Area (square miles)	Example(s)	Spatial Data Source
basin	Generally more than 800 square miles	Santa Ynez River basin (896 square miles)	Watershed Boundary Dataset HUC-8 shapefiles available from: U.S. Geological Survey & Natural Resource Conservation Service
watershed	Generally >60 square miles to <250 square miles	Mono Creek watershed (123 square miles) Santa Cruz Creek watershed (76 square miles)	Watershed Boundary Dataset HUC-10 shapefiles available from: U.S. Geological Survey & Natural Resource Conservation Service
subwatershed	Generally >15 square miles to <60 square miles	Nojoqui Creek subwatershed (16 square miles) Zaca Creek subwatershed (40 square miles)	Watershed Boundary Dataset HUC-12 shapefiles available from: U.S. Geological Survey & Natural Resource Conservation Service

The Santa Ynez River basin is delineated at the HUC-8 hydrologic unit scale (HUC 18060010) – refer back to Figure 1 which highlights the Santa Ynez River basin in map view.

Individual watersheds at the HUC-10 hydrologic unit scale which are nested within the Santa Ynez River basin were delineated by digitally clipping HUC-10 watershed shapefiles using the Santa Ynez River basin HUC-8 shapefile as a mask. Based on HUC-10 delineations, there are seven distinct watersheds nested within the Santa Ynez River basin as tabulated in Table 2 and shown in map view in Figure 2.

At a higher resolution hydrologic scale, there are 28 distinct subwatersheds, delineated at the HUC-12 scale, nested within the Santa Ynez River basin as shown in map view in Figure 2 and tabulated in Table 3.

Table 2. TMDL watershed hierarchy (basins, watersheds, and subwatersheds).

Name	Hydrologic Scale	Spatial Data Source	Drainage Area (mi^2)
Santa Ynez River basin	**basin**	WBD 8-digit Hydrologic Unit Code HUC # 18060010	897
Mono Creek	**watershed** *within the Santa Ynez River basin*	WBD 10-digit Hydrologic Unit Code HUC # 1806001001	124
Headwaters Santa Ynez River	**watershed** *within the Santa Ynez River basin*	WBD 10-digit Hydrologic Unit Code HUC # 1806001002	78

Name	**Hydrologic Scale**	**Spatial Data Source**	**Drainage Area (mi^2)**
Santa Cruz Creek	**watershed** *within the Santa Ynez River basin*	WBD 10-digit Hydrologic Unit Code HUC # 1806001003	76
Redrock Canyon-Santa Ynez River	**watershed** *within the Santa Ynez River basin*	WBD 10-digit Hydrologic Unit Code HUC # 1806001004	102
Alamo Pintado Creek-Santa Ynez River	**watershed** *within the Santa Ynez River basin*	WBD 10-digit Hydrologic Unit Code HUC # 1806001005	231
Zaca Creek-Santa Ynez River	**watershed** *within the Santa Ynez River basin*	WBD 10-digit Hydrologic Unit Code HUC # 1806001006	125
Salsipuedes Creek-Santa Ynez River	**watershed** *within the Santa Ynez River basin*	WBD 10-digit Hydrologic Unit Code HUC # 1806001007	161
Subwatersheds of the Santa Ynez River basin	**subwatersheds**	WBD 12-digit Hydrologic Unit Codes See Figure 2 and Table 3 for subwatershed information	-

Figure 2. Map of watersheds (HUC-10s) and subwatersheds (HUC-12s) in the Santa Ynez River basin. The subwatersheds in this map have associated numeric identifiers and the subwatershed names are tabulated in Table 3.

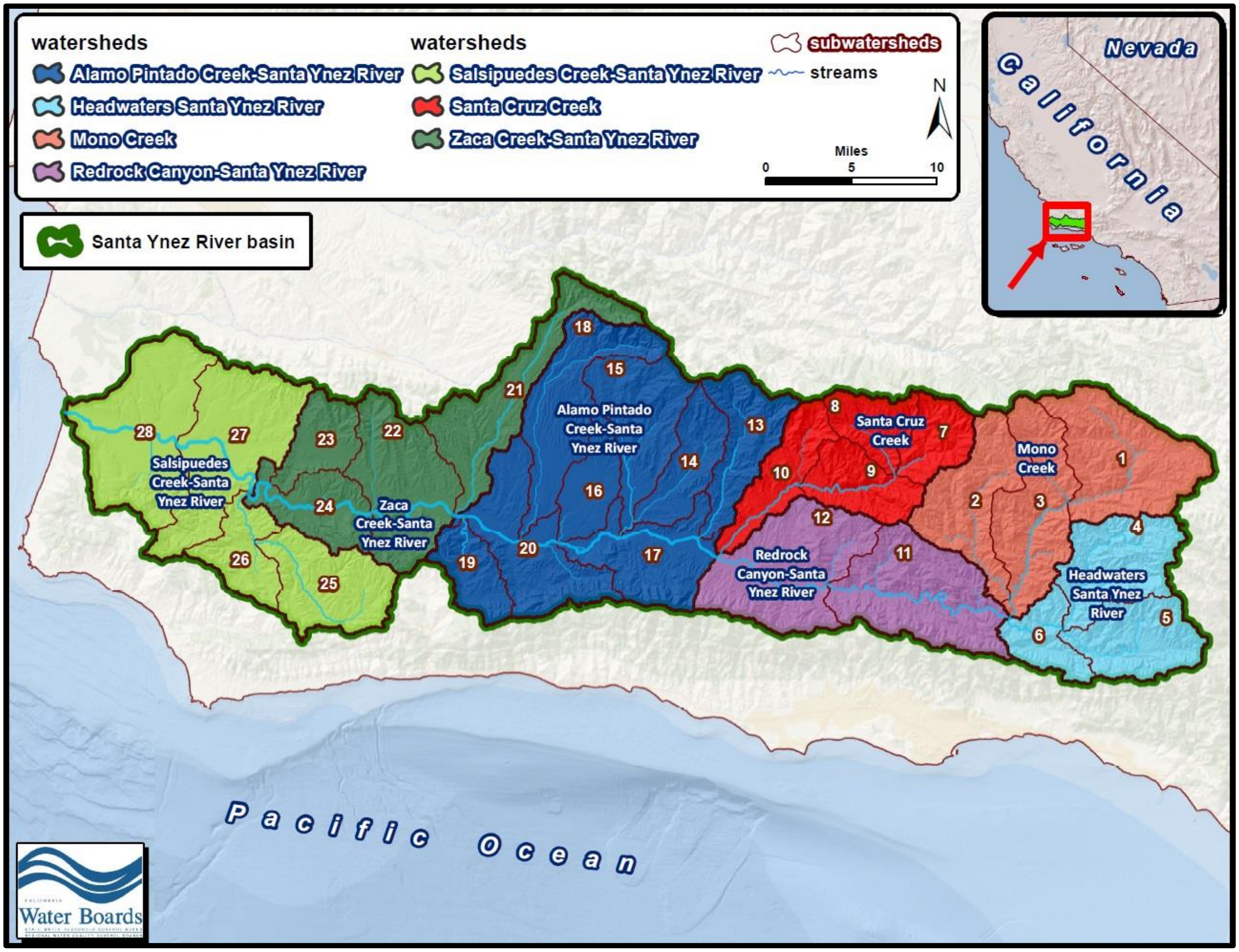


Table 3. Summary of subwatersheds (HUC-12s) of the Santa Ynez River basin. The subwatershed locations and their associated numeric identifiers are shown in map view in Figure 2.

Numeric ID	Subwatershed Name	Hydrologic Unit Code (HUC-12)	Hydrologic modifications[A]	Area (mi^2)
1	Upper Mono Creek	180600100101	no modifications	48
2	Indian Creek	180600100102	no modifications	35
3	Lower Mono Creek	180600100103	reservoir	41
4	Agua Caliente Canyon	180600100201	aqueduct	34
5	Juncal Canyon-Santa Ynez River	180600100202	aqueduct	29
6	Blue Canyon-Santa Ynez River	180600100203	dam at outlet, aqueduct	16
7	East Fork Santa Cruz Creek	180600100301	no modifications	16

Numeric ID	Subwatershed Name	Hydrologic Unit Code (HUC-12)	Hydrologic modifications[A]	Area (mi^2)
8	West Fork Santa Cruz Creek	180600100302	no modifications	16
9	Upper Santa Cruz Creek	180600100303	reservoir	21
10	Lower Santa Cruz Creek	180600100304	reservoir	22
11	Gibraltar Reservoir-Santa Ynez River	180600100401	dam at outlet, aqueduct	50
12	Kelly Creek-Santa Ynez River	180600100402	reservoir, aqueduct	52
13	Cachuma Creek	180600100501	reservoir	26
14	Happy Canyon	180600100502	dam at outlet, aqueduct	21
15	Santa Agueda Creek	180600100503	no modifications	35
16	Zanja de Cota Creek	180600100504	no modifications	18
17	Calabazal Creek-Santa Ynez River	180600100505	no modifications	33
18	Alamo Pintado Creek	180600100506	no modifications	41
19	Nojoqui Creek	180600100507	no modifications	16
20	Alisal Creek-Santa Ynez River	180600100508	no modifications	40
21	Zaca Creek	180600100601	no modifications	40
22	Santa Rosa Creek-Santa Ynez River	180600100602	no modifications	44
23	Santa Rita Valley	180600100603	no modifications	17
24	Canada De La Vina-Santa Ynez River	180600100604	no modifications	23
25	El Jaro Creek	180600100701	mining activity	33
26	Salsipuedes Creek	180600100702	mining activity	19
27	San Miguelito Creek-Santa Ynez River	180600100703	mining activity, general canal/ditch	52
28	Santa Lucia Canyon-Santa Ynez River	180600100704	general canal/ditch	57

3 CLEAN WATER ACT SECTION 303(d) LISTINGS

The purpose of this section of the report is to highlight nutrient and nutrient-related water quality issues associated with California’s 2020-2022 Clean Water Act section 303(d) assessment. Under section 303(d) of the Clean Water Act, states, territories, and authorized tribes are required to submit lists of impaired waters, frequently called “303(d) lists.” These are waters that are too polluted or otherwise degraded to meet water quality standards. Section 303(d) of the Clean Water Act states:

“Each State shall establish for the waters identified in paragraph (1)(A) of this subsection, and in accordance with the priority ranking, the total maximum daily load, for those pollutants which the Administrator identifies under section 1314(a)(2) of this title as suitable for such calculation.

Such load shall be established at a level necessary to implement the applicable water quality standards with seasonal variations and a margin of safety that takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality."

The state complies with this requirement by periodically assessing the conditions of our rivers, lakes, and bays and identifying them as impaired if they do not meet water quality standards. These waters, and the pollutant or condition causing the impairment, are placed on the 303(d) List. The Clean Water Act also requires that the states develop TMDLs for these waters.

303(d) listings in the Santa Ynez River basin from California's 2018 303(d) List are tabulated in Table 4. This TMDL project is anticipated to assess and address the nutrient-related impairments in the river basin, specifically nitrate and un-ionized ammonia. Nutrient pollution refers to excessive amounts of nitrate and phosphorus in our water resources. Nutrient pollution of the lower reaches of the Santa Ynez River has long been recognized as a problem with respect to nitrate pollution. Nutrient pollution can degrade municipal and domestic water supply and may degrade irrigation water quality for sensitive crops. Nutrient pollution can also result in a cascade of adverse environmental impacts in streams such as excessive nuisance algae, disruption of the natural dissolved oxygen balance, and disruption of the aquatic food web.

Table 4. 2018 303(d) listings in the Santa Ynez River basin. This TMDL study will focus on nitrate and dissolved oxygen impairments (see bolded) and may address select salt listings on a case-by-case basis as a matter of staff resource efficiency.

Water Body Name	Pollutant
Santa Ynez River (Cachuma Lake to below City of Lompoc)	Sedimentation/Siltation
Santa Ynez River (Cachuma Lake to below City of Lompoc)	Sodium
Santa Ynez River (Cachuma Lake to below City of Lompoc)	Temperature, water
Santa Ynez River (Cachuma Lake to below City of Lompoc)	Total Dissolved Solids
Santa Ynez River (Cachuma Lake to below City of Lompoc)	Toxicity
Santa Ynez River (below city of Lompoc to Ocean)	Chloride
Santa Ynez River (below city of Lompoc to Ocean)	Escherichia coli (E. coli)
Santa Ynez River (below city of Lompoc to Ocean)	Fecal Coliform
Santa Ynez River (below city of Lompoc to Ocean)	Low Dissolved Oxygen
Santa Ynez River (below city of Lompoc to Ocean)	Nitrate
Santa Ynez River (below city of Lompoc to Ocean)	Sedimentation/Siltation
Santa Ynez River (below city of Lompoc to Ocean)	Sodium
Santa Ynez River (below city of Lompoc to Ocean)	Temperature, water
Santa Ynez River (below city of Lompoc to Ocean)	Total Dissolved Solids
Santa Ynez River (below city of Lompoc to Ocean)	Toxicity
Santa Ynez River (below city of Lompoc to Ocean)	pH
Sloans Canyon Creek	Un-ionized ammonia
San Miguelito Creek	Dissolved oxygen
San Miguelito Creek	Nitrate

4 RIVER BASIN SETTING

An assessment of the physical setting and existing conditions of any given watershed is a necessary step in TMDL development. This section of the report presents highlights of the physical, climatic, and hydrologic setting of the Santa Ynez River basin. As appropriate, additional information on the River basin setting will be compiled during TMDL development.

4.1 Land Use & Land Cover

Land use and land cover are an integral part of TMDL development. Pollutant transport and fate are frequently related to land cover in any given watershed. We evaluated land use and land cover in the Santa Ynez River basin using digital data from the National Land Cover Database (2011 Edition). For this TMDL report, we provide a cursory summary of land cover in the river basin. At the time of TMDL report data compilation and analysis, the 2011 landcover dataset was the most recent available to staff. At the geographic scale of a large river basin, this landcover data should be reasonably representative.

Figure 3 is a map view of land use-land cover in the Santa Ynez River basin. The River basin's land use and cover are tabulated in Table 5.

The upper Santa Ynez River basin remains in a relatively natural and undisturbed state within the Los Padres National Forest, with an ecosystem characterized by chamise-redshank chaparral, oak woodlands, and some areas of montane-hardwood conifer woodlands.

The lower Santa Ynez River basin, below Cachuma Dam, has a more significant human footprint where landscapes are characterized by urbanized/developed lands, cultivated cropland, coastal oak woodland and coastal scrub.

Figure 3. Land use–land cover (year 2011) in the Santa Ynez River basin (source: National Land Cover Dataset, 2011) with major watersheds identified by hydrologic unit codes.

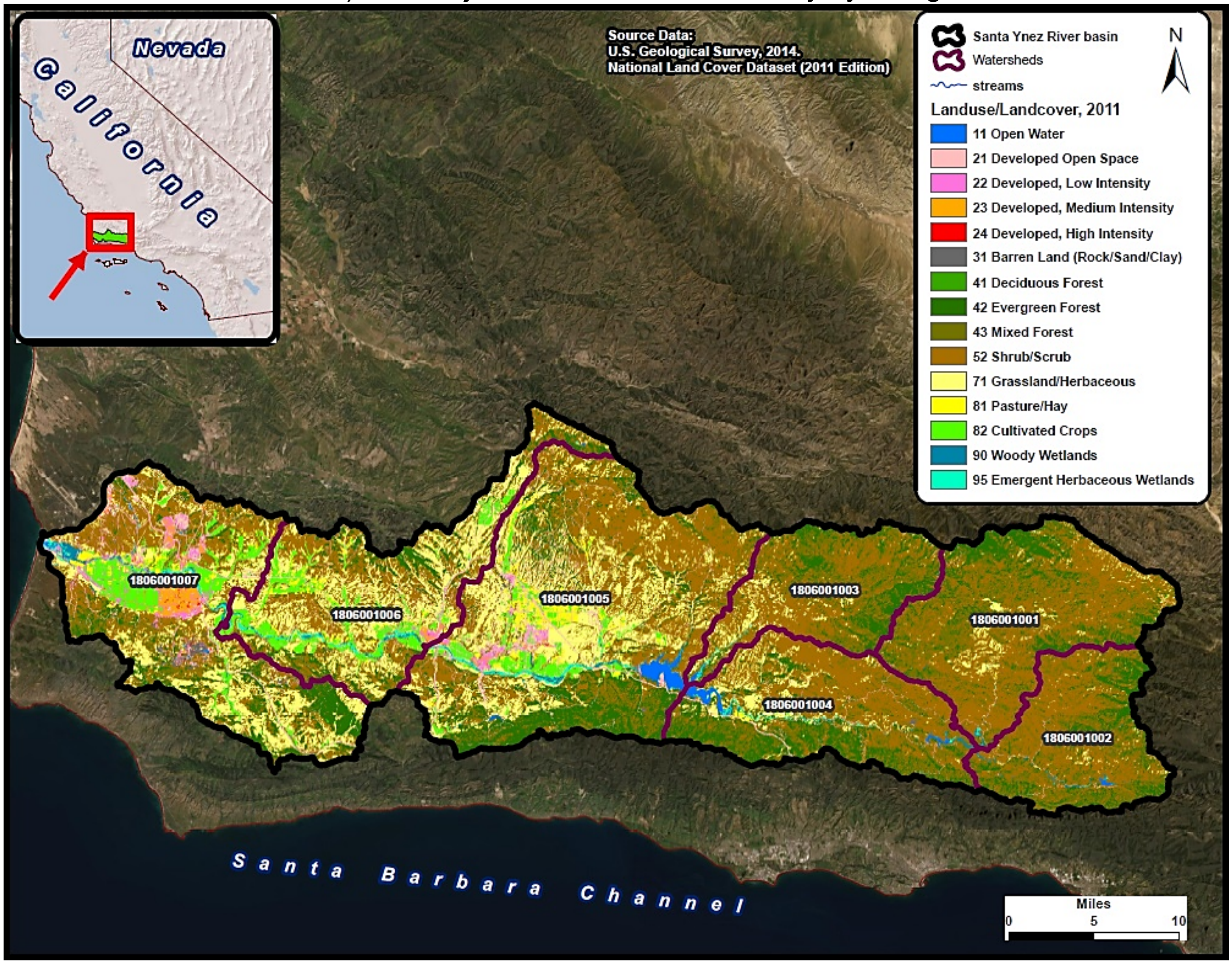


Table 5. Land use-land cover in the Santa Ynez River basin (source: National Land Cover Dataset, 2011).

Land cover category	Acres	Percent of river basin (%)
Open Water	3,266	0.6%
Developed Open Space	23,510	4.1%
Developed, Low Intensity	5,546	1.0%
Developed, Medium Intensity	3,897	0.7%
Developed, High Intensity	246	0.0%
Barren Land (Rock/Sand/Clay)	1,547	0.3%
Deciduous Forest	12	0.0%
Evergreen Forest	90,899	15.8%
Mixed Forest	77,372	13.5%
Shrub/Scrub	236,661	41.2%

Land cover category	Acres	Percent of river basin (%)
Grassland/Herbaceous	90,204	15.7%
Pasture/Hay	10,356	1.8%
Cultivated Crops	23,663	4.1%
Woody Wetlands	2,958	0.5%
Emergent Herbaceous Wetlands	3,684	0.6%
Total acres	573,821	-

Table 6. Land use-land cover in watersheds (HUC10-level) in the Santa Ynez River basin (source: National Land Cover Dataset, 2011).

Watershed **Landuse/Landcover**	**Mono Creek**	**Headwaters Santa Ynez River**	**Santa Cruz Creek**	**Redrock Canyon-Santa Ynez River**	**Alamo Pintado Creek-Santa Ynez River**	**Alamo Pintado Creek-Santa Ynez River**	**Salsipuedes Creek-Santa Ynez River**
OpenWater	2	111	94	1,019	1,839	1,839	181
DevelopedOpenSpace	221	238	275	1,585	9,691	9,691	7,170
DevevelopedLowIntensity	0	0	2	19	1,313	1,313	3,822
DevelopedMedIntensity	0	0	2	2	271	271	3,403
DevelopedHighIntensity	0	0	0	0	22	22	216
Barren	98	14	38	157	224	224	964
DeciduosForest	0	2	6	0	1	1	3
EvergreenForest	14,683	9,395	10,576	13,205	22,289	22,289	12,370
MixedForest	19,546	13,047	11,264	11,932	10,888	10,888	6,935
ShrubScrub	41,288	25,947	23,010	30,168	55,642	55,642	33,338
Grassland	3,143	830	3,332	6,040	32,089	32,089	21,080
PastureHay	10	0	2	290	5,542	5,542	2,224
Crops	11	23	0	48	6,429	6,429	9,170
WoodyWetlands	126	289	73	367	555	555	1,212
EmergentWetlands	50	37	159	480	1,097	1,097	854
Total Acres	79,178	49,934	48,833	65,313	147,892	147,892	102,941

4.2 Hydrography

Assessing the hydrology of a watershed is an important step in evaluating the magnitude and nature of nutrient transport and loading in waterbodies. This section of the report presents some information concerning the hydrography of the Santa Ynez River basin. More hydrologic data will be assessed as necessary during TMDL development.

The Santa Ynez River is a large and important river on California's central coast, with a length of 75 miles, and a drainage area of nearly 900 square miles. Since the mid-20^{th} century, the natural hydrology of the Santa Ynez River has been modified by dams and reservoirs. Major tributaries of the Santa Ynez River are Salsipuedes, Cachuma, Santa Cruz, and Indian creeks.

Figure 4 illustrates some regional hydrographic features and hydrologic characteristics within the Santa Ynez River basin. Table 7 presents flow statistics for select stream reaches in the Santa Ynez River basin based on U.S. Geological Survey stream gage data.

Owing to the Mediterranean-type climate of Santa Barbara County, the hydrology of the River basin is generally characterized by flashy runoff associated with wet-season storms, and depletion of surface flows, or intermittent flows in the dry season. Since the construction of dams in the early to mid-20^{th} century, substantial amounts of surface runoff in the river basin are impounded in reservoirs, resulting in regulated flows in the lower Santa Ynez River.

The Santa Ynez River begins in the uplands of the Santa Ynez Mountains, and then flows to Gibraltar Reservoir which is reportedly nearly filled with silt. The River then flows to the Cachuma Reservoir where some water is diverted by tunnel to Santa Barbara. Below Cachuma Dam, the River channel winds through lowlands of the River basin toward the Pacific Ocean west of the Lompoc, and through one of California's larger tidal marshes.

Figure 4. Generalized hydrographic features of the Santa Ynez River basin.

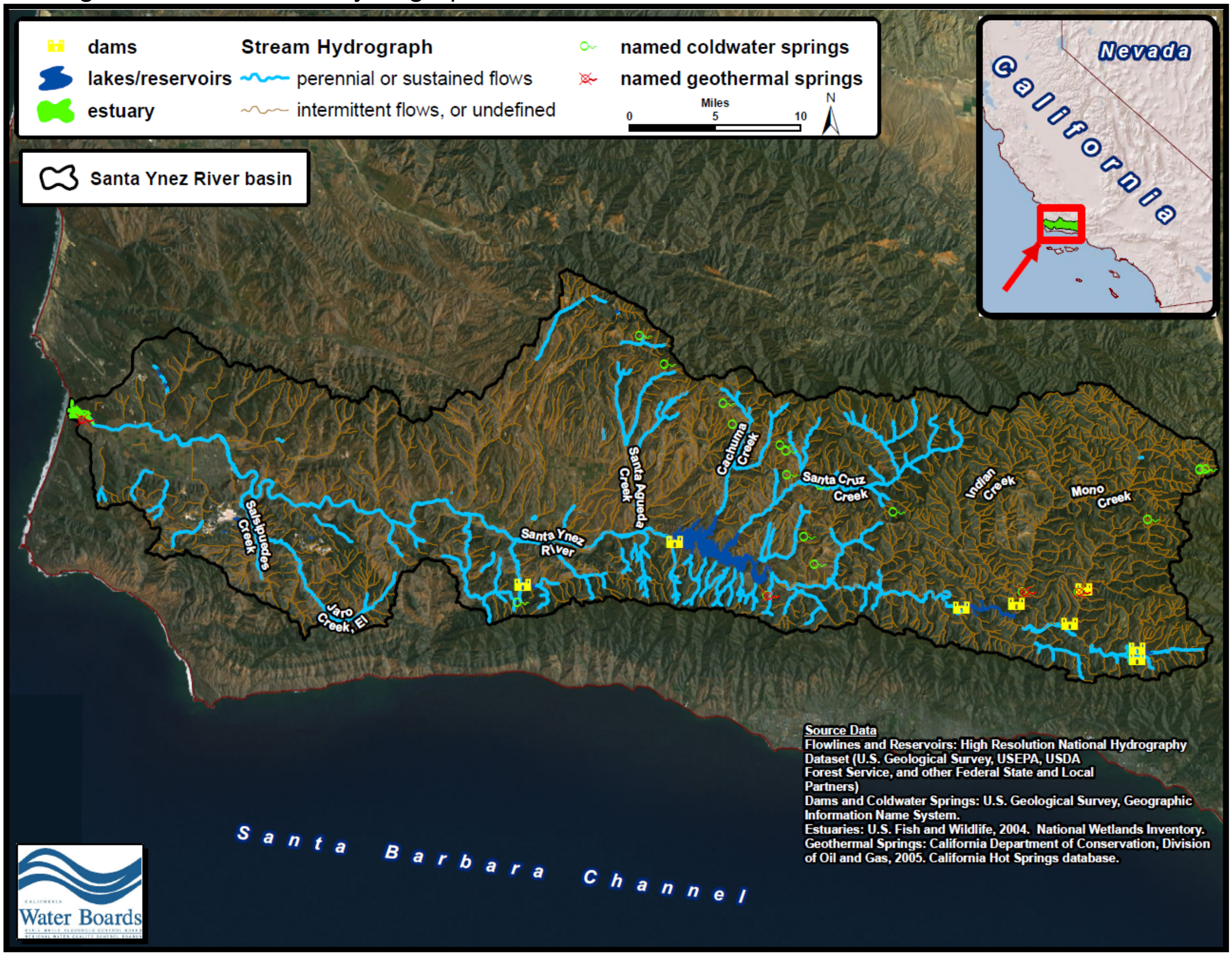


Table 7. Flow statistics from U.S. Geological Survey stream gages in the Santa Ynez River basin (flow units = cubic feet per second; drainage area units = square miles; BFI = base flow index).

U.S. Geological Survey Station Name	Period of Record	Ave. Flow	MIN	P25	P50	P75	Max Flow	BFI	Drain Area
SANTA YNEZ R A JAMESON LK NR MONTECITO CA	1988-2000	22.9	0	0.0	0.0	0.0	2,660	0.27	NR
JAMESON LK RELEASE WEIR A JAMESON LAKE CA	1970-2000	2.0	0	1.2	1.9	2.7	7	0.85	NR
GIBRALTAR DAM DIV WEIR A GIBRALTAR DAM CA	1970-2000	7.3	0	3.0	8.2	11.0	90	0.79	NR
SANTA YNEZ R AB GIBRALTAR DAM NR SANTA BARB CA	1904-1918	126.3	0	2.0	9.0	44.0	19,000	0.31	216
GIBRALTER DAM REL WR A GIBRALTER DAM CA	1988-2000	0.8	0	0.0	0.0	0.0	16	0.71	NR

SANTA YNEZ R BL GIBRALTAR DAM NR SNTA BRB C CA	1933-2000	66.5	0	0.0	0.1	6.1	26,600	0.30	216
SANTA YNEZ R BL LOS LAURLS CYN NR SNTA YNEZ CA	1947-2000	89.5	0	0.0	0.1	8.6	33,700	0.27	277
SANTA CRUZ C AB STUKE CN NR SANTA YNEZ CA	1947-1952	10.1	0	0.2	0.5	3.9	850	NR	65
SANTA CRUZ C NR SANTA YNEZ CA	1941-2000	20.5	0	0.0	1.3	8.6	5,000	0.43	74
CACHUMA C NR SANTA YNEZ CA	1950-1962	3.7	0	0.0	0.1	1.0	782	0.38	24
SANTA YNEZ R NR SANTA YNEZ CA	1929-2000	69.2	0	0.0	1.3	12.0	38,900	0.30	422
SANTA AGUEDA C NR SANTA YNEZ CA	1940-1978	3.6	0	0.0	0.1	0.5	1,760	0.22	56
SAN LUCAS C NR SANTA YNEZ CA	1952-1954	0.1	0	0.0	0.0	0.0	5	NR	NR
ZANJA DE COTA C NR SANTA YNEZ CA	1954-1961	1.9	0	0.7	1.3	2.4	115	0.67	14
SANTA YNEZ R A GA NR SANTA YNEZ CA	1954-1965	15.9	0	0.6	2.2	4.9	1,370	0.46	513
ALAMO PINTADO C NR SOLVANG CA	1970-2000	2.7	0	0.0	0.0	0.8	1,150	0.17	29
ALISAL C NR SOLVANG CA	1954-1972	5.6	0	0.0	0.0	0.4	2,040	0.16	12
SANTA YNEZ R A SOLVANG CA	1928-1999	95.7	0	0.0	3.5	11.0	40,000	0.38	579
NOJOQUI C NR BUELLTON CA	1952-1954	0.8	0	0.0	0.0	0.3	74	NR	15
SANTA YNEZ R A BUELLTON CA	1954-1959	38.1	0	0.0	1.1	7.6	3,970	0.23	611
ZACA C NR BUELLTON CA	1963-2000	1.7	0	0.0	0.0	0.0	598	0.08	33
ZACA C A BUELLTON CA	1941-1963	0.9	0	0.0	0.0	0.0	358	0.02	39
SANTA YNEZ R NR BUELLTON CA	1952-1974	61.8	0	0.0	1.3	12.0	42,000	0.48	668
SANTA YNEZ R AT SANTA ROSA DAMSITE NR BUELLTON CA	1954-1964	31.6	0	0.0	0.1	3.4	4,400	0.38	700
SANTA YNEZ R A COOPERS REEF NR LOMPOC CA	1954-1976	73.4	0	0.1	0.4	12.0	38,000	0.43	708
SANTA YNEZ R BL SANTA RITA C NR LOMPOC CA	1954-1962	37.2	0	0.1	0.2	2.6	4,800	0.32	733
SALSIPUEDES C NR LOMPOC CA	1941-2000	11.8	0	0.3	1.5	3.7	5,390	0.38	47
SANTA YNEZ R A NARROWS NR LOMPOC CA	1952-2000	124.6	0	0.0	1.9	21.0	38,000	0.36	789

SANTA YNEZ R NR LOMPOC CA	1906-1998	220.7	0	0.2	16.0	79.0	32,500	0.36	790
PURISIMA C NR LOMPOC CA	1970-1975	0.1	0	0.0	0.0	0.0	72	0.01	5
SANTA YNEZ R A H ST NR LOMPOC CA	1946-2000	47.5	0	0.0	0.0	0.0	19,600	0.18	815
SANTA YNEZ R A V STREET NR LOMPOC CA	1954-1975	78.9	0	0.0	0.0	0.0	38,000	0.15	820
MIGUELITO C A LOMPOC CA	1970-2000	2.4	0	0.1	0.4	1.2	1,170	0.35	12
SANTA YNEZ R A PINE CYN NR LOMPOC CA	1940-1983	185.4	0	1.3	4.2	34.0	38,400	0.35	844
RODEO-SAN PASQUAL C NR LOMPOC CA	1970-1972	0.0	0	0.0	0.0	0.0	3	NR	8
SANTA YNEZ R A BARRIER NR SURF CA	1946-1965	41.5	0	0.0	0.0	0.5	21,900	0.31	895

4.3 Climate & Atmospheric Deposition

Precipitation is often considered in the development of TMDLs and is directly related to a number of watershed hydrologic functions, such as surface runoff, groundwater recharge, and water table elevations.

The Santa Ynez River basin and California's central coast are characterized by a Mediterranean–type climate, with the vast majority of precipitation falling between November and April (see monthly rain gage data found in Table 8).

Table 8. Rainfall gauge records in Santa Ynez River basin (units = inches; NR=not reported).

Station	Elevation (ft.)	Period of Record	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean Annual Rainfall
Alisal Ranch[A]	479	1966-2014	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	**24.30**
Buellton[A]	364	1955-2015	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	**16.80**
Burton Mesa fire station[A]	344	1962-2014	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	**14.51**
Cachuma Lake[B]	783	1952-2015	4.39	4.65	3.47	1.54	0.38	0.04	0.01	0.03	0.21	0.66	1.93	3.09	**20.39**
El Deseo Ranch[A]	3993	1967-2014	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	**36.45**
Figueroa Mountain[A]	4520	1961-2015	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	**21.42**
Gibraltar Dam[A]	1404	1920-2015	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	**26.45**
Jameson Dam[A]	2227	1926-2013	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	**29.36**
Lompoc[B]	112	1917-2015	3.07	3.09	2.55	1.14	0.26	0.03	0.02	0.02	0.17	0.53	1.53	2.24	**14.67**
Lompoc City Hall[A]	112	1955-2015	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	**14.51**
Miguelito Canyon[A]	433	1947-2014	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	**22.78**
Nojoqui Falls[A]	1099	1966-2014	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	**27.47**

Station	Elevation (ft.)	Period of Record	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean Annual Rainfall
Rancho San Julian[A]	620	1920-2014	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	**24.03**
Salsipuedes gaging stn[B]	255	1948-2014	3.84	4.17	3.09	1.48	0.33	0.05	0.00	0.03	0.17	0.62	1.88	2.88	**18.54**
San Marcos Pass[A]	2217	1966-2015	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	**34.21**
Santa Ynez fire station[A]	607	1951-2015	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	**15.81**
Solvang[A]	502	Average Precipitation (inches)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	**18.78**

It is important to recognize that rainfall gauging stations have limited spatial distribution, and that gauging stations tend to be located in lower elevations where people live. Consequently, these locations can bias estimates of regional rainfall towards climatic conditions at lower elevations. The topography of the California Central Coast region, however, can result in significant orographic enhancement of rainfall (i.e., enhancement of rainfall due to topographic relief and mountainous terrain).

Therefore, due to climatic spatial variability, mean annual precipitation estimates for the Santa Ynez River basin may be assessed using the Parameter-elevation Regressions on Independent Slopes Model (PRISM).[9] PRISM is a climate mapping system that accounts for orographic climatic effects and is widely used in watershed studies and TMDL projects to make projections of precipitation into rural or mountainous areas where rain gage data is often absent, or sparse. PRISM is the U.S. Department of Agriculture's official climatological dataset and PRSIM is used by the U.S. National Weather Service to spatially interpolate rainfall frequency estimates. PRISM is also used by private consultants engaged in watershed studies.[10]

Figure 5 illustrates modeled 30-year mean annual rainfall in the Santa Ynez River basin averaged over the period 1981-2010. At the time of TDML project data compilation and analysis, this was the most recent vintage precipitation data set available to staff. The precipitation range estimates shown in Table 9 comport reasonably well with historical regional rainfall range estimates reported by the U.S. Geological Survey and with estimates reported by the County of Santa Barbara.[11]

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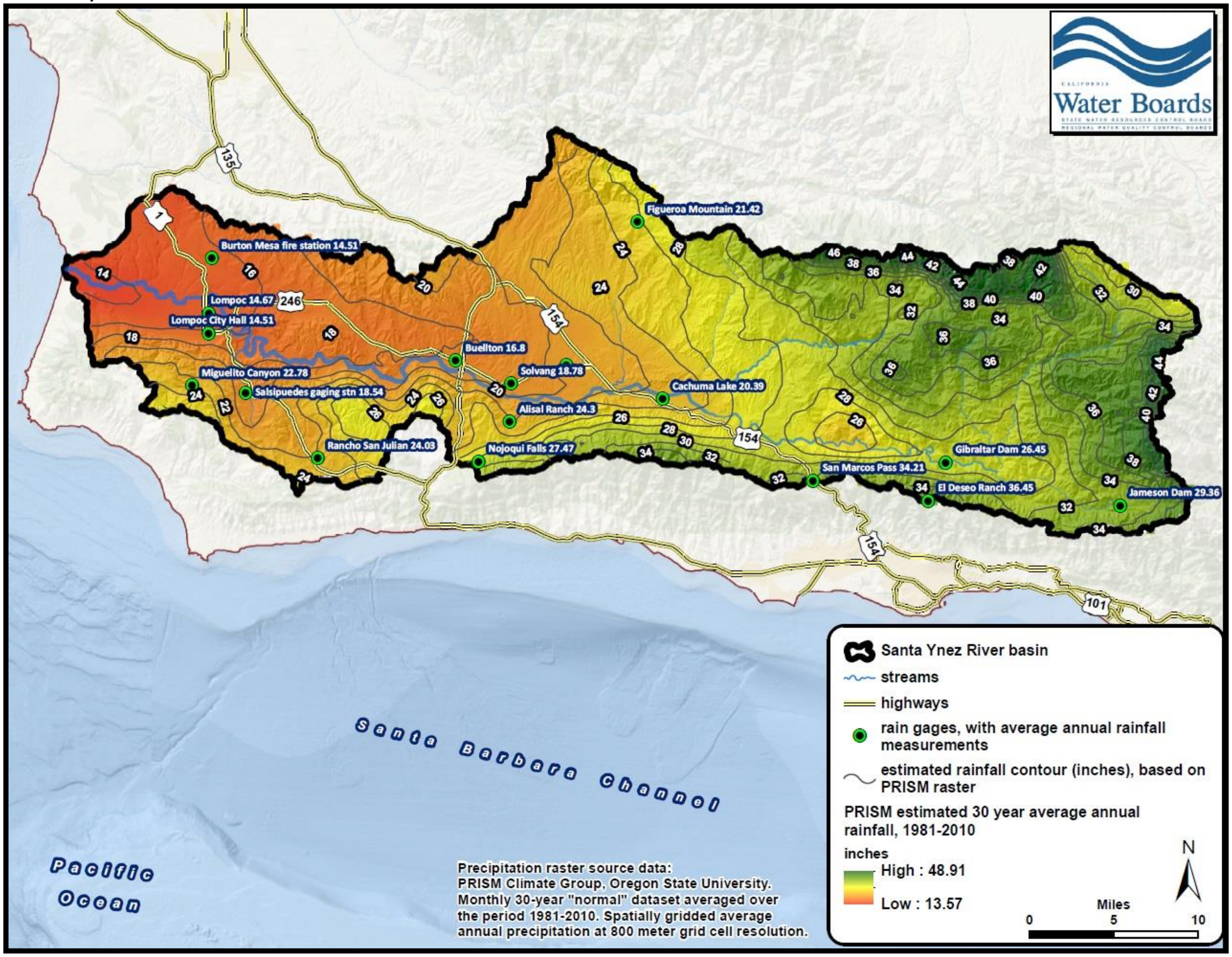
[9] The PRISM dataset was developed by researchers at Oregon State University, and uses point measurements of precipitation, temperature, and other climatic factors to produce continuous, digital grid estimates of climatic parameters. The dataset incorporates a digital elevation model, and expert knowledge of climatic variation, including rain shadows, coastal effects, and orographic effects. Available online at: http://www.prism.oregonstate.edu/

[10] For example: Tetra Tech, November 2015. *Salinas River Watershed Area Salt Modeling* report.

[11] The U.S. Geological Survey (1951), Water Supply Paper 1107 states that "mean annual rainfall ranges from about 14 inches on the coast to 35 or 40 inches on the higher mountains" (Water Supply Paper 1107. Geology and Water Resources of the Santa Ynez River Basin, Santa Barbara County, California). The County of Santa Barbara Public Works Departments webpage reports that rainfall is typically "over 36 inches at the apex of the Santa Ynez Mountains" (webpage accessed Sept. 29, 2015).

Figure 5. Color gradient display illustrating modeled 30-year mean annual rainfall averaged over the period of 1981-2010 in the Santa Ynez River basin.



Estimated mean annual precipitation within the Santa Ynez River basin for the period 1981-2010 ranged from less than 14 inches per year near the coast, to around 19 inches per year at Solvang approximately 15 miles inland, to about 35 or 40 inches on the higher mountains in the eastern areas of the river basin. Taken as a whole, basin-wide average annual precipitation from 1981-2010 is estimated to be 26 inches.

Table 9. Estimated 30-year mean annual rainfall[A] averaged over the period of 1981-2010 within subwatersheds of the Santa Ynez River basin. These are the most recent available data at the time of TMDL report development.

ID Number	Subwatershed Name[B]	Mean Annual Precipitation (Inches) 1981-2010
1	Upper Mono Creek	34.15
2	Indian Creek	35.50
3	Lower Mono Creek	34.36

ID Number	Subwatershed Name[B]	Mean Annual Precipitation (Inches) 1981-2010
4	Agua Caliente Canyon	36.65
5	Juncal Canyon-Santa Ynez River	34.83
6	Blue Canyon-Santa Ynez River	30.88
7	East Fork Santa Cruz Creek	36.14
8	West Fork Santa Cruz Creek	35.37
9	Upper Santa Cruz Creek	31.90
10	Lower Santa Cruz Creek	29.47
11	Gibraltar Reservoir-Santa Ynez River	29.96
12	Kelly Creek-Santa Ynez River	28.61
13	Cachuma Creek	28.54
14	Happy Canyon	25.54
17	Calabazal Creek-Santa Ynez River	25.45
18	Alamo Pintado Creek	22.28
19	Nojoqui Creek	24.94
20	Alisal Creek-Santa Ynez River	22.98
21	Zaca Creek	20.47
22	Santa Rosa Creek-Santa Ynez River	19.26
23	Santa Rita Valley	17.67
24	Canada De La Vina-Santa Ynez River	19.05
25	El Jaro Creek	23.49
26	Salsipuedes Creek	20.87
27	San Miguelito Creek-Santa Ynez River	17.38
28	Santa Lucia Canyon-Santa Ynez River	15.77

[A] Source data: PRISM Climate Group, Oregon State University, 30-arcsec annual precipitation grid, 1981-2010. PRISM precipitation zonal statistics were extracted for subwatersheds using the ArcMap 10.1™ Spatial Analyst extension.

[B] Refer back to Figure 2 for a map and tabulation of subwatersheds within the Santa Ynez River basin.

It should be reiterated that the PRISM model represents average precipitation conditions over a 30-year period. California has been experiencing extreme drought conditions in recent years, which is not represented in Figure 5 or Tables 8 and 9. Consequently, solutions and timeframes for water quality improvements and monitoring aimed at achieving pollutant load reductions in the Santa Ynez River may need to consider assumptions about water quality conditions under extreme drought conditions.

Other climatic parameters may be considered during TMDL development. Atmospheric deposition of nitrogen and phosphorus is often considered in watershed assessments of nutrient pollution. Deposition of nutrients by rainfall can be a significant local source of loading to surface waters in any given watershed. Because nitrogen can exist in a gaseous phase (while phosphorus cannot), nitrogen is more prone to atmospheric transport and deposition. Phosphorus associated with fine-grained airborne particulate matter can also exist in the atmosphere (U.S. Environmental Protection Agency, 1999).

Additionally, atmospheric deposition of nitrogen compounds is generally most prevalent downwind of large urban areas, near point sources of combustion (like coal burning power plants), or in mixed urban/agricultural areas characterized by substantial vehicular combustion contributions to local air quality (Westbrook and Edinger-Marshall, 2014).

Estimated total nitrogen atmospheric deposition for the year 2002 in the Santa Ynez River basin and vicinity is based on a deposition model developed by the University of California-Riverside Center for Conservation Biology.[12]

Based on summary statistics of the California statewide nitrogen deposition raster data, the 25th percentile of data values is 2.5 kilogram (kg) of nitrogen per hectare (Ha)[13] and the median value is 3.7 kg/hectare. These values (2.5 to 3.7 kg/Ha) presumably could represent a plausible range for lightly-impacted or natural ambient atmospheric deposition conditions in California.

Estimated atmospheric deposition of nitrogen in the Santa Ynez River basin (5.0 kg/Ha, refer to Table 10) is marginally higher than the aforementioned ambient condition. However, atmospheric nitrogen deposition in the river basin is substantially lower than in highly developed areas of southern California such as the Los Angeles Basin and the Santa Ana Basin, which generally can range to above 20 kg/Ha of nitrogen deposition annually based on the raster dataset.

Table 10. Estimated annual atmospheric deposition of total nitrogen as N in watersheds of the Santa Ynez River basin (units = kilograms/hectare per year).

Watershed	Min	Max	Mean
Mono Creek	5.2	8.6	6.0
Headwaters Santa Ynez River	5.7	9.5	6.8
Santa Cruz Creek	4.5	5.9	5.4
Redrock Canyon-Santa Ynez River	4.5	8.1	6.3
Alamo Pintado Creek-Santa Ynez River	4.9	7.8	6.0
Zaca Creek-Santa Ynez River	5.0	6.7	5.6
Salsipuedes Creek-Santa Ynez River	1.2	7.1	5.1
Basin-wide mean atmospheric deposition rate (Santa Ynez River basin)	-	-	5.0

Based on the University of California Riverside's atmospheric deposition model, the average annual atmospheric deposition of nitrogen as N in the Santa Ynez River basin is:
5.0 kilograms total nitrogen (N) per hectare per year.

4.4 Groundwater

TMDLs do not directly address pollution of groundwater by controllable sources, however, shallow groundwater inflow to streams may be considered in the context of TMDL development. Groundwater and surface water are not closed systems that act independently from each other; it is well known that groundwater inflow to surface waters can be a source of nutrients or salts to any given surface waterbody. The physical interconnectedness of surface waters and groundwater is widely recognized by scientific agencies, researchers, and resource professionals, as highlighted below:

[12] Tonnesen, G., Z. Wang, M. Omary, and C. J. Chien. 2007. University of California-Riverside. Assessment of Nitrogen Deposition: Modeling and Habitat Assessment. California Energy Commission, PIER Energy-Related Environmental Research. CEC-500-2006-032.
[13] One hectare is equal to 2.47 acres.

"Traditionally, management of water resources has focused on surface water or ground water as separate entities….Nearly all surface-water features (streams, lakes reservoirs, wetlands, and estuaries) interact with groundwater. Pollution of surface water can cause degradation of ground-water quality and conversely pollution of ground water can degrade surface water. Thus, effective land and water management requires a clear understanding of the linkages between ground water and surface water as it applies to any given hydrologic setting."

From: U.S. Geological Survey, 1998. Circular 1139: "Groundwater and Surface Water – A Single Resource."

"While ground water and surface water are often treated as separate systems, they are in reality highly interdependent components of the hydrologic cycle. Subsurface interactions with surface waters occur in a variety of ways. Therefore, the potential pollutant contributions from ground water to surface waters should be investigated when developing TMDLs."

From: U.S. Environmental Protection Agency, Guidance for Water Quality-Based Decisions: The TMDL Process – Appendix B. EPA 440/4-91-001.

"Although surface water and groundwater appear to be two distinct sources of water, they are not. Surface water and groundwater are basically one singular source of water connected physically in the hydrologic cycle...Effective management requires consideration of both water sources as one resource."

From: California Department of Water Resources: Relationship between Groundwater and Surface Water
http://www.water.ca.gov/groundwater/groundwater_basics/gw_sw_interaction.cfm.

"The popular misconception in U.S. western culture appears to be that groundwater and surface water are two separate sources of water. This bimodal legal approach to managing what is one resource – water – has not resulted in rational water management in California…whether the water is above the land surface or below the land surface, it is the same water. Labeling it "groundwater" or "surface water" is a human construct that represents where the water is at that moment in time. They are not different sources."

From: Carl Hauge, retired Chief Hydrologist for the California Department of Water Resources, in Groundwater Resources Association of California, web seminar entitled *"No Surface Water = No Groundwater",* October 2015.

"Surface water and ground water are increasingly viewed as a single resource within linked reservoirs. The movement of water from streams to aquifers and from aquifers to streams influences both the quantity and quality of available water within both reservoirs"

From: C. Ruehl, A. Fisher, C. Hatch, M. Los Huertos, G. Stemler, and C. Shennan (2006), *Differential gauging and tracer tests resolve seepage fluxes in a strongly-losing stream.* Journal of Hydrology, volume 330, pp. 235-248.

"Surface water bodies are hydraulically connected to ground water in most types of landscapes…Even if a surface water body is separated from the ground-water system by an unsaturated zone, seepage from the surface water may recharge the ground water. Because of the interchange of water between these two components of the hydrologic cycle, development or contamination of one commonly affects the other."

From: Thomas C. Winter, U.S. Geological Survey Water Resources Division (2000). *Interaction of Ground Water and Surface Water.* Proceedings of the Ground-Water/Surface-Water Interactions Workshop, 2000, pp. 15-20. EPA/542/R-00/007

"It's a myth that groundwater is separate from surface water and also a myth that it's difficult to legally integrate the two….California's groundwater and surface water are often closely interconnected and sometimes managed jointly."

From: Buzz Thompson, Professor of Natural Resources Law, Stanford University Law School, quoted in *Managing California's Groundwater*, by Gary Pitzer in Western Water January/February 2014, *and* from Public Policy Institute of California, *California Water Myths*, www.ppic.org.

The range of information discussed above is illustrated conceptually in Figure 6

Figure 6. Streams are intimately connected to the groundwater system.

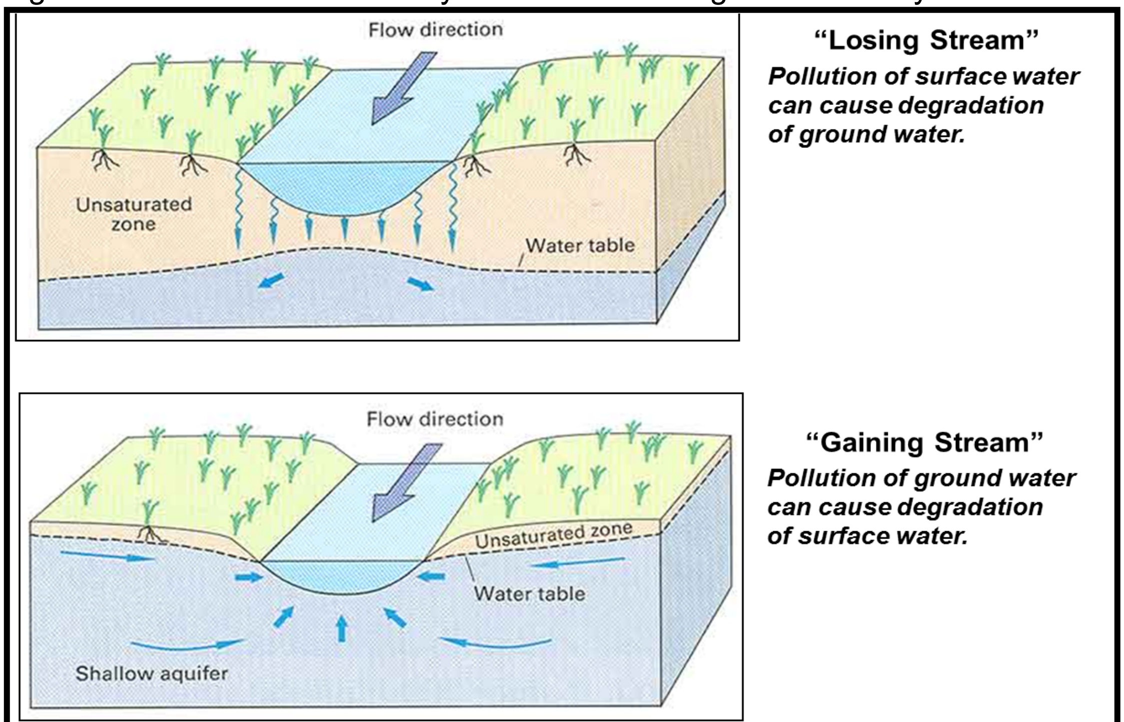
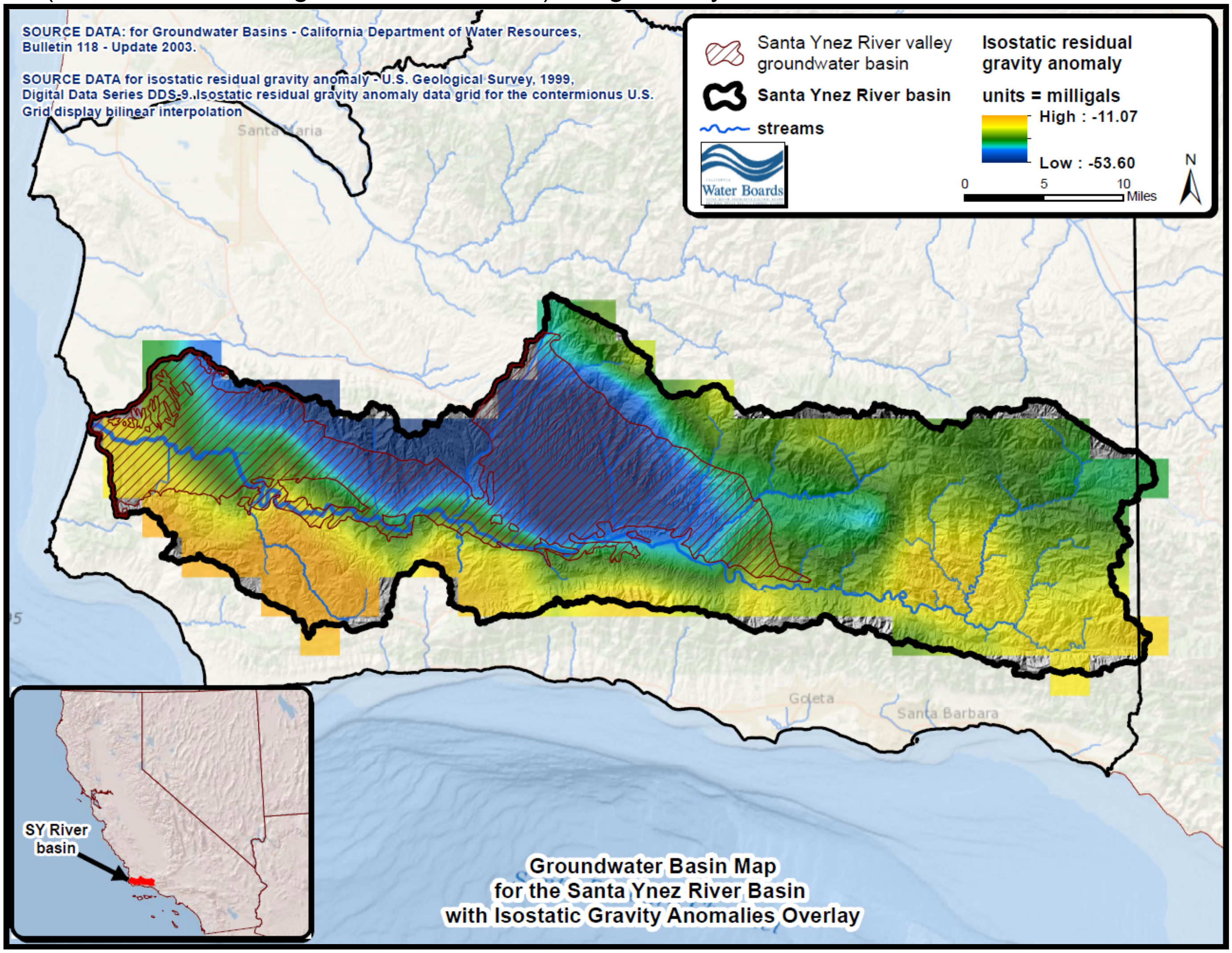


Figure credits: U.S. Geological Survey Circular 1139 , Groundwater and Surface Water A Single Resource (1998)

As with any watershed study, it is worth being cognizant of the distribution of alluvial groundwater basins located within the Santa Ynez River basin. Alluvial groundwater basins in the Santa Ynez River basin, with an isostatic residual gravity anomalies overlay,[14] are presented in Figure 7. Note that groundwater basins are three-dimensional in architecture, and gravity data can thus give some insight into the shape and distribution of alluvial basins.

[14] Isostatic residual gravity anomaly data are a geophysical attribute that represents density contrasts and can be used as a proxy to assess the presence and the depth or thickness of alluvial fill. Caution and professional judgment must be used, because gravity anomalies can also be associated with subsurface geologic structure, faults, and rapid changes in lithology (rock types). Isostatic residual gravity data source: U.S. Geological Survey (1999), *Isostatic residual gravity anomaly data grid for the conterminous U.S.*

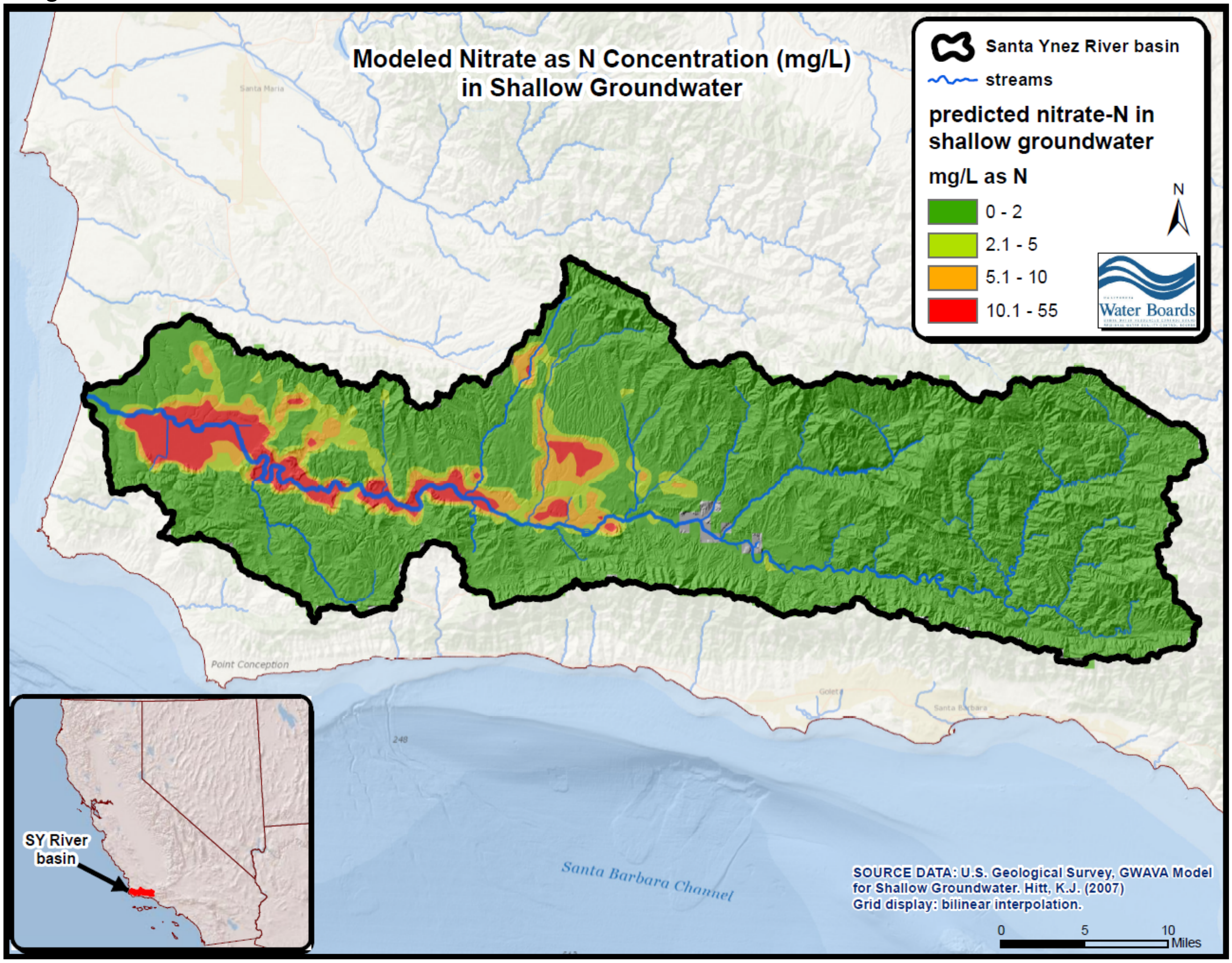
Figure 7. Map illustrating the Santa Ynez River basin, the Santa Ynez River Valley groundwater basin, and an isostatic residual gravity color gradient overlay. Lower density geologic materials (i.e., alluvial fill and groundwater basins) are generally associated.



Estimated nitrate as N concentrations in shallow, recently-recharged groundwater are available from the U.S. Geological Survey. Figure 8 illustrates estimated nitrate as nitrogen concentrations in shallow, recently-recharged groundwater in the Santa Ynez River basin (data source: U.S. Geological Survey GWAVA model[15]). Shallow, recently recharged groundwater is defined by the U.S. Geological Survey in the GWAVA dataset as groundwaters generally less than 5 meters below ground surface. This dataset indicates that nitrate concentrations are highest in the shallow groundwaters of the alluvial fill of the lower (western) reaches of the river basin.

[15] The GWAVA (Ground Water Vulnerability Assessment) dataset represents predicted nitrate concentration in shallow, recently recharged groundwater in the conterminous United States, and was generated by a national nonlinear regression model based on 14 input parameters.

Figure 8. Map illustrating estimated nitrate as N concentrations in shallow, recently recharged groundwater of the Santa Ynez River basin.

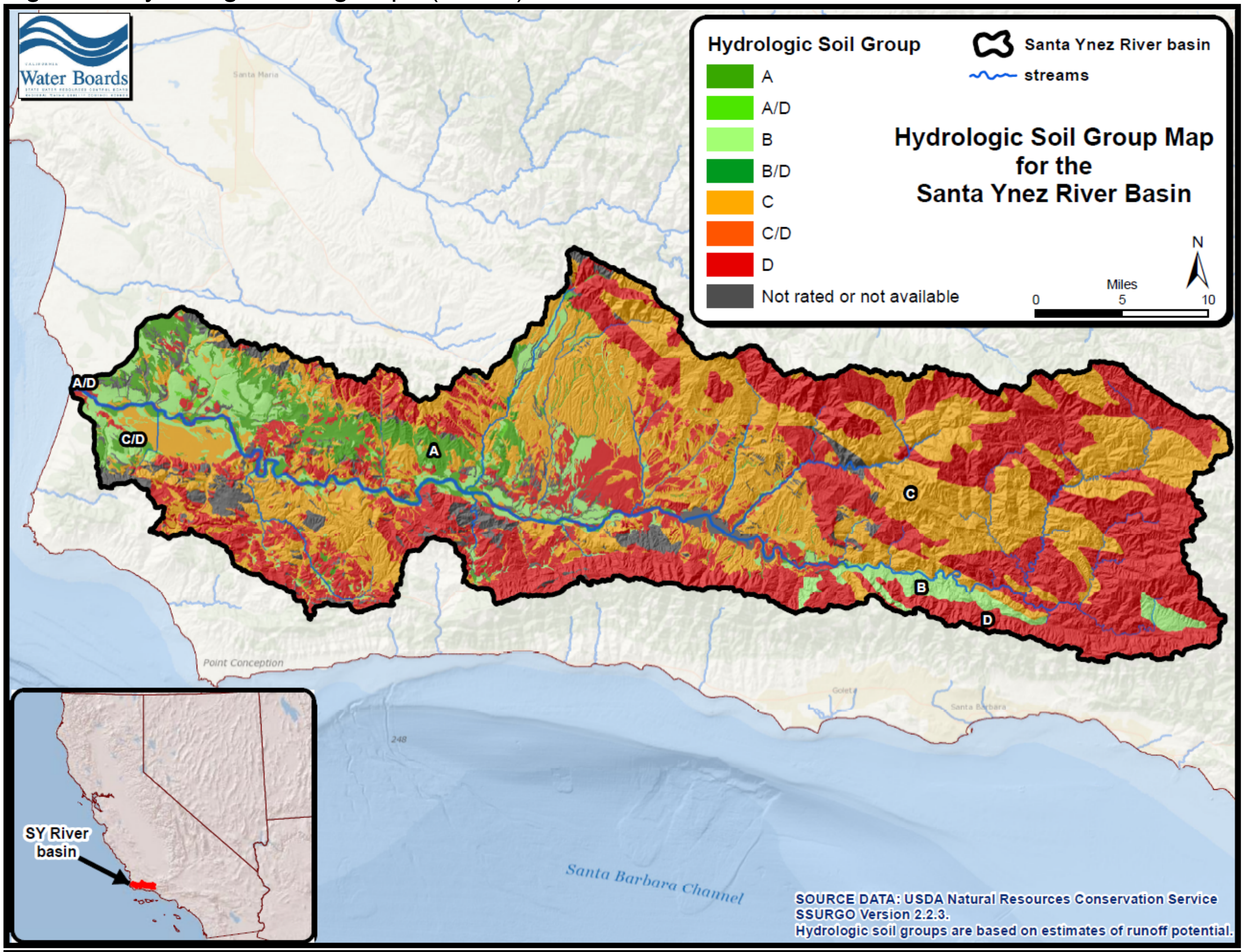


4.5 Soils

Soils have physical and hydrologic characteristics which may have a significant influence on the transport and fate of nutrients. Watershed researchers and TMDL projects often assess soil characteristics in conjunction with other physical watershed parameters to estimate the risk and magnitude of nutrient loading to waterbodies (Mitsova-Boneva and Wang, 2008; McMahon and Roessler). Generally, fine-textured soils with lower capacity for infiltration of precipitation/water are more prone to runoff and are consequently typically associated with a higher risk of nutrient loads to surface waters.

Soils play a key role in drainage, runoff, and subsurface infiltration in any given watershed. The U.S. Department of Agriculture National Resources Conservation Service's compiled soil survey by counties is available online under the title of Soil Survey Geographic (SSURGO) Database. SSURGO has been updated with extensive soil attribute data, including Hydrologic Soil Groups. Hydrologic Soil Groups are a soil attribute associated with a mapped soil unit, which indicates the soil's infiltration rate and potential for runoff. Figure 9 illustrates the distribution of hydrologic soil groups in the Santa Ynez River basin along with a tabular description of the soil group's hydrologic properties.

Figure 9. Hydrologic soils groups (HSGs) in the Santa Ynez River basin.



Hydrologic Soil Group Descriptions	
A	Well drained to excessively drained sands or gravelly sands.
B	Moderately well drained or well drained soils having moderately fine to moderately course texture.
C	Soils having a slow infiltration rate when thoroughly wet; moderately fine or fine texture.
D	Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays, soils which have a high water table, soils that have a claypan or clay layer near the surface, and soils that overlie a shallow, nearly impervious surface.
A/D	If a soil is assigned a dual hydrologic group, the first letter is for drained areas and the second is for undrained areas.

4.6 Disadvantaged Communities

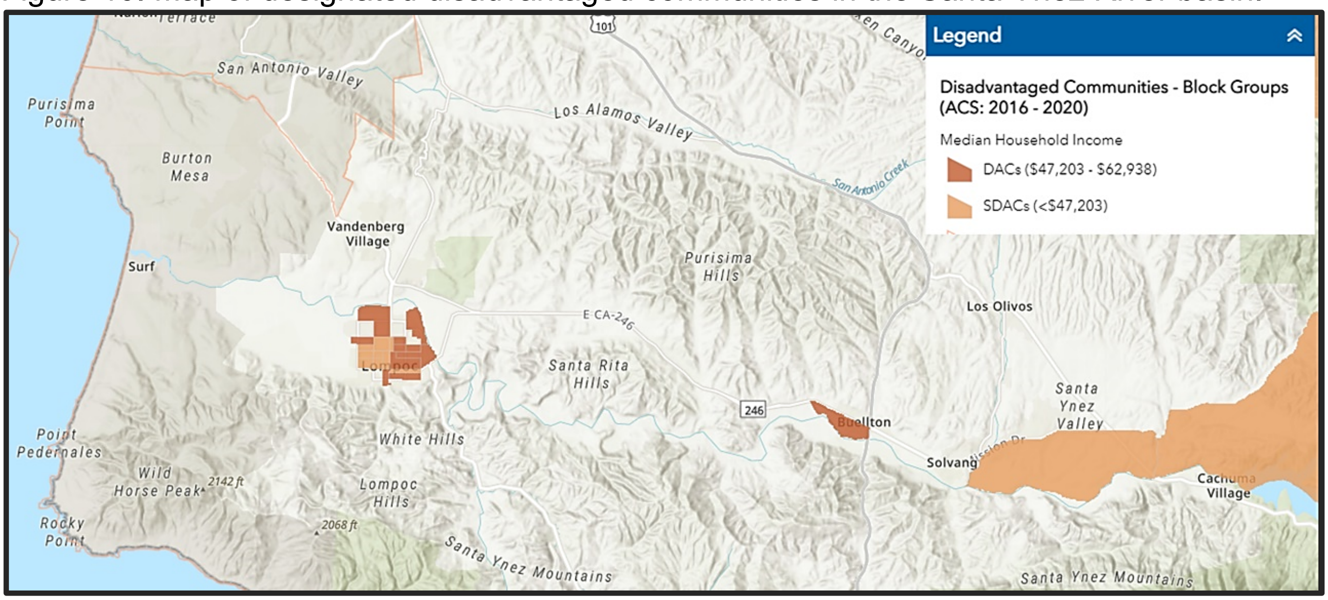
The Central Coast Water Board implements regulatory activities and water quality projects in a manner that ensures the fair treatment of people of all ethnicities, cultures, backgrounds, and income levels, including disadvantaged communities (DACs). By identifying DACs in the TMDL project area, staff and stakeholders will be able to improve coordination and pursue grant funds that may be used to reduce TMDL implementation costs.

California Public Resources Code (PRC) § 75005 (g) defines DACs as "a community with a median household income less than 80% of the statewide average." The PRC also defines severely disadvantaged community (SDACs) as "a community with a median household income (MHI) less than 60% of the statewide average."

Staff used the California Department of Water Resources disadvantaged community web mapping tool to identify DACs in the river basin.

Based on median household income and as shown in Figure 10 several census block groups of Lompoc, Buellton, and the Santa Ynez Valley are all DACs, with several block groups also meeting the criteria for a SDAC.

Figure 10. Map of designated disadvantaged communities in the Santa Ynez River basin.



5 WATER QUALITY STANDARDS

TMDLs are requirements pursuant to the federal Clean Water Act. The broad objective of the federal Clean Water Act is to "restore and maintain the chemical, physical and biological integrity of the Nation's waters."[16] Water quality standards are provisions of state and federal law intended to implement the federal Clean Water Act. In accordance with state and federal law, California's water quality standards consist of:

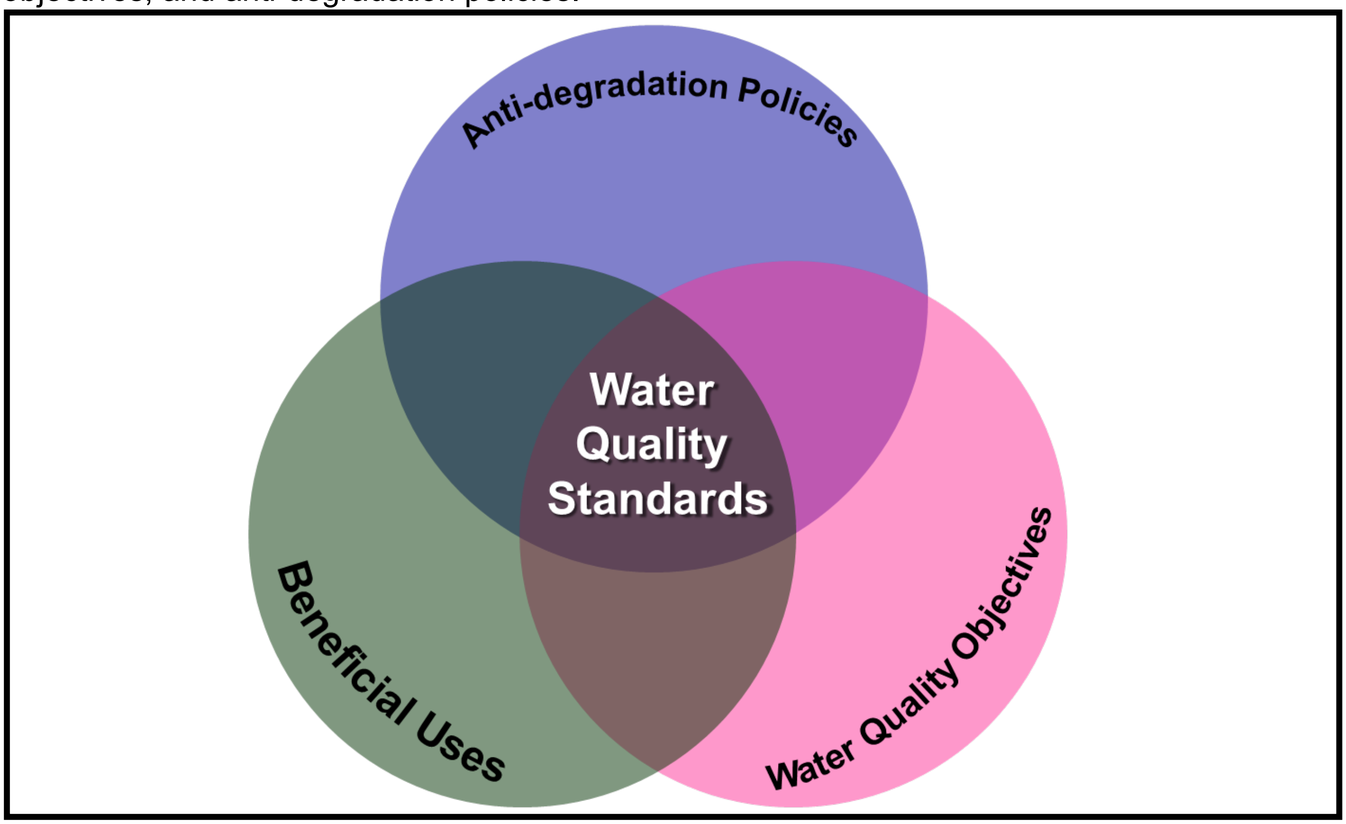
- Beneficial uses, which refer to legally-designated uses of waters of the state that may be protected against water quality degradation (e.g., drinking water supply, recreation, aquatic habitat, agricultural supply, etc.).

[16] 33 U.S.C. § 1251(a), CWA § 101(a).

- Water quality objectives, which refer to levels (numeric or narrative) of water quality constituents or characteristics that provide for the reasonable protection of beneficial uses of waters of the state.
- Anti-degradation policies, which are implemented to maintain and protect existing water quality, and high-quality waters. State Water Board Resolution No. 68-16, Statement of Policy with Respect to Maintaining High Quality of Waters in California, incorporates the federal antidegradation policy in 40 C.F.R. § 131.12 and is consistent with the intent and goals of the federal Clean Water Act, especially the clause that states: "The objective of this Act is to restore and *maintain* the chemical, physical, and biological integrity of the Nation's water"[17] (emphasis added).

Therefore, beneficial uses, water quality objectives, and anti-degradation policies collectively constitute water quality standards (see Figure 11). Beneficial uses, relevant water quality objectives, and anti-degradation requirements that potentially pertain to this TMDL project are presented below in following sections of this report.

Figure 11. TMDLs are action plans to assist the states in implementing their water quality standards, and California's water quality standards consist of beneficial uses, water quality objectives, and anti-degradation policies.



5.1 Beneficial Uses

California's water quality standards designate beneficial uses for each waterbody (e.g., drinking water supply, aquatic life support, recreation, etc.) and the scientific criteria to support that use.

[17] *Ibid*

Central Coast Water Board is required under both state and federal law to protect and regulate beneficial uses of waters of the state.

The 2019 Water Quality Control Plan for the Central Coastal Basin (Basin Plan) identifies beneficial uses for waterbodies of California's Central Coast region. Beneficial uses for surface waters in the Santa Ynez River basin are presented in Table 11. The Basin Plan also states that surface water bodies within the region that do not have beneficial uses specifically designated for them are assigned the beneficial uses of "municipal and domestic water supply" and "protection of both recreation and aquatic life." The Central Coast Water Board has interpreted this general statement of beneficial uses to encompass the beneficial uses of REC-1, REC-2, and MUN, along with all beneficial uses associated with aquatic life. The finding comports with the Clean Water Act's national interim goal of water quality [CWA section 101(a)(2)], which provides for the protection and propagation of fish, shellfish, and wildlife.

Table 11. Beneficial uses of surface waters in the Santa Ynez River basin

Waterbody Names	MUN	AGR	PRO	IND	GWR	REC1	REC2	WILD	COLD	WARM	MIGR	SPWN	BIOL	RARE	EST	FRESH	NAV	POW	COMM	AQUA	SAL	SHELL
SANTA YNEZ HYDROLOGIC UNIT																						
Santa Ynez River Estuary						X	X	X		X	X	X	X	X	X				X			X
Santa Ynez River, downstream	X	X	X	X	X	X	X	X	X	X	X	X		X		X			X			
Graves Wetland						X	X	X		X		X							X			
Lompoc Canyon	X	X		X	X	X	X	X		X									X			
La Salle Canyon Creek	X	X			X	X	X	X		X									X			
Sloans Canyon Creek	X				X	X	X	X		X									X			
San Miguelito Creek	X	X			X	X	X	X	X	X		X							X			
Salsipuedes Creek	X	X		X	X	X	X	X	X	X	X	X							X			
El Jaro Creek	X	X		X	X	X	X	X	X	X	X	X							X			
El Callejon Creek	X				X	X	X	X		X									X			
Llanito Creek	X				X	X	X	X		X									X			
Yridisis Creek	X	X			X	X	X	X		X		X							X			
Canada de la Vina	X	X			X	X	X	X		X									X			
Nojoqui Creek	X	X			X	X	X	X	X	X		X							X			
Alamo Pintado Creek	X	X		X	X	X	X	X		X									X			
Zaca Creek	X	X			X	X	X	X	X	X				X					X			
Zaca Lake	X					X	X	X	X	X		X		X					X			
Santa Rosa Creek	X	X			X	X	X	X	X	X	X	X							X			
Santa Rita Creek	X	X		X	X	X	X	X		X									X			
Davis Creek	X				X	X	X	X		X									X			
Santa Lucia Canyon Creek	X	X			X	X	X	X		X									X			
Oak Canyon Creek	X	X		X	X	X	X	X		X			X						X			
Hilton Creek	X	X			X	X	X	X	X		X	X							X			
Cachuma Reservoir	X	X	X		X	X	X	X	X	X		X		X		X	X		X			
Santa Ynez River, upstream	X	X	X	X	X	X	X	X	X	X	X	X		X		X			X			
Gibralter Reservoir	X	X	X	X	X	X	X	X	X	X		X		X		X	X		X			
Jameson Reservoir	X	X	X		X	X	X	X	X	X		X		X		X	X		X			
Agua Caliente Canyon	X	X		X	X	X	X	X	X	X		X		X					X			
Mono Creek	X	X		X	X	X	X	X	X	X	X	X		X					X			
Indian Creek	X	X		X	X	X	X	X	X	X	X	X	X	X					X			
Santa Cruz Creek	X	X		X	X	X	X	X	X	X	X	X		X					X			
Cachuma Creek	X				X	X	X	X	X	X	X	X		X					X			

MUN: Municipal and domestic water supply
AGR: Agricultural supply
PRO: Industrial process supply
IND: Industrial service supply
GWR: Groundwater recharge
REC1: Water contact recreation
REC2: Non-Contact water recreation
WILD: Wildlife habitat
COLD: Cold freshwater habitat
WARM: Warm freshwater habitat
MIGR: Migration of aquatic organisms

SPWN: Spawning, reproduction, and/or early development of fish
BIOL: Preservation of biological habitats of special significance
RARE: Rare, threatened or endangered species
EST: Estuarine habitat
FRESH: Freshwater replenishment
NAV: Navigation
COMM: Commercial and sport fishing
SHELL: Shellfish harvesting

A narrative description of the designated beneficial uses in the Santa Ynez River basin which are most likely to be at risk of impairment by water column nutrient pollution are presented below.

Municipal & Domestic Water Supply (MUN)
This beneficial use is defined in section 2.2.1 of the Basin Plan as follows:

> *Uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply. According to State Board Resolution No. 88- 63, "Sources of Drinking Water Policy" all surface waters are considered suitable, or potentially suitable, for municipal or domestic water supply except where:*
>
> *TDS exceeds 3000 mg/l (5000 uS/cm electrical conductivity);*
> *Contamination exists, that cannot reasonably be treated for domestic use;*
> *The source is not sufficient to supply an average sustained yield of 200 gallons per day;*
> *The water is in collection or treatment systems of municipal or industrial wastewaters, process*
> *waters, mining wastewaters, or storm water runoff; and*
> *The water is in systems for conveying or holding agricultural drainage waters.*

The nitrate numeric water quality objective protective of the MUN beneficial use is established as 10 mg/L nitrate as nitrogen. This level is established to protect public health. The adverse health effects of nitrate in drinking water has been documented and published by state and federal health agencies.

Ground Water Recharge (GWR)
This beneficial use is defined in 2.2.5 of the Basin Plan as follows:

> *Uses of water for natural or artificial recharge of ground water for purposes of future extraction, maintenance of water quality, or halting of saltwater intrusion into freshwater aquifers. Ground water recharge includes recharge of surface water underflow.*

The groundwater recharge (GWR) beneficial use is recognition of the fundamental nature of the hydrologic cycle, and that surface waters and groundwater are not closed systems that act independently from each other. Underlying groundwaters are, in effect, receiving waters for stream waters that infiltrate and recharge the subsurface water resource. Most surface waters and groundwaters of the Central Coast region are designated with both the MUN (drinking water) and AGR (agricultural supply) beneficial uses. The MUN nitrate water quality objective (10 mg/L) therefore applies to *both* the surface waters the underlying groundwater. This numeric water quality objective and the MUN and AGR designations of underlying groundwater are relevant to the extent that portions of Santa Ynez River basin streams recharge the underlying groundwater resource.

Agricultural Supply (AGR)
This beneficial use is defined in section 2.2.2 of the Basin Plan as follows:

> *Uses of water for farming, horticulture, or ranching including, but not limited to, irrigation, stock watering, or support of vegetation for range grazing.*

In accordance with the Basin Plan, interpretation of the amount of nitrate which adversely affects the agricultural supply beneficial uses of waters of the state shall be derived from the University of California Agricultural Extension Service guidelines, which are found in Basin Plan Table 3-1. Accordingly, severe problems for sensitive crops could occur for irrigation water exceeding

30 mg/L.[18] It should be noted that the University of California Agricultural Extension Service guideline values are flexible, and may not necessarily be appropriate due to local conditions or special conditions of crop, soil, and method of irrigation.

Further, the Basin Plan provides water quality objectives for nitrate which are protective of the AGR beneficial uses for livestock watering. While nitrate (NO_3) itself is relatively non-toxic to livestock, ingested nitrate is broken down to nitrite (NO_2); subsequently nitrite enters the bloodstream where it converts blood hemoglobin to methemoglobin. This greatly reduces the oxygen-carrying capacity of the blood, and the animal suffers from oxygen starvation of the tissues.[19] Death can occur when blood hemoglobin has fallen to one-third normal levels. Resource professionals[20] report that nitrate can reach dangerous levels for livestock in streams, ponds, or shallow wells that collect drainage from highly fertilized fields. Accordingly, the Basin Plan identifies the safe threshold of nitrate as N for purposes of livestock watering at 100 mg/L.[21]

Aquatic Habitat (WARM, COLD, MIGR, SPWN, WILD, BIOL, RARE, EST)

These beneficial uses are defined in Chapter 2 of the Basin Plan as follows:

WARM: Uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.

COLD: Uses of water that support cold water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish or wildlife, including invertebrates.

MIGR: Uses of water that support habitats necessary for migration or other temporary activities by aquatic organisms, such as anadromous fish.

SPWN: Uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish.

WILD: Uses of water that support terrestrial ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.

BIOL: Uses of water that support designated areas or habitats, such as established refuges, parks, sanctuaries, ecological reserves, or Areas of Special Biological Significance (ASBS), where the preservation or enhancement of natural resources requires special protection.

RARE: Uses of water that support habitats necessary, at least in part, for the survival and successful maintenance of plant or animal species established under state or federal law as rare, threatened, or endangered.

EST: Uses of water that support estuarine ecosystems including, but not limited to, preservation or enhancement of estuarine habitats, vegetation, fish, shellfish, or wildlife (e.g., estuarine mammals, waterfowl, shorebirds). An estuary is generally described as a semi-enclosed body of water having a free connection with the open sea, at least part of the year and within which the seawater is diluted at least seasonally with fresh water drained

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[18] The University of California Agricultural Extension Service guideline values. 30 mg/L nitrate as nitrogen is the recommended uppermost threshold concentration for nitrate in irrigation supply water as identified by the University of California Agricultural Extension Service which potentially cause severe problems for sensitive crops (see Table 3-1 in the Basin Plan). Selecting the least stringent threshold (30 mg/L) therefore conservatively identifies exceedances which could detrimentally impact the AGR beneficial uses for irrigation water.

[19] New Mexico State University, Cooperative Extension Service. Nitrate Poisoning of Livestock. Guide B-807.

[20] University of Arkansas, Division of Agriculture - Cooperative Extension. “Nitrate Poisoning in Cattle”. Publication FSA3024.

[21] 100 mg/L nitrate as nitrogen is the Basin Plan’s water quality objective protective of livestock watering, and is based on National Academy of Sciences-National Academy of Engineering guidelines (see Table 3-2 in the Basin Plan).

from the land. Included are water bodies which would naturally fit the definition if not controlled by tide gates or other such devices.

The Basin Plan water quality objectives protective of aquatic habitat beneficial uses and which are most relevant to nutrient pollution[22] are the biostimulatory substances objective and dissolved oxygen objectives for aquatic habitat. The biostimulatory substances objective is a narrative water quality objective that states:

> *Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses.*

Narrative water quality objectives do not explicitly identify numeric water quality criteria and are instead subject to interpretation when implemented. Worth noting here is that the U.S. Environmental Protection Agency reported that total nitrogen concentrations in streams that are protective against biostimulatory effects should generally be expected to be in an acceptable range of 2 mg/L to 6 mg/L (see Text Box 5-1 below).

Text Box 5-1. U.S. Environmental Protection Agency information on generally acceptable ranges of total nitrogen in streams to protect aquatic habitat.

"(A)n excess amount of nitrogen in a waterway may lead to low levels of oxygen and negatively affect various plant life and organisms…An acceptable range of total nitrogen is ***2 mg/L to 6 mg/L****, though it is recommended to check tribal, state, or federal standards…"* (emphasis added)

From U.S. Environmental Protection Agency, 2013a, "Total Nitrogen" fact sheet, revised June 4, 2013

The Basin Plan also requires that in waterbodies designated for WARM habitat, dissolved oxygen concentrations shall not be depressed below 5 mg/L, and that in waterbodies designated for COLD and SPWN, dissolved oxygen shall not be depressed below 7 mg/L.
Further, since un-ionized ammonia is highly toxic to aquatic species, the Basin Plan requires that the discharge of waste shall not cause concentrations of unionized ammonia (NH_3) to exceed 0.025 mg/L (as N) in receiving waters.

Water Contact Recreation (REC-1)
This beneficial use is defined in section 2.2.9 of the Basin Plan as follows:

Uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, white water activities, fishing, or use of natural hot springs.

The Basin Plan water quality objective protective of water contact recreation beneficial uses that is most relevant to nutrient pollution is the general toxicity objective for all inland surface waters, enclosed bays, and estuaries (Basin Plan Chapter 3, section 3.3.2.1. The general toxicity objective is a narrative water quality objective that states:

[22] Nutrients, such as nitrate, do not by themselves necessarily directly impair aquatic habitat beneficial uses. Rather, they cause indirect impacts by promoting algal growth and low dissolved oxygen that impair aquatic habitat uses.

> *All waters shall be maintained free of toxic substances in concentrations which are toxic to, or which produce detrimental physiological responses in, human, plant, animal, or aquatic life. Compliance with this objective will be determined by use of indicator organisms, analyses of species diversity, population density, growth anomalies, toxicity bioassays of appropriate duration, or other appropriate methods as specified by the Regional Board.*

Depending on local environmental conditions in any given watershed, harmful algal blooms can be associated with elevated nutrient concentrations in surface waters. Because illnesses are considered detrimental physiological responses in humans, the narrative toxicity objective applies to algal toxins, such as cyanobacteria associated with blue-green algae.

Possible health effects of exposure to blue-green algae blooms and their toxins can include rashes, skin and eye irritation, allergic reactions, gastrointestinal upset, and other effects including poisoning. Note that microcystins are toxins produced by cyanobacteria (blue-green algae) and are associated with algal blooms, elevated nutrients, and biostimulation in surface waterbodies.

The State of California Office of Environmental Health Hazard Assessment (OEHHA) has published peer-reviewed public health action-level guidelines for algal cyanotoxins (microcystins) in recreational water uses; this public health action-level for microcystins is 0.8 mg/L (OEHHA, 2012). This public health action level can therefore be used to assess attainment or non-attainment of the Basin Plan's general toxicity objective and to ensure that REC-1 designated beneficial uses are being protected and supported.

5.2 Water Quality Objectives & Assessment Thresholds

The Basin Plan contains specific water quality objectives or non-regulatory assessment thresholds and guideline values which apply to nutrients and nutrient-related parameters. In addition, the Central Coast Water Board uses water quality objectives and numeric criteria that are established to protect beneficial uses and are compiled in Table 12.

Table 12. Compilation of Basin Plan water quality objectives, assessment thresholds, or protective guideline values for nutrients and nutrient-related parameters.

Constituent Parameter	Numeric Target	Primary Use Protected
Un-ionized Ammonia as N	0.025 mg/L	General Objective for all Inland Surface Waters, Enclosed Bays, and Estuaries *(toxicity objective)*
Nitrate as N	10 mg/L	MUN, GWR (Municipal/Domestic Supply; Groundwater Recharge)
Nitrate as N	5 – 30 mg/L *California Agricultural Extension Service guidelines*	AGR (Agricultural Supply – irrigation water) *"Severe" problems for sensitive crops at greater than 30 mg/L* *"Increasing problems" for sensitive crops at 5 to 30 mg/L*
Nitrate (NO_3-N) plus Nitrite (NO_2-N)	100 mg/L *National Academy of Sciences-National Academy of Engineers guidelines*	AGR (Agricultural Supply - livestock watering)
Nitrite (NO_2–N)	10 mg/L *National Academy of Sciences-National Academy of Engineers guidelines*	AGR (Agricultural Supply - livestock watering)
Dissolved Oxygen	For waters not mentioned by a specific beneficial use, dissolved oxygen shall not be depressed below 5.0 mg/L Median values should not fall below 85% saturation.	General Objective for all Inland Surface Waters, Enclosed Bays, and Estuaries
	Dissolved Oxygen shall not be depressed below 5.0 mg/L (WARM) Dissolved Oxygen shall not be depressed below 7.0 mg/L (COLD, SPWN)	Cold Freshwater Habitat, Warm Freshwater Habitat, Fish Spawning
	Dissolved Oxygen shall not be depressed below 2.0 mg/L	AGR (Agricultural Supply)
pH	pH value shall not be depressed below 7.0 or raised above 8.5	General Objective for all Inland Surface Waters, Enclosed Bays, and Estuaries
	The pH value shall neither be depressed below 6.5 nor raised above 8.3	Municipal/Domestic Supply, Agricultural Supply, Water Recreation

Constituent Parameter	**Numeric Target**	**Primary Use Protected**
	pH value shall not be depressed below 7.0 or raised above 8.5	Cold Freshwater Habitat, Warm freshwater habitat
Biostimulatory Substances	Basin Plan only has a narrative water quality objective	General Objective for all Inland Surface Waters, Enclosed Bays, and Estuaries *(biostimulatory substances objective)* -- (e.g., WARM, COLD, REC, WILD, EST)
Chlorophyll *a*	40 mcg/L *North Carolina Administrative Code, Title 151, Subchapter 2B, Rule 0211*	Numeric listing criteria to implement the Basin Plan biostimulatory substances objective for purposes of Clean Water Act section 303(d) listing assessments.
Microcystins *(includes Microcystins LA, LR, RR, and YR)*	0.8 mcg/L *California Office of Environmental Health Hazard Assessment Suggested Public Health Action Level*	REC-1 (water contact recreation)

5.3 Anti-degradation Policies

The U.S. Environmental Agency requires an anti-degradation policy as one of the minimum elements required to be included in a state's water quality standards.[23] Anti-degradation policies are consistent with the intent and goals of the federal Clean Water Act, especially the clause that states: "The objective of this Act is to restore and *maintain* the chemical, physical, and biological integrity of the Nation's water" (emphasis added).[24, 25]

Accordingly, section 3.2 of the Basin Plan, states that wherever the existing quality of water is better than the quality of water established in the Basin Plan as objectives, **such existing quality shall be maintained** unless otherwise provided by provisions of the state anti-degradation policy. Practically speaking, this means that where water quality is *better* than necessary to support designated beneficial uses, such existing high quality water shall be maintained, and further lowering of water quality is not allowed except under conditions provided for in the anti-degradation policy.

The U.S. Environmental Protection Agency also requires states to implement the federal anti-degradation regulations for surface waters (40 CFR § 131.12). The State Water Resources Control Board (State Water Board) Resolution No. 68-16 (i.e., the state anti-degradation policy) incorporates the federal anti-degradation policy where applicable to ensure consistency. It is important to note that the federal policy only applies to surface waters, while the state policy applies to both surface and ground waters.

For purposes of the anti-degradation policy, "high quality waters" are defined on a pollutant-by-pollutant basis. From the water quality management perspective, it is simply not enough to improve impaired waters – protection of existing high-quality waters and prevention of any further water quality degradation should be identified as a high priority goal.[26] Simply put, TMDL implementation efforts are justified in considering improved protection of high-quality waters and addressing anti-degradation concerns, as well as focusing on improving impaired waterbodies.

Indeed, the U.S. Environmental Protection Agency recognizes the validity of using TMDLs as a tool for implementing anti-degradation goals:

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[23] 40 C.F.R. § 131.6.
[24] U.S. Environmental Protection Agency, *"Questions & Answers on: Antidegradation"* EPA/811/1985.5, Office of Water Regulations and Standards, August 1985.
[25] Federal Water Pollution Control Act (Clean Water Act), Sec. 101(a)
[26] The Central Coast Water Board considers *preventing* impairment of waterbodies to be as important a priority as *correcting* impairments of waterbodies (see the staff report for agenda item 3, July 11, 2012 Central Coast Water Board meeting).

Identifying opportunities to protect waters that are not yet impaired: TMDLs are typically written for restoring impaired waters; however, states can prepare TMDLs geared towards maintaining a "better than water quality standard" condition for a given waterbody-pollutant combination, and they can be a useful tool for high quality waters.

From: U.S. Environmental Protection Agency, 2014a. Opportunities to Protect Drinking Water Sources and Advance Watershed Goals Through the Clean Water Act: A Toolkit for State, Interstate, Tribal and Federal Water Program Managers. November 2014.

Similarly, the U.S. Environmental Protection Agency makes clear that TMDLs can serve as planning tools not only for *restoring* water quality, but also for *protecting* and *maintaining* water quality consistent with the goals of anti-degradation policies:

"A TMDL serves as a planning tool and potential starting point for restoration or ***protection*** *activities with the ultimate goal of attaining or* ***maintaining*** *water quality standards." (emphasis added)*

U.S. Environmental Protection Agency, Implementing Clean Water Action Section 303(d): Impaired Waters and Total Maximum Daily Loads (TMDLs) – webpage accessed April 2016 EPA TMDL webpage

6 WATER QUALITY DATA ANALYSIS

The intent of this section of the report is to present surface water quality data compiled for this TMDL project. Water quality data was downloaded from CEDEN. Monitoring site locations, statistical summaries, and temporal trends are included herein.

6.1 Water Quality Data Sources

The following is a list of water quality data sources that could be used in watershed assessment and TMDL development. As appropriate, Central Coast Water Board staff will work with stakeholders to identify additional sources of data.

California Environmental Data Exchange Network (CEDEN). CEDEN is the State Water Board's data system for surface water quality in California.

Cooperative Monitoring Program (CMP). CMP is the surface water quality monitoring program conducted by Central Coast Water Quality Preservation, Inc. for dischargers of waste from irrigated agriculture.

California Integrated Water Quality System (CIWQS) Project. Effluent water quality is available from CIWQS. CIWQS is a database system used by the Regional Water Quality Control Boards to track information about places of environmental interest and it allows online submittal of data by permittees within certain programs.

Storm Water Multiple Application and Report Tracking System (SMARTS). Water quality data associated with the National Pollutant Discharge Elimination System (NPDES) permitted stormwater discharges are available from SMARTS, which is an online database for documents and data from stormwater discharges.

Central Coast Water Board staff invited stakeholders and interested members of the public to submit any information and data to Central Coast Water Board staff which they think could be relevant to a TMDL study for nutrient pollution in the Santa Ynez River basin.

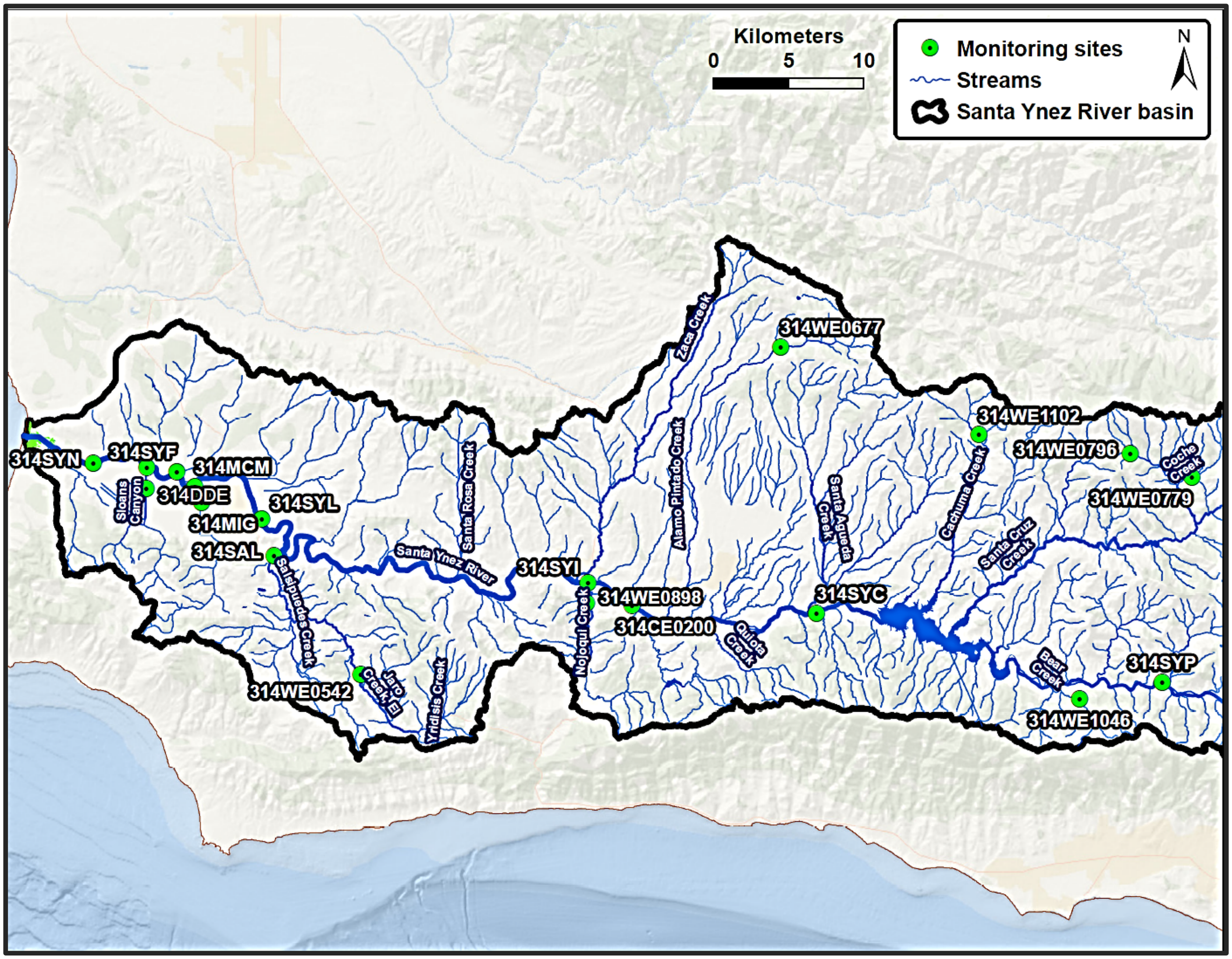
6.2 Monitoring Locations

Table 13 presents a tabular summary of surface water quality monitoring sites used for this report. The map in Figure 12 illustrates the location of these monitoring sites in the River basin.

Table 13. Surface water monitoring locations in the Santa Ynez River basin.

Station Code	Location	Latitude	Longitude
314MCM	Miguelito Creek mouth @ treatment plant	34.663334	-120.479
314SYN	Santa Ynez River at 13th Street	34.676617	-120.553
314SYF	Santa Ynez River at Floradale Rd	34.672131	-120.492
314SYI	Santa Ynez River at Highway 101	34.60622	-120.193
314SYL	Santa Ynez River at Highway 246	34.643871	-120.43
314WE0542	El Jaro Creek ~0.3 miles downstream from Ytias Creek.	34.55085	-120.358
314WE0898	Nojoqui Creek Hwy 101 ~1.4mi S Hwy 246	34.594021	-120.194
314WE0796	Santa Cruz Creek WF ~3mi above Coche Creek	34.68351	-119.799
314WE0785	Unnamed Creek ~0.2mi SE Santa Ynez River	34.674728	-120.514
314WE0677	Alamo Pintado Creek ~0.8mi above Figueroa Mtn. Rd.	34.7477	-120.053
314WE1046	Kelly Creek ~0.8mi above Paradise Rd.	34.536499	-119.836
314WE0779	Coche Creek ~1mi above WF Santa Cruz Creek	34.66959	-119.754
314WE1102	Cachuma Creek ~0.25mi below Cachuma Cmp Grnd	34.695259	-119.909
314CE0200	Santa Ynez River ~2.3mi above Hwy 101	34.592777	-120.161
314DDE	Canal trib to Santa Ynez River @ W. Central Ave. (Sloans Canyon Creek)	34.661545	-120.5144
314SAL	Salsipuedes Creek @ Santa Rosa Rd	34.621761	-120.421
314MIG	San Miguelito Creek at W. North Avenue	34.653545	-120.474
314SYP	Santa Ynez River at Paradise Road	34.54623	-119.776
314SYC	Santa Ynez River d/s Lake Cachuma at Highway 154	34.587997	-120.027

Figure 12. Map illustrating surface water monitoring locations in the Santa Ynez River basin.



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6.3 Summary Statistics

Statistical summaries are a way of organizing data and providing ways to assess trends and variation, in water quality. Table 14 through Table 23 present statistical summaries of surface water quality data for nutrients and nutrient-related parameters in the Santa Ynez River basin. These data show a ranges of water quality conditions with respect to nutrients and nutrient-related parameters in streams of the Santa Ynez River basin.

Table 14. Summary statistics (percentiles for the range of data from each site) for nitrate as nitrogen (NO3-N) for streams in the Santa Ynez River basin (units=mg/L, dates=month/year).

Station Code	Sample count	Sample date range	mean	Min	Median	Max	Count exceeding 10 mg/L	Percent exceeding 10 mg/L
314MCM	12	1/08-12/08	21.7	10.5	21.1	33.8	12	100%
314MIG	49	1/01-12/14	0.18	0.01	0.02	2.52	0	0%
314DDE	11	1/08-12/08	6.1	0.1	4.58	27.9	1	9%
314SAL	66	1/01-2/20	0.31	0.009	0.18	1.92	0	0%
314SYC	64	1/01-2/20	0.126	0.004	0.07	0.58	0	0%
314SYF	189	1/01-2/20	8.7	0.006	5.8	30.7	67	35%
314SYI	56	1/01-2/20	0.196	0.001	0.12	1.95	0	0%
314SYL	105	1/01-5/19	0.16	0.003	0.01	2.17	0	0%
314SYN	368	1/01-2/20	4.9	0.01	2.31	72	74	20%
314SYP	63	1/01-2/20	0.11	0.01	0.02	1.12	0	0%
314WE0542	1	7/00	0.03	0.03	0.03	0.03	0	0%
314WE0677	1	5/02	0.01	0.01	0.01	0.01	0	0%
314WE0779	1	7/01	0.01	0.01	0.01	0.01	0	0%
314WE0785	1	5/01	9.9	9.93	9.93	9.93	0	0%
314WE0796	1	7/01	0.01	0.01	0.01	0.01	0	0%
314WE0898	1	5/01	0.57	0.57	0.57	0.57	0	0%
314WE1046	1	6/02	0.09	0.09	0.09	0.09	0	0%
314WE1102	2	5/03-6/12	0.006	0.01	0.01	0.01	0	0%

Table 15. Summary statistics for total nitrogen (TN) for streams in the Santa Ynez River basin (units=mg/L, dates=month/year).

Station Code	Sample count	Sample date range	mean	Min	Median	Max	Count exceeding 2 mg/L[A]	Percent exceeding 2 mg/L[A]
314MIG	24	1/01-9/08	0.90	0.40	0.66	3.20	2	8%
314SAL	29	1/01-2/20	0.96	0.05	0.50	8.25	3	10%
314SYC	29	1/01-2/20	0.44	0.15	0.41	1.1	0	0%
314SYF	78	1/01-2/20	8.67	0.25	5.69	28.30	74	95%
314SYI	22	1/01-2/20	1.59	0.12	0.42	24.59	1	5%
314SYL	44	1/01-5/19	1.05	0.11	0.40	10.06	6	14%
314SYN	193	1/01-2/20	5.59	0.08	2.47	73.60	109	56%
314SYP	31	1/01-2/20	0.47	0.14	0.24	2.86	1	3%
314WE0542	1	7/00	0.25	0.25	0.25	0.25	0	0%
314WE0677	1	5/02	0.15	0.15	0.15	0.154	0	0%
314WE0779	1	7/01	0.17	0.17	0.17	0.17	0	0%
314WE0785	1	5/01	12.15	12.15	12.15	12.15	1	100%
314WE0796	1	7/01	0.05	0.05	0.04	0.04	0	0%
314WE0898	1	5/01	0.718	0.71	0.71	0.71	0	0%
314WE1046	1	6/02	0.18	0.18	0.17	0.17	0	0%
314WE1102	2	5/03-6/12	0.21	0.13	0.21	0.27	0	0%

[A] 2 mg/L is not a California regulatory standard, it is a generalized USEPA non-regulatory guidance value. The USEPA “Total Nitrogen” fact sheet, revised June 4, 2013 states that an acceptable range of total nitrogen is generally between 2 mg/L to 6 mg/L. Therefore, 2 mg/L is used in this table as a numeric guideline indicating sites which may have elevated total nitrogen concentrations.

Table 16. Summary statistics for total ammonia (sum of NH3-N plus NH4-N) for streams in the Santa Ynez River basin (units=mg/L, dates=month/year).

Station Code	Sample count	Sample date range	mean	Min	Median	Max	Percent above 4.4 mg/L[A]	Percent above 30 mg/L[A]
314MCM	12	1/08-12/08	3.41	1.3	3.195	6.61	25%	0%
314MIG	25	1/01-12/14	0.04	0.015	0.035	0.2132	0%	0%

Station Code	Sample count	Sample date range	mean	Min	Median	Max	Percent above 4.4 mg/L[A]	Percent above 30 mg/L[A]
314SAL	39	1/01-2/20	0.05	0.015	0.041	0.24	0%	0%
314SYC	37	1/01-2/20	0.04	0.015	0.0375	0.15	0%	0%
314SYF	161	1/01-2/20	1.04	0.0205	0.142	9.84	6%	0%
314SYI	36	1/01-2/20	0.09	0.015	0.0557	0.758	0%	0%
314SYL	83	1/01-5/19	0.08	0.01	0.071	0.297	0%	0%
314SYN	253	1/01-2/20	0.18	0.0075	0.0745	5.5	0%	0%
314SYP	34	1/01-2/20	0.06	0.015	0.0375	0.41	0%	0%
314WE1102	1		0.01	0.0112	0.0112	0.0112	0%	0%

[A] USEPA water quality criterion for total ammonia. The 30 mg/L criteria are a chronic 30 day rolling average Aquatic Life Ambient Water Quality Criteria for Ammonia in Freshwater (published April 2013). The 4.4 mg/L criteria is applicable at pH 7.8 and 23 degrees C, in Summer and Fall conditions. USEPA reports these ammonia criteria are pH and temperature dependent. Table 5b in "Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater (EPA, 2013b)" provides the temperature and pH-dependent values of the chronic criteria magnitude.

Table 17. Summary statistics for un-ionized ammonia as nitrogen (NH3-N) for streams in the Santa Ynez River basin (units=mg/L, dates=month/year).

Station Code	Sample count	Sample date range	mean	Min	Median	Max	Count exceeding 0.025 mg/L[A]	Percent exceeding 0.025 mg/L[A]
314MCM	12	1/08-12/08	0.018	0.007	0.013	0.056	2	17%
314MIG	24	1/01-9/08	0.007	0.001	0.006	0.020	0	0%
314DDE	11	1/08-12/08	0.16	0.001	0.086	0.795	10	91%
314SAL	27	1/01-12/08	0.001	0.000	0.001	0.004	0	0%
314SYC	26	1/01-12/08	0.001	0.000	0.001	0.002	0	0%
314SYF	144	1/01-9/19	0.008	0.000	0.003	0.080	12	8%
314SYI	29	1/01-12/08	0.003	0.000	0.002	0.015	0	0%
314SYL	81	1/01-5/19	0.004	0.000	0.003	0.027	1	1%
314SYN	208	1/01-8/19	0.005	0.000	0.002	0.089	6	3%

Station Code	Sample count	Sample date range	mean	Min	Median	Max	Count exceeding 0.025 mg/L[A]	Percent exceeding 0.025 mg/L[A]
314SYP	29	1/01-1/09	0.001	0.000	0.001	0.005	0	0%
314WE0542	1	7/00	0.010	0.010	0.010	0.010	0	0%
314WE0677	1	5/02	0.008	0.008	0.008	0.008	0	0%
314WE0779	1	7/01	0.020	0.020	0.020	0.020	0	0%
314WE0785	1	5/01	1.149	1.149	1.149	1.149	1	100%
314WE0796	1	7/01	0.002	0.002	0.002	0.002	0	0%
314WE0898	1	5/01	0.010	0.010	0.010	0.010	0	0%
314WE1046	1	6/02	0.009	0.009	0.009	0.009	0	0%
314WE1102	1	5/03	0.016	0.016	0.016	0.016	0	0%

[A] Water quality objective from the Basin Plan.

Table 18. Summary statistics for total phosphorus (TP) for streams in the Santa Ynez River basin (units=mg/L, dates=month/year).

Station Code	Sample count	Sample date range	mean	Min	Median	Max	Count exceeding 0.1 mg/L[A]	Percent exceeding 0.1 mg/L[A]
314MIG	15	11/01-12/14	0.213	0.033	0.130	1.000	8	53%
314SAL	29	11/01-2/20	0.158	0.056	0.130	0.490	19	66%
314SYC	27	11/01-2/20	0.051	0.017	0.035	0.140	3	11%
314SYF	79	11/01-2/20	3.846	0.260	4.200	6.240	79	100%
314SYI	20	12/01-2/20	0.955	0.024	0.059	18.000	2	10%
314SYL	34	11/01-5/19	0.635	0.034	0.085	8.530	14	41%
314SYN	194	11/01-2/20	1.679	0.021	1.745	5.400	193	99%
314SYP	24	11/01-2/20	0.089	0.023	0.035	0.770	2	8%
314WE0542	1	07/00	0.137	0.137	0.137	0.137	1	100%
314WE0677	1	5//02	0.192	0.192	0.192	0.192	1	100%
314WE0779	1	7/01	0.002	0.002	0.002	0.002	0	0%
314WE0785	1	5//01	0.265	0.265	0.265	0.265	1	100%
314WE0796	1	7/01	0.003	0.003	0.003	0.003	0	0%

314WE0898	1	5//01	0.002	0.002	0.002	0.002	0	0%
314WE1046	1	6//02	0.017	0.017	0.017	0.017	0	0%
314WE1102	2	5//03-6/12	0.039	0.025	0.039	0.054	0	0%

[A] 0.1 mg/L is not a California regulatory standard, it is a generalized water quality goal for total phosphorus published in the San Diego Regional Water Quality Control Plan. It is provided here for informational purposes and as a non-regulatory threshold to indicate waters potentially enriched in phosphorus.

Table 19. Summary statistics for chlorophyll *a* for streams in the Santa Ynez River basin (units=mcg/L, dates=month/year).

Station Code	Sample count	Sample date range	mean	Min	Median	Max	Count exceeding 15 mcg/L[A]	Percent exceeding 15 mcg/L[A]
314MCM	12	1/08-12/08	2.7	0.86	2.23	8.5	0	0%
314MIG	25	1/01-12/14	5.2	0.1	1	76.9	1	4%
314DDE	11	1/08-12/08	5.8	0	5.1	19.9	1	9%
314SAL	39	1/01-2/20	3.6	0.04	2	23.4	1	3%
314SYC	36	1/01-2/20	1.9	0	1	11.3	0	0%
314SYF	156	1/01-2/20	7.3	0	2.2	398	7	4%
314SYI	33	1/01-2/20	3.7	0.1	0.9	81	1	3%
314SYL	76	1/01-5/19	2.9	0	0.9	45	4	5%
314SYN	245	1/01-2/20	9.2	0	3.5	230	23	9%
314SYP	34	1/01-2/20	2.7	0.1	0.5	20.5	1	3%
314WE0542	1	7/00	0	0	0	0	0	0%
314WE0677	1	5/02	0	0	0	0	0	0%
314WE0779	1	7/01	0	0	0	0	0	0%
314WE0785	1	5/01	0	0	0	0	0	0%
314WE0796	1	7/01	0	0	0	0	0	0%
314WE0898	1	5/01	0	0	0	0	0	0%
314WE1046	1	6/02	0	0	0	0	0	0%
314WE1102	2	5/03	0	0	0	0	0	0%

[A] Fifteen mcg/L chlorophyll *a* represents a condition for which the Central Coast Water Board will designate water bodies as impaired for aquatic life use (Worcester, et al., 2010).

Table 20. Summary statistics for percent floating algal cover for streams in the Santa Ynez River basin (units=%, dates=month/year).

Station Code	Sample count	Sample date range	mean	Min	Median	Max	Count exceeding 50%[A]	Percent exceeding 50%[A]
314MIG	1	12/14	0.0	0	0	0	0	0%
314SAL	14	2/14-3/20	0.0	0	0	0	0	0%
314SYC	11	2/14-3/20	0.4	0	0	2	0	0%
314SYF	76	1/09-9/20	4.6	0	0	50	0	0%
314SYI	9	1/14-9/20	0.6	0	0	5	0	0%
314SYL	54	1/09-3/20	4.1	0	0.5	30	0	0%
314SYN	118	1/09-3/22	13.7	0	2	95	10	8%
314SYP	6	4/14-3/20	0.0	0	0	0	0	0%

[A] One or more observances of 50% algal cover or greater represents supporting evidence of potential nutrient over-enrichment and biostimulation. (Worcester, et al., 2010).

Table 21. Summary statistics for dissolved oxygen in streams in the Santa Ynez River basin and exceedance frequencies for 5 and 7 mg/L criteria. (units=mg/L, dates=month/year).

Station Code	Sample count	Sample date range	mean	Min	Median	Max	Percent below 5 mg/L[A]	Percent below 7 mg/L[A]
314CE0200	3	1/06-5/07	11.0	9.8	10.8	12.3	0%	0%
314MCM	12	1/08-12/08	5.9	4.4	5.7	8.5	17%	92%
314MIG	26	1/01-12/14	13.9	6.4	14.1	22.6	0%	4%
314DDE	11	1/08-12/08	12.6	8.7	11.8	16.3	0%	0%
314SAL	40	1/01-2/20	10.1	6.14	10.1	15	0%	10%
314SYC	229	1/01-2/20	8.5	3.4	7.9	13.7	2%	16%
314SYF	256	1/01-2/20	4.0	0.5	3.5	12.3	61%	79%
314SYI	132	1/01-2/20	8.2	5.3	7.9	17	0%	39%
314SYL	181	1/01-5/19	8.9	5.6	9.5	17.1	0%	26%

314SYN	548	1/01-2/20	5.7	0.05	5.9	25.8	45%	57%
314SYP	133	1/01-2/20	8.4	6.12	8.1	11.6	0%	2%
314WE0542	1	7/00	8.4	8.4	8.4	8.4	0%	0%
314WE0677	1	5/02	8.8	8.8	8.8	8.8	0%	0%
314WE0785	1	5/01	12.3	12.3	12.3	12.3	0%	0%
314WE1046	1	6/02	7.2	7.2	7.2	7.2	0%	0%
314WE1102	2	5/03-6/12	9.9	7.9	9.9	11.9	0%	0%

[A] Water quality objectives for dissolved oxygen published in the Water Quality Control Plan for the Central Coastal Basin

Table 22. Summary statistics for dissolved oxygen in streams in the Santa Ynez River basin and exceedance frequencies for 13 mg/L supersaturation criteria.

Station Code	Sample count	mean	Min	Median	Max	Count above 13 mg/L[A]	Percent above 13 mg/L[A]
314CE0200	3	11.0	9.8	10.8	12.3	0	0%
314MCM	12	5.9	4.4	5.7	8.5	0	0%
314MIG	26	13.9	6.4	14.1	22.6	16	62%
314DDE	11	12.6	8.7	11.8	16.3	5	45%
314SAL	40	10.1	6.1	10.1	15	4	10%
314SYC	229	8.5	3.4	7.9	13.7	1	0%
314SYF	256	4.0	0.5	3.5	12.3	0	0%
314SYI	132	8.2	5.3	7.9	17	4	3%
314SYL	181	8.9	5.6	9.5	17.1	1	1%
314SYN	548	5.7	0.05	5.94	25.8	28	5%
314SYP	133	8.4	6.1	8.1	11.6	0	0%
314WE0542	1	8.4	8.4	8.4	8.4	0	0%
314WE0677	1	8.8	8.8	8.8	8.8	0	0%
314WE0785	1	12.3	12.3	12.3	12.3	0	0%
314WE1046	1	7.2	7.2	7.2	7.2	0	0%
314WE1102	2	9.9	7.9	9.9	11.9	0	0%

[A] This is not a California regulatory threshold, but is used here for screening purposes. Source: (Worcester, et al., 2010). Interpreting Narrative Objectives for Biostimulatory Substances for California Central Coast Waters. Central Coast Ambient Monitoring Program, California Central Coast Water Board, Technical Report.

Table 23. Summary statistics for dissolved oxygen saturation (%) in streams in the Santa Ynez River basin.

Station Code	Sample count	Sample date range	mean	Min	Median	Max	Count below 85% saturation[A]	Percent below 85% saturation[A]
314MCM	12	1/08-12/08	66.8	50.4	66.35	80.8	12	100%
314MIG	26	1/01-12/14	153.3	66.2	152.2	263.7	1	4%
314SAL	40	1/01-2/20	103.4	65.0	101.0	154.7	7	18%
314SYC	229	1/01-2/20	88.5	37.8	79.8	156.2	150	66%
314SYF	256	1/01-2/20	44.5	5.7	37.0	146.7	209	82%
314SYI	132	1/01-2/20	90.9	57	89.5	178.3	59	45%
314SYL	181	1/01-5/19	98.0	12	102.4	170.2	55	30%
314SYN	544	1/01-2/20	60.4	0.5	62.1	306.6	374	69%
314SYP	133	1/01-2/20	88.5	67.3	86.6	122	53	40%
314WE1102	1	6/12	80.2	80.2	80.2	80.2	1	100%

[A] Water quality objectives for dissolved oxygen published in the Water Quality Control Plan for the Central Coastal Basin.

6.4 Temporal Trends

Figure 13 through Figure 16 illustrate time series plots of nitrate as N concentrations several key points in the Santa Ynez River basin, where stream nitrate concentrations are known to be highly elevated above natural background conditions. Concentrations appear to be generally decreasing over time.

Figure 13. Time series graph of nitrate concentrations at monitoring site 314SYF (units are in mg/L).

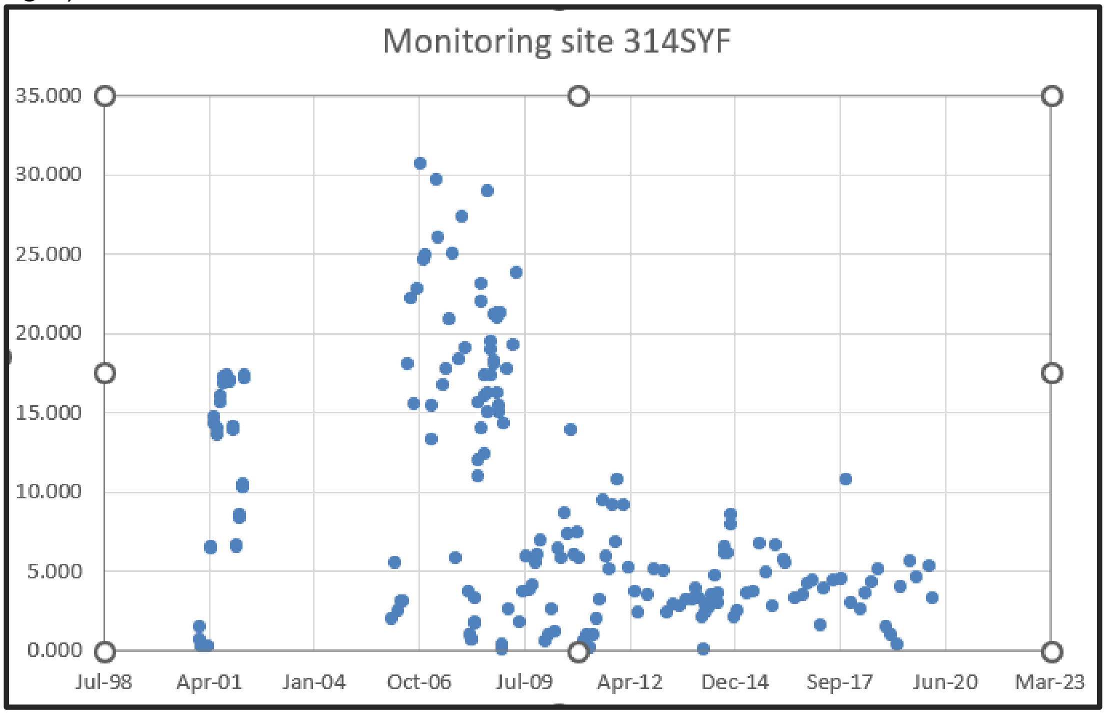


Figure 14. Time series graph of nitrate concentrations at monitoring site 314SYN (units are in mg/L).

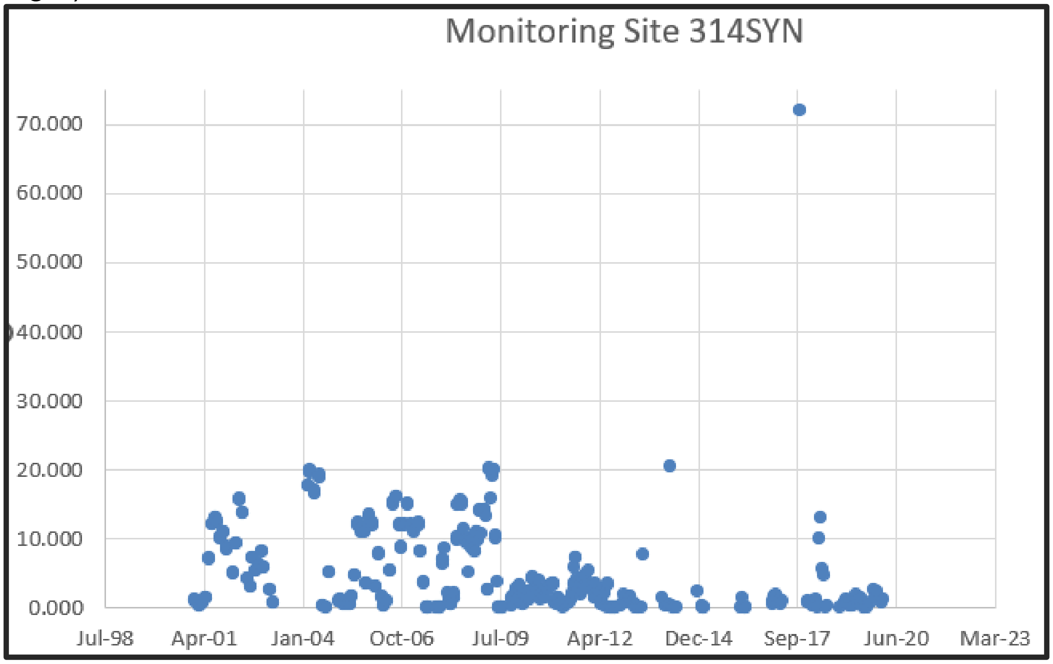


Figure 15. Time series graph of total nitrogen concentrations at monitoring site 314SYF (units are in mg/L).

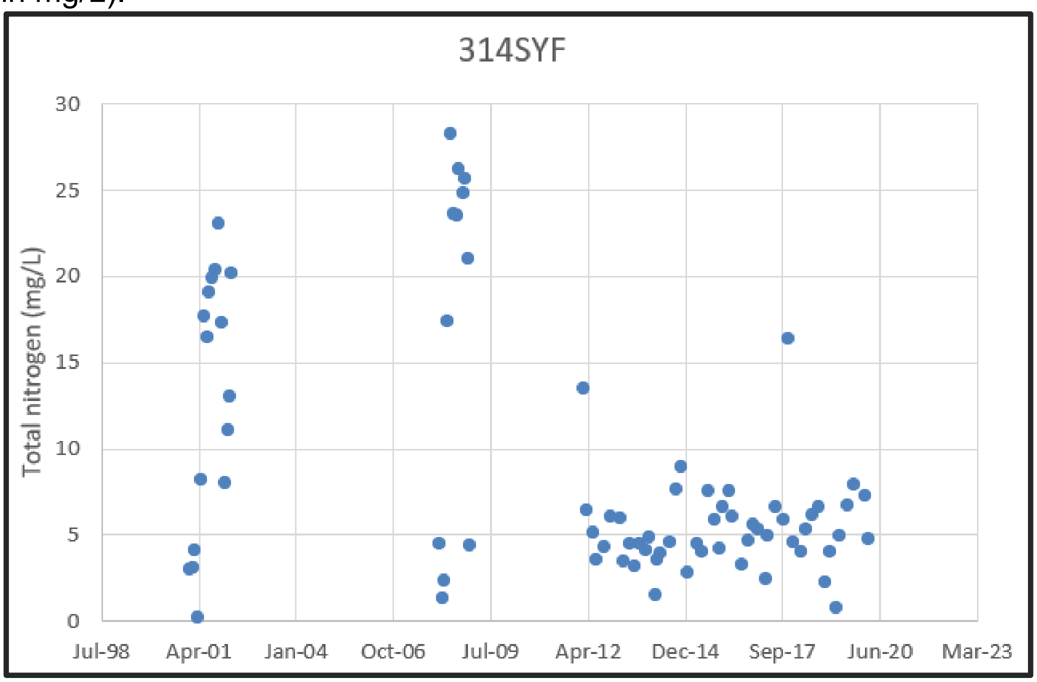
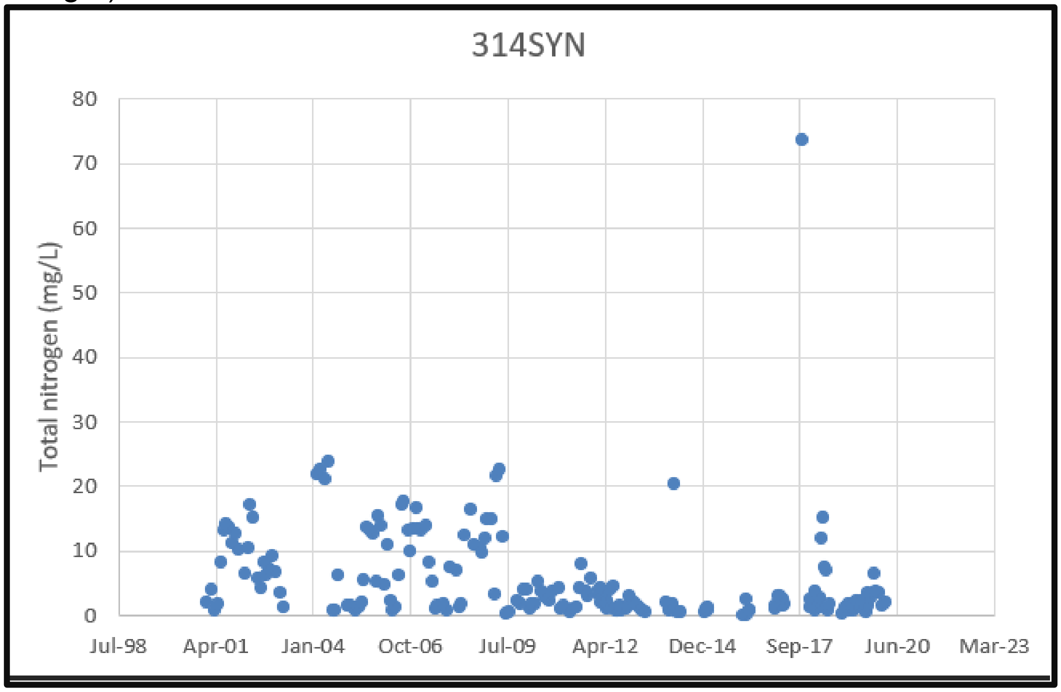


Figure 16. Time series graph of total nitrogen concentrations at monitoring site 314SYF (units are in mg/L).



6.5 Assessment of Biostimulatory Conditions

We used a range of numeric water quality objectives and peer-reviewed biostimulatory numeric screening criteria specific to the Central Coast region (Worcester et al., 2010)[27] to assess which, if any, Santa Ynez River basin waterbodies may exhibit excessive biostimulatory response to nutrient loads. These ranges of screening criteria collectively constitute a weight-of-evidence approach which demonstrates if and where biostimulatory conditions are impairing beneficial uses.

Elevated nutrients, in and of themselves, do not necessarily indicate biostimulation and impairment of beneficial uses. A linkage between elevated nutrients and actual impairment of beneficial uses must be demonstrated, generally using dissolved oxygen, excessive algal biomass, and other water quality indicators. Note that the USEPA Science Advisory Board (2010) and Worcester et al. (2010) report that numeric targets for biostimulatory impairments may need to be supported with a weight of evidence approach, rather than stand-alone statistical methods. The weight of evidence approach could use other evidence of eutrophication; for example, presence and abundance of floating algal mats, water column chlorophyll a concentration, evidence of oxygen depression, and supersaturation.

As such, staff used a wide range of Basin Plan numeric water quality objectives and peer-reviewed screening numeric criteria specific to the Central Coast region (Worcester et al., 2010) to assess the spatial distribution of biostimulatory effects and impairments in order to adequately determine if there are biostimulatory issues in the Santa Ynez River basin streams. Consistent with USEPA guidance, staff asserted biostimulatory impairment only where a waterbody exhibits a range of biostimulatory water quality indicators. Text Box 6-1 summarizes the range of biostimulatory indicators needed to assert biostimulatory impairment. The range of indicators in

[27] Worcester, K., D. Paradies, and M. Adams. 2010. Interpreting Narrative Objectives for Biostimulatory Substances for California Central Coast Waters. California Surface Water Ambient Monitoring Technical Report, July 2010.

Text Box 6-1 thus constitutes multiple lines of evidence, in a weight-of-evidence approach, to assess biostimulatory impairments.

Text Box 6-1. Range of indicators needed to assert biostimulatory impairment problems.

Biostimulatory Indicators
1) At least one line of evidence of dissolved oxygen problems – i.e., dissolved oxygen depletion and/or supersaturation (based on basin plan water quality objectives, and peer-reviewed numeric screening values) and/or wide diel swings in DO/pH; 2) At least one line of evidence indicating elevated algal biomass exceeding central coast reference conditions (peer-reviewed numeric screening criteria values for the Central Coast region, i.e., Worcester et al, 2010); 3) Evidence of elevated water column nutrients concentrations exceeding central coast reference conditions (e.g., Worcester et al., 2010); and 4) At least one additional line of evidence including photo documentation of excessive algal growth, or evidence of downstream nutrient impacts to a waterbody that does show multiple indicators of biostimulation problems. 5) For stream reaches that do not exhibit the full range of biostimulatory indicators (bullets 1 through 4, above), but contain nutrient concentrations elevated above reference conditions and are discharging directly into a downstream waterbody that does show a full range of biostimulatory indicators, these stream reaches will be given a numeric target protective against the risk of potential biostimulation, and to protect against downstream impacts (as consistent with USEPA Scientific Advisory Board guidance).

On the basis of the information outlined above, Table 24 presents the numeric criteria and screening values used to assess the potential indicators of biostimulation.

In an effort to use a systematic and consistent approach in assessing potential for biostimulation impairments, staff organized bistimulatory criteria, approaches, and measures identified in Text Box 6-1 into a tabular format in Table 24 and Table 25

Based on the approach described above, Table 26 presents the biostimulatory assessment matrix for Santa Ynez River basin streams. No conclusive evidence of excessive biostimulation response in the streams assessed, generally based on the lack of evidence for excessive algal biomass (i.e., elevated chlorophyll a concentrations or routine observations of floating algal mats).

Santa Ynez River estuary: Water quality data was unavailable for the Santa Ynez estuary. This estuary is designated by the California Coastal Commission as a Critical Coastal Area (CCA). CCAs are designations for high resource-value coastal waters. We maintain that the Santa Ynez estuary's administrative status as a CCA, does at least merit the consideration of protecting the estuary from upstream nutrient enrichment identified in the lower reaches of the Santa Ynez River.

Table 24. Water quality objectives and screening criteria which can be used as indicators of biostimulation in a weight of evidence approach.

Constituent Parameter	Source of Water Quality Objective	Numeric Water Quality Objective
Dissolved Oxygen	General Inland Surface Waters numeric objective	Dissolved Oxygen shall not be depressed below 5.0 mg/L

Constituent Parameter	Source of Water Quality Objective	Numeric Water Quality Objective
	Basin Plan numeric objective WARM, COLD, SPWN	Median values should not fall below 85% saturation. Dissolved Oxygen shall not be depressed below 5.0 mg/L (**WARM**) Dissolved Oxygen shall not be depressed below 7.0 mg/L (**COLD**, **SPWN**)
Biostimulatory Substances	Basin Plan General Objected for all Inland Surface Waters, Enclosed Bays, and Estuaries	Basin Plan narrative objective: *"Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses." (Basin Plan, Chapter 3)*

Table 25. Supplemental thresholds used to assess potential biostimulatory response in receiving waters which may be used in a weight-of-evidence approach.

Constituent − Parameter	Source of Screening Criteria	Screening Criteria/Method
Low dissolved oxygen and/or oxygen super saturation	Basin Plan Objectives and California Surface Water Ambient Monitoring Program Technical Report[A]	1) Below Basin Plan Objectives: 7.0 mg/L (COLD, SPWN), or 5.0 mg/L (general objective); or below Basin Plan saturation objective of median 85% saturation; – and/or – 2) Exceeding 13 mg/L = evidence of supersaturated conditions and potential nutrient over-enrichment and biostimulation. Low DO or supersaturated DO conditions indicating potential biostimulatory impairments were asserted if exceedances of numeric screening values exceeding sample size and frequencies identified in Table 3.2 of the State Water Board Listing Policy (2004)[c]
Chlorophyll *a*	California Surface Water Ambient Monitoring Program Technical Report[A]	Exceeding 15 µg/L (central coast reference condition)= supporting evidence of potential nutrient over-enrichment and biostimulation.
Evidence of nitrogen enrichment relative to Central Coast reference conditions	USEPA "Total Nitrogen" fact sheet, revised June 4, 2013	Exceeding 2 mg/L is taken as evidence of nitrogen enrichment. 2 mg/L is not a California regulatory standard, it is a generalized USEPA non-regulatory guidance value. The USEPA "Total Nitrogen" fact sheet, revised June 4, 2013 states that an acceptable range of total nitrogen is generally between 2 mg/L to 6 mg/L. Therefore, 2 mg/L is used here as a numeric guideline indicating sites which may have elevated total nitrogen concentrations.

Constituent − Parameter	Source of Screening Criteria	Screening Criteria/Method
Evidence of phosphorus enrichment relative to reference conditions	San Diego Regional Water Quality Control Plan	Exceeding 0.1 mg/L is taken as evidence of phosphorus enrichment. 0.1 mg/L is not a California regulatory standard, it is a generalized water quality goal for total phosphorus published in the San Diego Regional Water Quality Control Plan. It is used here for informational purposes and as a non-regulatory threshold to indicate waters potentially enriched in phosphorus.
Percent Floating Algal Cover	California Surface Water Ambient Monitoring Program Technical Report[A]	One or more observances of 50% cover or greater represents supporting evidence of potential nutrient over-enrichment and biostimulation.
Downstream Impacts	USEPA Scientific Advisory Board (2010) This scientific advisory board stressed the importance of recognizing downstream impacts in the context of nutrient pollution[B]	Observational: assess whether a stream reach exhibiting elevated nutrient concentrations (> 1mg/L total nitrogen; see nutrient enrichment screening criteria above) has downstream outlet discharging directly into waterbody which shows evidence of biostimulation problems (as indicated by screening values weight of evidence in this Table). Note: special consideration could be given to protecting designated California Critical Coastal Areas [E] (CCAs) from nutrient pollution in streams that flow into the CCAs. CCAs are an administrative, non-regulatory designation for coastal waterbodies that need protection from polluted runoff.

[A] Worcester, K., D. M. Paradies, and M. Adams. 2010. Interpreting Narrative Objectives for Biostimulatory Substances for California Central Coast Waters. Surface Water Ambient Monitoring Program (SWAMP) Technical Report, July 2010.

[B] USEPA Science Advisory Board Review of "Empirical Approaches for Nutrient Criteria Derivation". U.S Environmental Protection Agency. April 27, 2010.

Table 26. Biostimulation assessment matrix for streams of the Santa Ynez River basin.

	DO	**DO**	**Nutrients**	**Nutrients**	**Algal Biomass**	**Algal Biomass**	**Other Indicators**	**Other Indicators**	
Stream Reach	**Low DO?**	**DO super-saturation ?**	**Total nitrogen exceeding reference conditions?**	**Total phosphorus exceeding reference conditions?**	**Chlorophyll-*a* exceeding reference conditions?**	**Excess floating algal cover (≥50% cover)?**	**Downstream nutrient impacts to a surface waterbody exhibiting biostimulation?**	**Photo evidence of routine excessive algal biomass, fish kills, etc.?**	**Biostimulation Impairment in Stream Reach?**
Santa Ynez River at 13th Street @ 314SYN	Yes	Yes	Yes	Yes	No	No	Unknown Supplemental information: The Santa Ynez River estuary is downstream of monitoring site 314SYN. Data was unavailable for the estuary. This estuary is designated by the Calif. Coastal Commission as a Critical Coastal Area (CCA). CCAs are designations for high resource-value coastal waters.	No	**No – based on excessive algal biomass problems not being expressed Supplemental information:** The downstream Santa Ynez estuary's administrative status as a California Critical Coastal Area, does merit the consideration of protecting the estuary from upstream nutrient enrichment.
Santa Ynez River at Floradale Rd @ 314SYF	Yes	Yes	Yes	Yes	No	No	No	No	**No – based on excessive algal biomass problems not being expressed**
Santa Ynez River at	No	Yes	Yes	Yes	No	No	No	No	**No – based on excessive algal**

	DO	DO	Nutrients	Nutrients	Algal Biomass	Algal Biomass	Other Indicators	Other Indicators	
Stream Reach	Low DO?	DO super-saturation ?	Total nitrogen exceeding reference conditions?	Total phosphorus exceeding reference conditions?	Chlorophyll-*a* exceeding reference conditions?	Excess floating algal cover (≥50% cover)?	Downstream nutrient impacts to a surface waterbody exhibiting biostimulation?	Photo evidence of routine excessive algal biomass, fish kills, etc.?	**Biostimulation Impairment in Stream Reach?**
Highway 246 @ 314SYL									**biomass problems not being expressed**
Santa Ynez River at Highway 101 @ 314SYI	Yes	Yes	No	Yes	No	No	No	No	**No – based on excessive algal biomass problems not being expressed**
Santa Ynez River d/s Lake Cachuma at Highway 154 @ 314SYC	Yes	Yes	No	Yes	No	No	No	No	**No – based on excessive algal biomass problems not being expressed**
Santa Ynez River at Paradise Road @ 314SYP	No	Yes	No	Yes	No	No	No	No	**No – based on excessive algal biomass problems not being expressed**
Unnamed Creek ~0.2mi SE Santa Ynez River @ 314WE0785	Insufficient data	No data	Insufficient data	Insufficient data	No data	No data	No	No	**No – based on insufficient evidence for nutrient enrichment, DO problems, or excessive algal biomass.**

	DO	DO	Nutrients	Nutrients	Algal Biomass	Algal Biomass	Other Indicators	Other Indicators	
Stream Reach	Low DO?	DO super-saturation ?	Total nitrogen exceeding reference conditions?	Total phosphorus exceeding reference conditions?	Chlorophyll-*a* exceeding reference conditions?	Excess floating algal cover (≥50% cover)?	Downstream nutrient impacts to a surface waterbody exhibiting biostimulation?	Photo evidence of routine excessive algal biomass, fish kills, etc.?	**Biostimulation Impairment in Stream Reach?**
Miguelito Creek mouth @ treatment plant @ 314MCM	Yes	Yes	Yes	No data	No	No data	No	No	**No – based on excessive algal biomass problems not being expressed**
San Miguelito Creek at W. North Avenue @ 314MIG	No	Yes	Yes	Yes	No	Insufficient data	No	No	**No – based on excessive algal biomass problems not being expressed**
Salsipuedes Creek @ Santa Rosa Rd @ 314SAL	No	Yes	Yes	Yes	No	No	No	No	**No – based on excessive algal biomass problems not being expressed**
Canal Trib to Santa Ynez River @ W Central Ave (Sloans Canyon Creek)	No	Yes	No data	No data	No	No data	No data	No data	**No – based on insufficient evidence for excessive algal biomass.**
El Jaro Creek ~0.3 miles downstream from Ytias Creek @ 314WE0542	Insufficient data	Insufficient data	Insufficient data	Insufficient data	No data	No data	No data	No data	**No – based on insufficient evidence for nutrient enrichment, DO problems, or**

	DO	DO	Nutrients	Nutrients	Algal Biomass	Algal Biomass	Other Indicators	Other Indicators	
Stream Reach	Low DO?	DO super-saturation ?	Total nitrogen exceeding reference conditions?	Total phosphorus exceeding reference conditions?	Chlorophyll-*a* exceeding reference conditions?	Excess floating algal cover (≥50% cover)?	Downstream nutrient impacts to a surface waterbody exhibiting biostimulation?	Photo evidence of routine excessive algal biomass, fish kills, etc.?	**Biostimulation Impairment in Stream Reach?**
									excessive algal biomass.
Nojoqui Creek Hwy 101 ~1.4mi S Hwy 246 @ 314WE0898	No data	No data	Insufficient data	Insufficient data	No data	No data	No	No	**No – based on insufficient evidence for nutrient enrichment, DO problems, or excessive algal biomass.**
Santa Ynez River ~2.3mi above Hwy 101 @ 314CE0200	Insufficient data	Insufficient data	No data	No data	No data	No data	No	No	**No – based on insufficient evidence for nutrient enrichment, DO problems, or excessive algal biomass.**
Alamo Pintado Creek ~0.8mi above Figueroa Mtn. Rd. @ 314WE0677	Insufficient data	Insufficient data	Insufficient data	Insufficient data	No data	No data	No	No	**No – based on insufficient evidence for nutrient enrichment, DO problems, or excessive algal biomass.**
Cachuma Creek ~0.25mi below	Insufficient data	Insufficient data	No	No	No data	No data	No	No	**No – based on insufficient evidence for**

	DO	DO	Nutrients	Nutrients	Algal Biomass	Algal Biomass	Other Indicators	Other Indicators	
Stream Reach	Low DO?	DO super-saturation ?	Total nitrogen exceeding reference conditions?	Total phosphorus exceeding reference conditions?	Chlorophyll-*a* exceeding reference conditions?	Excess floating algal cover (≥50% cover)?	Downstream nutrient impacts to a surface waterbody exhibiting biostimulation?	Photo evidence of routine excessive algal biomass, fish kills, etc.?	**Biostimulation Impairment in Stream Reach?**
Cachuma Cmp Grnd @ 314WE1102									**nutrient enrichment, DO problems, or excessive algal biomass.**
Santa Cruz Creek WF ~3mi above Coche Creek @ 314WE0796	No data	No data	Insufficient data	Insufficient data	No data	No data	No	No	**No – based on insufficient evidence for nutrient enrichment, DO problems, or excessive algal biomass.**
Coche Creek ~1mi above WF Santa Cruz Creek @ 314WE0779	No data	No data	Insufficient data	Insufficient data	No data	No data	No	No	**No – based on insufficient evidence for nutrient enrichment, DO problems, or excessive algal biomass.**
Kelly Creek ~0.8mi above Paradise Rd. @ 314WE1046	Insufficient data	Insufficient data	Insufficient data	Insufficient data	No data	No data	No	No	**No – based on insufficient evidence for nutrient enrichment, DO problems, or excessive algal biomass.**

6.6 Summary of Water Quality Impairments

Monitoring data show a range of water quality conditions with respect to nutrients and nutrient-related parameters in streams of the Santa Ynez River basin. On balance, many of the monitored stream reaches do not show significant evidence of adverse impact by nutrient loads. Table 27 presents a summary of water quality impairments. The most significant water quality impairments identified are within the lower reaches of the Santa Ynez River basin, as summarized below.

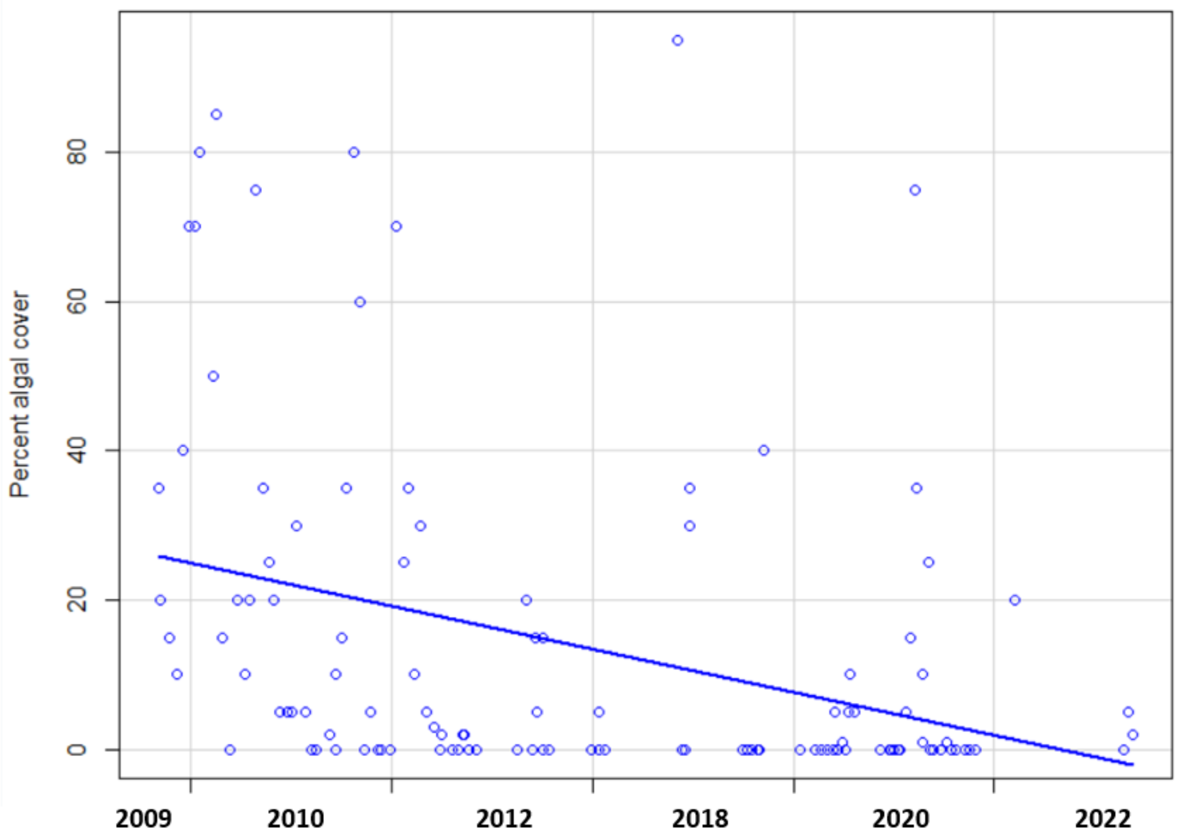
Nitrate: identified nitrate impairments in streams appear to be limited to the lowermost Santa Ynez River from Floradale Road downstream to where the river enters the estuary, and also in the lowermost Miguelito Creek from the Lompoc wastewater treatment plant downstream to the confluence with the Santa Ynez River – see Figure 18.

Dissolved oxygen (DO): identified DO impairments as defined by low dissolved oxygen or oxygen supersaturation in streams appear throughout all monitored reaches Santa Ynez River from downstream to where the river enters the estuary to upstream of Lake Cachuma, and also in the lowermost Miguelito Creek from the treatment plant downstream to the confluence with the Santa Ynez River – see Figure 19.

Un-ionized ammonia: identified un-ionized impairments occur only in the lowermost Miguelito Creek from the Lompoc wastewater treatment plant downstream to the confluence with the Santa Ynez River, and in Sloans Canyon Creek from all reaches upstream of monitoring site 314DDE to the confluence with the Santa Ynez River – see Figure 20.

Biostimulatory impairments: No biostimulatory impairments as a response to nutrient loads in the Santa Ynez River basin were identified. Algal biomass as represented by chlorophyll *a* concentrations and floating algal cover were within acceptable limits at all monitoring sites. Figure 17 presents a time series graph and summary statistics for percent floating algal cover at monitoring site 314SYN (Santa Ynez River at 13th street), in the lowermost reach of the river. R statistical analysis demonstrates that floating algal cover in the lowermost Santa Ynez River is trending down sharply over time, and the downward trend is statistically significant at the 95% confidence level (p-value = 2.8 E-06). Since 2012, summary statistics indicated that floating algal cover at this monitoring site has been relatively infrequent or low. The Santa Ynez River estuary is downstream of monitoring site 314SYN. Data was unavailable for the estuary. This estuary is designated by the California Coastal Commission as a Critical Coastal Area (CCA). CCAs are designations for high resource-value coastal waters. The estuary's administrative status as a CAA, does merit the consideration of protecting the estuary from upstream nutrient enrichment.

Figure 17. Time series graph and summary statistics of percent floating algal cover at monitoring site 314SYN.



Santa Ynez River @ 13th St.	Time period 2009 - 2012	Time period 2013-2022
Average floating algae cover	24%	7%
Median floating algae cover	15%	0%
Percentage of time observed algae exceeded 50% coverage	18.8%	2.9%

Figure 18. Map showing extent of nitrate impaired steams in the lowermost Santa Ynez River basin.

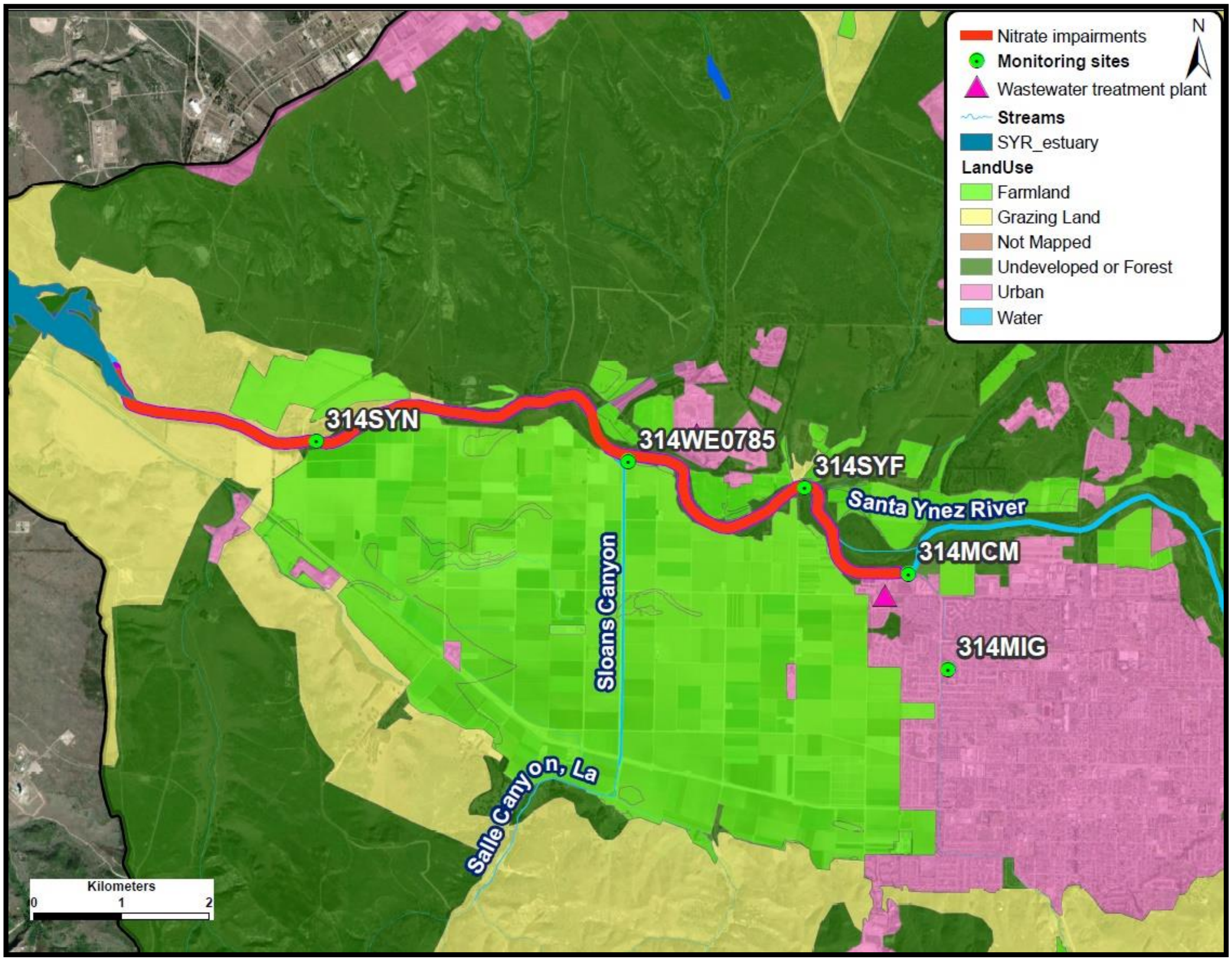


Figure 19. Map showing extent of dissolved oxygen impaired steams in the Santa Ynez River basin.

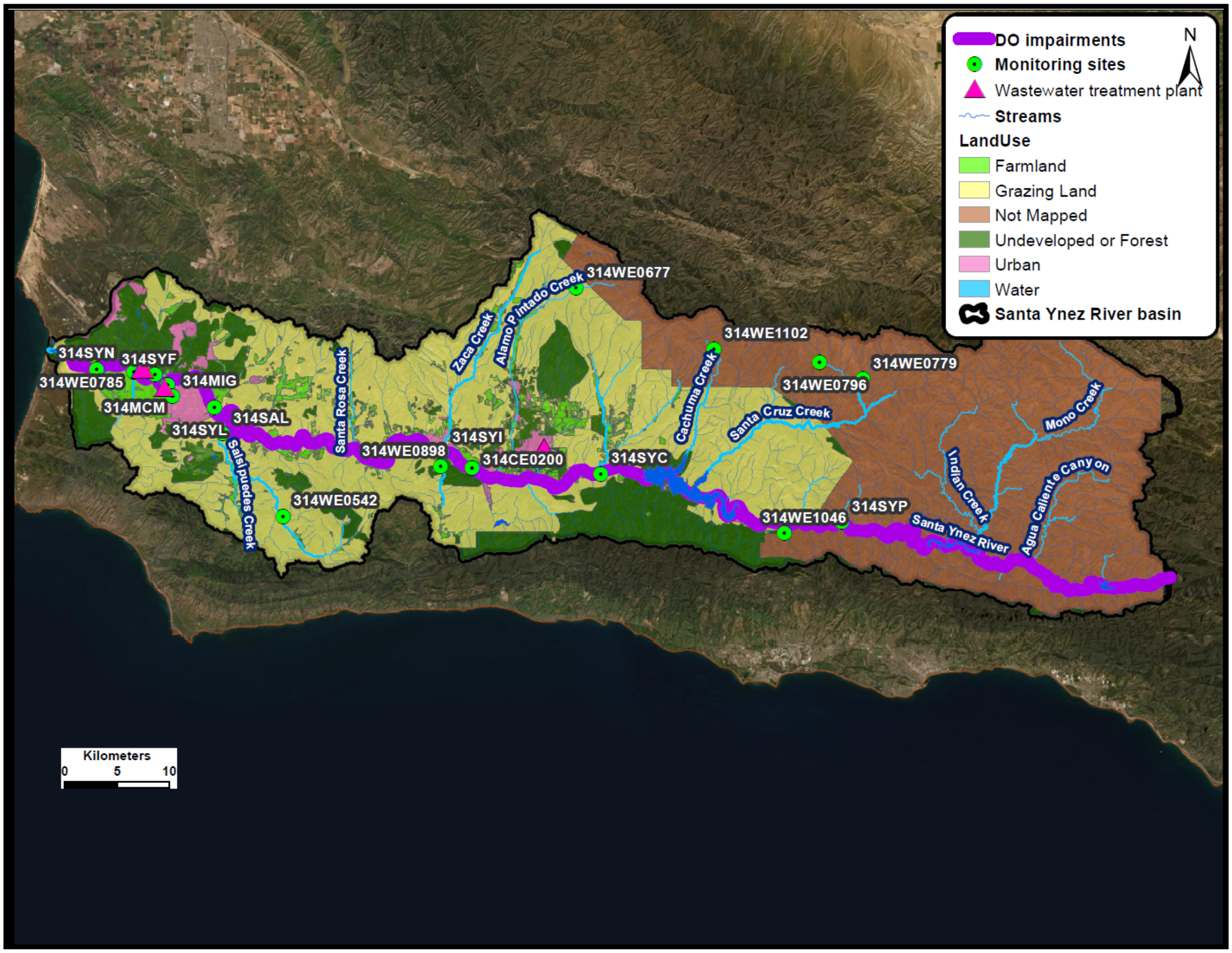


Figure 20. Map showing extent of un-ionized ammonia impairment in the Santa Ynez River basin.

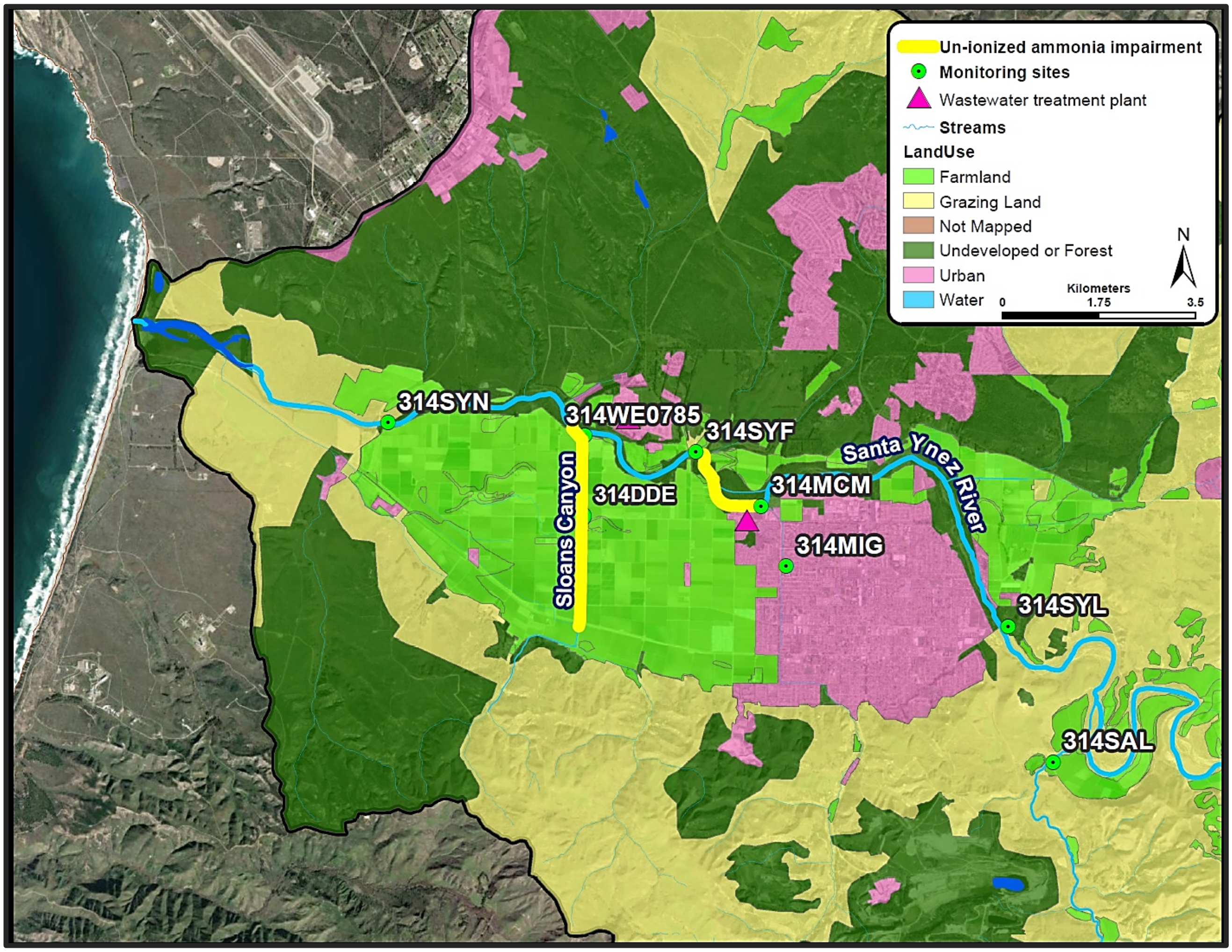


Table 27. Table illustrating status summary of designated beneficial uses of Santa Ynez River basin streams which could potentially be impacted by nutrients or nutrient-related parameters (DO = dissolved oxygen). Shaded cells in the sixth column indicate stream reach-pollutant combinations where beneficial uses are not being supported.

Station Code and Location	Parameter	Designated Beneficial Use	Exceeding water quality criteria or non-regulatory recommended level?	Is Beneficial Use being supported for this parameter?
314MCM Miguelito Creek mouth @ treatment plant	nitrate	MUN & GWR (human health)	Yes	Not supported
314MCM Miguelito Creek mouth @ treatment plant	total ammonia	MUN (human health)	No	Supported
314MCM Miguelito Creek mouth @ treatment plant	total ammonia	COLD, WARM (aquatic habitat)	Yes	Not supported
314MCM Miguelito Creek mouth @ treatment plant	un-ionized ammonia	Basin Plan general toxicity objective	Yes	Not supported
314MCM Miguelito Creek mouth @ treatment plant	Chlorophyll *a*	COLD, WARM (aquatic habitat)	No	Supported
314MCM Miguelito Creek mouth @ treatment plant	Percent floating algal cover	Biostimulation response indicator	No data	No data
314MCM Miguelito Creek mouth @ treatment plant	DO	COLD (aquatic habitat)	No	Supported
314MCM Miguelito Creek mouth @ treatment plant	DO	WARM (aquatic habitat)	Yes	Not supported
314MCM Miguelito Creek mouth @ treatment plant	DO saturation	General aquatic habitat objective (COLD, WARM, SPWN)	Yes	Not supported
314MCM Miguelito Creek mouth @ treatment plant	DO supersaturation	General aquatic habitat objective (COLD, WARM, SPWN)	No	Supported
314SYN Santa Ynez River at 13th Street	nitrate	MUN & GWR (human health)	Yes	Not supported
314SYN Santa Ynez River at 13th Street	total nitrogen	COLD, WARM (aquatic habitat)	Yes	Not supported

Station Code and Location	Parameter	Designated Beneficial Use	Exceeding water quality criteria or non-regulatory recommended level?	Is Beneficial Use being supported for this parameter?
314SYN Santa Ynez River at 13th Street	total ammonia	MUN (human health)	No	Supported
314SYN Santa Ynez River at 13th Street	total ammonia	COLD, WARM (aquatic habitat)	No	Supported
314SYN Santa Ynez River at 13th Street	un-ionized ammonia	Basin Plan general toxicity objective	No	Supported
314SYN Santa Ynez River at 13th Street	total phosphorus	COLD, WARM (aquatic habitat)	Yes	Not supported
314SYN Santa Ynez River at 13th Street	Chlorophyll *a*	COLD, WARM (aquatic habitat)	No	Supported
314SYN Santa Ynez River at 13th Street	Percent floating algal cover	Biostimulation response indicator	No	Supported
314SYN Santa Ynez River at 13th Street	DO	COLD (aquatic habitat)	Yes	Not supported
314SYN Santa Ynez River at 13th Street	DO	WARM (aquatic habitat)	Yes	Not supported
314SYN Santa Ynez River at 13th Street	DO saturation	General aquatic habitat objective (COLD, WARM, SPWN)	Yes	Not supported
314SYN Santa Ynez River at 13th Street	DO supersaturation	General aquatic habitat objective (COLD, WARM, SPWN)	No	Supported
314SYF Santa Ynez River at Floradale Rd	nitrate	MUN & GWR (human health)	Yes	Not supported
314SYF Santa Ynez River at Floradale Rd	total nitrogen	COLD, WARM (aquatic habitat)	Yes	Not supported
314SYF Santa Ynez River at Floradale Rd	total ammonia	MUN (human health)	No	Supported

Station Code and Location	Parameter	Designated Beneficial Use	Exceeding water quality criteria or non-regulatory recommended level?	Is Beneficial Use being supported for this parameter?
314SYF Santa Ynez River at Floradale Rd	total ammonia	COLD, WARM (aquatic habitat)	No	Supported
314SYF Santa Ynez River at Floradale Rd	un-ionized ammonia	Basin Plan general toxicity objective	No	Supported
314SYF Santa Ynez River at Floradale Rd	total phosphorus	COLD, WARM (aquatic habitat)	Yes	Not supported
314SYF Santa Ynez River at Floradale Rd	chlorophyll *a*	COLD, WARM (aquatic habitat)	No	Supported
314SYF Santa Ynez River at Floradale Rd	Percent floating algal cover	Biostimulation response indicator	No	Supported
314SYF Santa Ynez River at Floradale Rd	DO	COLD (aquatic habitat)	Yes	Not supported
314SYF Santa Ynez River at Floradale Rd	DO	WARM (aquatic habitat)	Yes	Not supported
314SYF Santa Ynez River at Floradale Rd	DO saturation	General aquatic habitat objective (COLD, WARM, SPWN)	Yes	Not supported
314SYF Santa Ynez River at Floradale Rd	DO supersaturation	General aquatic habitat objective (COLD, WARM, SPWN)	No	Supported
314SYI Santa Ynez River at Highway 101	nitrate	MUN & GWR (human health)	No	Supported
314SYI Santa Ynez River at Highway 101	total nitrogen	COLD, WARM (aquatic habitat)	No	Supported
314SYI Santa Ynez River at Highway 101	total ammonia	MUN (human health)	No	Supported
314SYI Santa Ynez River at Highway 101	total ammonia	COLD, WARM (aquatic habitat)	No	Supported

Station Code and Location	Parameter	Designated Beneficial Use	Exceeding water quality criteria or non-regulatory recommended level?	Is Beneficial Use being supported for this parameter?
314SYI Santa Ynez River at Highway 101	un-ionized ammonia	Basin Plan general toxicity objective	No	Supported
314SYI Santa Ynez River at Highway 101	total phosphorus	COLD, WARM (aquatic habitat)	Yes	Not supported
314SYI Santa Ynez River at Highway 101	chlorophyll *a*	COLD, WARM (aquatic habitat)	No	Supported
314SYI Santa Ynez River at Highway 101	Percent floating algal cover	Biostimulation response indicator	No	Supported
314SYI Santa Ynez River at Highway 101	DO	COLD (aquatic habitat)	Yes	Not supported
314SYI Santa Ynez River at Highway 101	DO	WARM (aquatic habitat)	No	Supported
314SYI Santa Ynez River at Highway 101	DO saturation	General aquatic habitat objective (COLD, WARM, SPWN)	Yes	Not supported
314SYI Santa Ynez River at Highway 101	DO supersaturation	General aquatic habitat objective (COLD, WARM, SPWN)	No	Supported
314SYL Santa Ynez River at Highway 246	nitrate	MUN & GWR (human health)	No	Supported
314SYL Santa Ynez River at Highway 246	total nitrogen	COLD, WARM (aquatic habitat)	Yes	Not supported
314SYL Santa Ynez River at Highway 246	total ammonia	MUN (human health)	No	Supported
314SYL Santa Ynez River at Highway 246	total ammonia	COLD, WARM (aquatic habitat)	No	Supported
314SYL Santa Ynez River at Highway 246	un-ionized ammonia	Basin Plan general toxicity objective	No	Supported

Station Code and Location	Parameter	Designated Beneficial Use	Exceeding water quality criteria or non-regulatory recommended level?	Is Beneficial Use being supported for this parameter?
314SYL Santa Ynez River at Highway 246	total phosphorus	COLD, WARM (aquatic habitat)	Yes	Not supported
314SYL Santa Ynez River at Highway 246	chlorophyll *a*	COLD, WARM (aquatic habitat)	No	Supported
314SYL Santa Ynez River at Highway 246	Percent floating algal cover	Biostimulation response indicator	No	Supported
314SYL Santa Ynez River at Highway 246	DO	COLD (aquatic habitat)	Yes	Not supported
314SYL Santa Ynez River at Highway 246	DO	WARM (aquatic habitat)	No	Supported
314SYL Santa Ynez River at Highway 246	DO saturation	General aquatic habitat objective (COLD, WARM, SPWN)	Yes	Not supported
314SYL Santa Ynez River at Highway 246	DO supersaturation	General aquatic habitat objective (COLD, WARM, SPWN)	No	Supported
314WE0542 El Jaro Creek ~0.3 miles downstream from Ytias Creek	nitrate	MUN & GWR (human health)	Insufficient data	Insufficient data
314WE0542 El Jaro Creek ~0.3 miles downstream from Ytias Creek	total nitrogen	COLD, WARM (aquatic habitat)	Insufficient data	Insufficient data
314WE0542 El Jaro Creek ~0.3 miles downstream from Ytias Creek	total ammonia	MUN (human health)	No data	No data
314WE0542 El Jaro Creek ~0.3 miles downstream from Ytias Creek	total ammonia	COLD, WARM (aquatic habitat)	No data	No data

Station Code and Location	Parameter	Designated Beneficial Use	Exceeding water quality criteria or non-regulatory recommended level?	Is Beneficial Use being supported for this parameter?
314WE0542 El Jaro Creek ~0.3 miles downstream from Ytias Creek	un-ionized ammonia	Basin Plan general toxicity objective	Insufficient data	Insufficient data
314WE0542 El Jaro Creek ~0.3 miles downstream from Ytias Creek	total phosphorus	COLD, WARM (aquatic habitat)	Insufficient data	Insufficient data
314WE0542 El Jaro Creek ~0.3 miles downstream from Ytias Creek	chlorophyll *a*	COLD, WARM (aquatic habitat)	No data	No data
314WE0542 El Jaro Creek ~0.3 miles downstream from Ytias Creek	Percent floating algal cover	Biostimulation response indicator	No data	No data
314WE0542 El Jaro Creek ~0.3 miles downstream from Ytias Creek	DO	COLD (aquatic habitat)	Insufficient data	Insufficient data
314WE0542 El Jaro Creek ~0.3 miles downstream from Ytias Creek	DO	WARM (aquatic habitat)	Insufficient data	Insufficient data
314WE0542 El Jaro Creek ~0.3 miles downstream from Ytias Creek	DO saturation	General aquatic habitat objective (COLD, WARM, SPWN)	No data	No data
314WE0542 El Jaro Creek ~0.3 miles downstream from Ytias Creek	DO supersaturation	General aquatic habitat objective (COLD, WARM, SPWN)	Insufficient data	Insufficient data
314WE0898 Nojoqui Creek Hwy 101 ~1.4mi S Hwy 246	nitrate	MUN & GWR (human health)	Insufficient data	Insufficient data
314WE0898 Nojoqui Creek Hwy 101 ~1.4mi S Hwy 246	total nitrogen	COLD, WARM (aquatic habitat)	Insufficient data	Insufficient data

Station Code and Location	Parameter	Designated Beneficial Use	Exceeding water quality criteria or non-regulatory recommended level?	Is Beneficial Use being supported for this parameter?
314WE0898 Nojoqui Creek Hwy 101 ~1.4mi S Hwy 246	total ammonia	MUN (human health)	No data	No data
314WE0898 Nojoqui Creek Hwy 101 ~1.4mi S Hwy 246	total ammonia	COLD, WARM (aquatic habitat)	No data	No data
314WE0898 Nojoqui Creek Hwy 101 ~1.4mi S Hwy 246	un-ionized ammonia	Basin Plan general toxicity objective	Insufficient data	Insufficient data
314WE0898 Nojoqui Creek Hwy 101 ~1.4mi S Hwy 246	total phosphorus	COLD, WARM (aquatic habitat)	Insufficient data	Insufficient data
314WE0898 Nojoqui Creek Hwy 101 ~1.4mi S Hwy 246	chlorophyll *a*	COLD, WARM (aquatic habitat)	No data	No data
314WE0898 Nojoqui Creek Hwy 101 ~1.4mi S Hwy 246	Percent floating algal cover	Biostimulation response indicator	No data	No data
314WE0898 Nojoqui Creek Hwy 101 ~1.4mi S Hwy 246	DO	COLD (aquatic habitat)	No data	No data
314WE0898 Nojoqui Creek Hwy 101 ~1.4mi S Hwy 246	DO	WARM (aquatic habitat)	No data	No data
314WE0898 Nojoqui Creek Hwy 101 ~1.4mi S Hwy 246	DO saturation	General aquatic habitat objective (COLD, WARM, SPWN)	No data	No data
314WE0898 Nojoqui Creek Hwy 101 ~1.4mi S Hwy 246	DO supersaturation	General aquatic habitat objective (COLD, WARM, SPWN)	No data	No data
314WE0796 Santa Cruz Creek WF ~3mi above Coche Creek and 314WE0779 Coche Creek ~1mi above WF Santa Cruz Creek	nitrate	MUN & GWR (human health)	Insufficient data	Insufficient data

Station Code and Location	Parameter	Designated Beneficial Use	Exceeding water quality criteria or non-regulatory recommended level?	Is Beneficial Use being supported for this parameter?
314WE0796 Santa Cruz Creek WF ~3mi above Coche Creek and 314WE0779 Coche Creek ~1mi above WF Santa Cruz Creek	total nitrogen	COLD, WARM (aquatic habitat)	Insufficient data	Insufficient data
314WE0796 Santa Cruz Creek WF ~3mi above Coche Creek and 314WE0779 Coche Creek ~1mi above WF Santa Cruz Creek	total ammonia	MUN (human health)	No data	No data
314WE0796 Santa Cruz Creek WF ~3mi above Coche Creek and 314WE0779 Coche Creek ~1mi above WF Santa Cruz Creek	total ammonia	COLD, WARM (aquatic habitat)	No data	No data
314WE0796 Santa Cruz Creek WF ~3mi above Coche Creek and 314WE0779 Coche Creek ~1mi above WF Santa Cruz Creek	un-ionized ammonia	Basin Plan general toxicity objective	Insufficient data	Insufficient data
314WE0796 Santa Cruz Creek WF ~3mi above Coche Creek and 314WE0779 Coche Creek ~1mi above WF Santa Cruz Creek	total phosphorus	COLD, WARM (aquatic habitat)	Insufficient data	Insufficient data

Station Code and Location	Parameter	Designated Beneficial Use	Exceeding water quality criteria or non-regulatory recommended level?	Is Beneficial Use being supported for this parameter?
314WE0796 Santa Cruz Creek WF ~3mi above Coche Creek and 314WE0779 Coche Creek ~1mi above WF Santa Cruz Creek	chlorophyll *a*	COLD, WARM (aquatic habitat)	No data	No data
314WE0796 Santa Cruz Creek WF ~3mi above Coche Creek and 314WE0779 Coche Creek ~1mi above WF Santa Cruz Creek	Percent floating algal cover	Biostimulation response indicator	No data	No data
314WE0796 Santa Cruz Creek WF ~3mi above Coche Creek and 314WE0796 Santa Cruz Creek WF ~3mi above Coche Creek and 314WE0779 Coche Creek ~1mi above WF Santa Cruz Creek	DO	COLD (aquatic habitat)	No data	No data
314WE0796 Santa Cruz Creek WF ~3mi above Coche Creek and 314WE0779 Coche Creek ~1mi above WF Santa Cruz Creek	DO	WARM (aquatic habitat)	No data	No data

Station Code and Location	Parameter	Designated Beneficial Use	Exceeding water quality criteria or non-regulatory recommended level?	Is Beneficial Use being supported for this parameter?
314WE0796 Santa Cruz Creek WF ~3mi above Coche Creek and 314WE0779 Coche Creek ~1mi above WF Santa Cruz Creek	DO saturation	General aquatic habitat objective (COLD, WARM, SPWN)	No data	No data
314WE0796 Santa Cruz Creek WF ~3mi above Coche Creek and 314WE0779 Coche Creek ~1mi above WF Santa Cruz Creek	DO supersaturation	General aquatic habitat objective (COLD, WARM, SPWN)	No data	No data
314WE0785 Unnamed Creek ~0.2mi SE Santa Ynez River	nitrate	MUN & GWR (human health)	Insufficient data	Insufficient data
314WE0785 Unnamed Creek ~0.2mi SE Santa Ynez River	total nitrogen	COLD, WARM (aquatic habitat)	Insufficient data	Insufficient data
314WE0785 Unnamed Creek ~0.2mi SE Santa Ynez River	total ammonia	MUN (human health)	No data	No data
314WE0785 Unnamed Creek ~0.2mi SE Santa Ynez River	total ammonia	COLD, WARM (aquatic habitat)	No data	No data
314WE0785 Unnamed Creek ~0.2mi SE Santa Ynez River	un-ionized ammonia	Basin Plan general toxicity objective	Insufficient data	Insufficient data
314WE0785 Unnamed Creek ~0.2mi SE Santa Ynez River	total phosphorus	COLD, WARM (aquatic habitat)	Insufficient data	Insufficient data
314WE0785 Unnamed Creek ~0.2mi SE Santa Ynez River	chlorophyll *a*	COLD, WARM (aquatic habitat)	No data	No data
314WE0785 Unnamed Creek ~0.2mi SE Santa Ynez River	Percent floating algal cover	Biostimulation response indicator	No data	No data

Station Code and Location	Parameter	Designated Beneficial Use	Exceeding water quality criteria or non-regulatory recommended level?	Is Beneficial Use being supported for this parameter?
314WE0785 Unnamed Creek ~0.2mi SE Santa Ynez River	DO	COLD (aquatic habitat)	Insufficient data	Insufficient data
314WE0785 Unnamed Creek ~0.2mi SE Santa Ynez River	DO	WARM (aquatic habitat)	Insufficient data	Insufficient data
314WE0785 Unnamed Creek ~0.2mi SE Santa Ynez River	DO saturation	General aquatic habitat objective (COLD, WARM, SPWN)	No data	No data
314WE0785 Unnamed Creek ~0.2mi SE Santa Ynez River	DO supersaturation	General aquatic habitat objective (COLD, WARM, SPWN)	Insufficient data	Insufficient data
314WE0677 Alamo Pintado Creek ~0.8mi above Figueroa Mtn. Rd.	nitrate	MUN & GWR (human health)	Insufficient data	Insufficient data
314WE0677 Alamo Pintado Creek ~0.8mi above Figueroa Mtn. Rd.	total nitrogen	COLD, WARM (aquatic habitat)	Insufficient data	Insufficient data
314WE0677 Alamo Pintado Creek ~0.8mi above Figueroa Mtn. Rd.	total ammonia	MUN (human health)	No data	No data
314WE0677 Alamo Pintado Creek ~0.8mi above Figueroa Mtn. Rd.	total ammonia	COLD, WARM (aquatic habitat)	No data	No data
314WE0677 Alamo Pintado Creek ~0.8mi above Figueroa Mtn. Rd.	un-ionized ammonia	Basin Plan general toxicity objective	Insufficient data	Insufficient data
314WE0677 Alamo Pintado Creek ~0.8mi above Figueroa Mtn. Rd.	total phosphorus	COLD, WARM (aquatic habitat)	Insufficient data	Insufficient data

Station Code and Location	Parameter	Designated Beneficial Use	Exceeding water quality criteria or non-regulatory recommended level?	Is Beneficial Use being supported for this parameter?
314WE0677 Alamo Pintado Creek ~0.8mi above Figueroa Mtn. Rd.	chlorophyll *a*	COLD, WARM (aquatic habitat)	No data	No data
314WE0677 Alamo Pintado Creek ~0.8mi above Figueroa Mtn. Rd.	Percent floating algal cover	Biostimulation response indicator	No data	No data
314WE0677 Alamo Pintado Creek ~0.8mi above Figueroa Mtn. Rd.	DO	COLD (aquatic habitat)	Insufficient data	Insufficient data
314WE0677 Alamo Pintado Creek ~0.8mi above Figueroa Mtn. Rd.	DO	WARM (aquatic habitat)	Insufficient data	Insufficient data
314WE0677 Alamo Pintado Creek ~0.8mi above Figueroa Mtn. Rd.	DO saturation	General aquatic habitat objective (COLD, WARM, SPWN)	No data	No data
314WE0677 Alamo Pintado Creek ~0.8mi above Figueroa Mtn. Rd.	DO supersaturation	General aquatic habitat objective (COLD, WARM, SPWN)	Insufficient data	Insufficient data
314WE1046 Kelly Creek ~0.8mi above Paradise Rd.	nitrate	MUN & GWR (human health)	Insufficient data	Insufficient data
314WE1046 Kelly Creek ~0.8mi above Paradise Rd.	total nitrogen	COLD, WARM (aquatic habitat)	Insufficient data	Insufficient data
314WE1046 Kelly Creek ~0.8mi above Paradise Rd.	total ammonia	MUN (human health)	No data	No data
314WE1046 Kelly Creek ~0.8mi above Paradise Rd.	total ammonia	COLD, WARM (aquatic habitat)	No data	No data
314WE1046 Kelly Creek ~0.8mi above Paradise Rd.	un-ionized ammonia	Basin Plan general toxicity objective	Insufficient data	Insufficient data

Station Code and Location	Parameter	Designated Beneficial Use	Exceeding water quality criteria or non-regulatory recommended level?	Is Beneficial Use being supported for this parameter?
314WE1046 Kelly Creek ~0.8mi above Paradise Rd.	total phosphorus	COLD, WARM (aquatic habitat)	Insufficient data	Insufficient data
314WE1046 Kelly Creek ~0.8mi above Paradise Rd.	chlorophyll *a*	COLD, WARM (aquatic habitat)	No data	No data
314WE1046 Kelly Creek ~0.8mi above Paradise Rd.	Percent floating algal cover	Biostimulation response indicator	No data	No data
314WE1046 Kelly Creek ~0.8mi above Paradise Rd.	DO	COLD (aquatic habitat)	Insufficient data	Insufficient data
314WE1046 Kelly Creek ~0.8mi above Paradise Rd.	DO	WARM (aquatic habitat)	Insufficient data	Insufficient data
314WE1046 Kelly Creek ~0.8mi above Paradise Rd.	DO saturation	General aquatic habitat objective (COLD, WARM, SPWN)	No data	No data
314WE1046 Kelly Creek ~0.8mi above Paradise Rd.	DO supersaturation	General aquatic habitat objective (COLD, WARM, SPWN)	Insufficient data	Insufficient data
314WE1102 Cachuma Creek ~0.25mi below Cachuma Cmp Grnd	nitrate	MUN & GWR (human health)	No	Supported
314WE1102 Cachuma Creek ~0.25mi below Cachuma Cmp Grnd	total nitrogen	COLD, WARM (aquatic habitat)	No	Supported
314WE1102 Cachuma Creek ~0.25mi below Cachuma Cmp Grnd	total ammonia	MUN (human health)	Insufficient data	Insufficient data
314WE1102 Cachuma Creek ~0.25mi below Cachuma Cmp Grnd	total ammonia	COLD, WARM (aquatic habitat)	Insufficient data	Insufficient data

Station Code and Location	Parameter	Designated Beneficial Use	Exceeding water quality criteria or non-regulatory recommended level?	Is Beneficial Use being supported for this parameter?
314WE1102 Cachuma Creek ~0.25mi below Cachuma Cmp Grnd	un-ionized ammonia	Basin Plan general toxicity objective	Insufficient data	Insufficient data
314WE1102 Cachuma Creek ~0.25mi below Cachuma Cmp Grnd	total phosphorus	COLD, WARM (aquatic habitat)	No	Supported
314WE1102 Cachuma Creek ~0.25mi below Cachuma Cmp Grnd	chlorophyll *a*	COLD, WARM (aquatic habitat)	No data	No data
314WE1102 Cachuma Creek ~0.25mi below Cachuma Cmp Grnd	Percent floating algal cover	Biostimulation response indicator	No data	No data
314WE1102 Cachuma Creek ~0.25mi below Cachuma Cmp Grnd	DO	COLD (aquatic habitat)	Insufficient data	Insufficient data
314WE1102 Cachuma Creek ~0.25mi below Cachuma Cmp Grnd	DO	WARM (aquatic habitat)	Insufficient data	Insufficient data
314WE1102 Cachuma Creek ~0.25mi below Cachuma Cmp Grnd	DO saturation	General aquatic habitat objective (COLD, WARM, SPWN)	Insufficient data	Insufficient data
314WE1102 Cachuma Creek ~0.25mi below Cachuma Cmp Grnd	DO supersaturation	General aquatic habitat objective (COLD, WARM, SPWN)	Insufficient data	Insufficient data
314CE0200 Santa Ynez River ~2.3mi above Hwy 101	nitrate	MUN & GWR (human health)	No data	No data
314CE0200 Santa Ynez River ~2.3mi above Hwy 101	total nitrogen	COLD, WARM (aquatic habitat)	No data	No data

Station Code and Location	Parameter	Designated Beneficial Use	Exceeding water quality criteria or non-regulatory recommended level?	Is Beneficial Use being supported for this parameter?
314CE0200 Santa Ynez River ~2.3mi above Hwy 101	total ammonia	MUN (human health)	No data	No data
314CE0200 Santa Ynez River ~2.3mi above Hwy 101	total ammonia	COLD, WARM (aquatic habitat)	No data	No data
314CE0200 Santa Ynez River ~2.3mi above Hwy 101	un-ionized ammonia	Basin Plan general toxicity objective	No data	No data
314CE0200 Santa Ynez River ~2.3mi above Hwy 101	total phosphorus	COLD, WARM (aquatic habitat)	No data	No data
314CE0200 Santa Ynez River ~2.3mi above Hwy 101	chlorophyll *a*	COLD, WARM (aquatic habitat)	No data	No data
314CE0200 Santa Ynez River ~2.3mi above Hwy 101	Percent floating algal cover	Biostimulation response indicator	No data	No data
314CE0200 Santa Ynez River ~2.3mi above Hwy 101	DO	COLD (aquatic habitat)	Insufficient data	Insufficient data
314CE0200 Santa Ynez River ~2.3mi above Hwy 101	DO	WARM (aquatic habitat)	Insufficient data	Insufficient data
314CE0200 Santa Ynez River ~2.3mi above Hwy 101	DO saturation	General aquatic habitat objective (COLD, WARM, SPWN)	No data	No data
314CE0200 Santa Ynez River ~2.3mi above Hwy 101	DO supersaturation	General aquatic habitat objective (COLD, WARM, SPWN)	Insufficient data	Insufficient data
314SAL Salsipuedes Creek @ Santa Rosa Rd	nitrate	MUN & GWR (human health)	No	Supported
314SAL Salsipuedes Creek @ Santa Rosa Rd	total nitrogen	COLD, WARM (aquatic habitat)	Yes	Not supported
314SAL Salsipuedes Creek @ Santa Rosa Rd	total ammonia	MUN (human health)	No	Supported

Station Code and Location	Parameter	Designated Beneficial Use	Exceeding water quality criteria or non-regulatory recommended level?	Is Beneficial Use being supported for this parameter?
314SAL Salsipuedes Creek @ Santa Rosa Rd	total ammonia	COLD, WARM (aquatic habitat)	No	Supported
314SAL Salsipuedes Creek @ Santa Rosa Rd	un-ionized ammonia	Basin Plan general toxicity objective	No	Supported
314SAL Salsipuedes Creek @ Santa Rosa Rd	total phosphorus	COLD, WARM (aquatic habitat)	Yes	Not supported
314SAL Salsipuedes Creek @ Santa Rosa Rd	chlorophyll *a*	COLD, WARM (aquatic habitat)	No	Supported
314SAL Salsipuedes Creek @ Santa Rosa Rd	Percent floating algal cover	Biostimulation response indicator	No	Supported
314SAL Salsipuedes Creek @ Santa Rosa Rd	DO	COLD (aquatic habitat)	No	Supported
314SAL Salsipuedes Creek @ Santa Rosa Rd	DO	WARM (aquatic habitat)	No	Supported
314SAL Salsipuedes Creek @ Santa Rosa Rd	DO saturation	General aquatic habitat objective (COLD, WARM, SPWN)	Yes	Not supported
314MIG San Miguelito Creek at W. North Avenue	nitrate	MUN & GWR (human health)	No	Supported
314MIG San Miguelito Creek at W. North Avenue	total nitrogen	COLD, WARM (aquatic habitat)	Yes	Not supported
314MIG San Miguelito Creek at W. North Avenue	total ammonia	MUN (human health)	No	Supported
314MIG San Miguelito Creek at W. North Avenue	total ammonia	COLD, WARM (aquatic habitat)	No	Supported
314MIG San Miguelito Creek at W. North Avenue	un-ionized ammonia	Basin Plan general toxicity objective	No	Supported

Station Code and Location	Parameter	Designated Beneficial Use	Exceeding water quality criteria or non-regulatory recommended level?	Is Beneficial Use being supported for this parameter?
314MIG San Miguelito Creek at W. North Avenue	total phosphorus	COLD, WARM (aquatic habitat)	Yes	Not supported
314MIG San Miguelito Creek at W. North Avenue	chlorophyll *a*	COLD, WARM (aquatic habitat)	No	Supported
314MIG San Miguelito Creek at W. North Avenue	Percent floating algal cover	Biostimulation response indicator	Insufficient data	Insufficient data
314MIG San Miguelito Creek at W. North Avenue	DO	COLD (aquatic habitat)	No	Supported
314MIG San Miguelito Creek at W. North Avenue	DO	WARM (aquatic habitat)	No	Supported
314MIG San Miguelito Creek at W. North Avenue	DO saturation	General aquatic habitat objective (COLD, WARM, SPWN)	No	Supported
314MIG San Miguelito Creek at W. North Avenue	DO supersaturation	General aquatic habitat objective (COLD, WARM, SPWN)	Yes	Not supported
314SYP Santa Ynez River at Paradise Road	nitrate	MUN & GWR (human health)	No	Supported
314SYP Santa Ynez River at Paradise Road	total nitrogen	COLD, WARM (aquatic habitat)	No	Supported
314SYP Santa Ynez River at Paradise Road	total ammonia	MUN (human health)	No	Supported
314SYP Santa Ynez River at Paradise Road	total ammonia	COLD, WARM (aquatic habitat)	No	Supported
314SYP Santa Ynez River at Paradise Road	un-ionized ammonia	Basin Plan general toxicity objective	No	Supported
314SYP Santa Ynez River at Paradise Road	total phosphorus	COLD, WARM (aquatic habitat)	Yes	Not supported

Station Code and Location	Parameter	Designated Beneficial Use	Exceeding water quality criteria or non-regulatory recommended level?	Is Beneficial Use being supported for this parameter?
314SYP Santa Ynez River at Paradise Road	chlorophyll *a*	COLD, WARM (aquatic habitat)	No	Supported
314SYP Santa Ynez River at Paradise Road	Percent floating algal cover	Biostimulation response indicator	No	Supported
314SYP Santa Ynez River at Paradise Road	DO	COLD (aquatic habitat)	No	Supported
314SYP Santa Ynez River at Paradise Road	DO	WARM (aquatic habitat)	No	Supported
314SYP Santa Ynez River at Paradise Road	DO saturation	General aquatic habitat objective (COLD, WARM, SPWN)	Yes	Not supported
314SYP Santa Ynez River at Paradise Road	DO supersaturation	General aquatic habitat objective (COLD, WARM, SPWN)	No	Supported
314SYC Santa Ynez River d/s Lake Cachuma at Highway 154	nitrate	MUN & GWR (human health)	No	Supported
314SYC Santa Ynez River d/s Lake Cachuma at Highway 154	total nitrogen	COLD, WARM (aquatic habitat)	No	Supported
314SYC Santa Ynez River d/s Lake Cachuma at Highway 154	total ammonia	MUN (human health)	No	Supported
314SYC Santa Ynez River d/s Lake Cachuma at Highway 154	total ammonia	COLD, WARM (aquatic habitat)	No	Supported
314SYC Santa Ynez River d/s Lake Cachuma at Highway 154	un-ionized ammonia	Basin Plan general toxicity objective	No	Supported
314SYC Santa Ynez River d/s Lake Cachuma at Highway 154	total phosphorus	COLD, WARM (aquatic habitat)	Yes	Not supported
314SYC Santa Ynez River d/s Lake Cachuma at Highway 154	chlorophyll *a*	COLD, WARM (aquatic habitat)	No	Supported

Station Code and Location	Parameter	Designated Beneficial Use	Exceeding water quality criteria or non-regulatory recommended level?	Is Beneficial Use being supported for this parameter?
314SYC Santa Ynez River d/s Lake Cachuma at Highway 154	Percent floating algal cover	Biostimulation response indicator	No	Supported
314SYC Santa Ynez River d/s Lake Cachuma at Highway 154	DO	COLD (aquatic habitat)	Yes	Not supported
314SYC Santa Ynez River d/s Lake Cachuma at Highway 154	DO	WARM (aquatic habitat)	No	Supported
314SYC Santa Ynez River d/s Lake Cachuma at Highway 154	DO saturation	General aquatic habitat objective (COLD, WARM, SPWN)	Yes	Not supported
314SYC Santa Ynez River d/s Lake Cachuma at Highway 154	DO supersaturation	General aquatic habitat objective (COLD, WARM, SPWN)	No	Supported

7 Source Analysis

There are many possible nutrient sources within any given watershed; in general, the following can potentially be significant sources of nutrient loading to water resources:

- Municipal wastewater
- Fertilizer application on irrigated cropland
- Urban Stormwater runoff
- Industrial and construction stormwater runoff
- Manure from livestock and domestic animals
- Natural sources (including atmospheric deposition)

Treated municipal wastewater effluent has historically been a major source of nitrate in the lower Santa Ynez River downstream of the City of Lompoc Regional Wastewater Treatment Plant (see Figure 21). Nitrogen is a common pollutant in municipal wastewater effluent.

Worth noting is that the City of Lompoc completed major upgrades to the regional wastewater treatment plant in November 2009 (source: Central Coast Water Board Order Number R3-2022-0004, NPDES number CA0048127). According to reporting by the Central Coast Ambient Monitoring Program, nitrate plus nitrite as N concentrations have generally improved in the Lower Santa Ynez River during the last decade. Nitrate as N concentrations in the lower Santa Ynez River are not frequently below the municipal drinking water done, 10 mg/L.

Nutrient water quality impairments and the highest observed nutrient concentrations in the river basin are identified only in the lowermost Santa Ynez River, downstream of the Lompoc regional wastewater treatment plant. We therefore surmise that other potential nutrient sources in the river basin are not likely contributing significantly to nutrient impairments or elevated nutrient concentrations in stream waters.

7.1 NPDES-Permitted Wastewater Facilities

Treated municipal wastewater can be a source of nutrient loads to streams in any given watershed. Based on available data, discharges of treated wastewater from municipal wastewater treatment facilities are expected to generally be a relatively major source of nutrient pollution to waters of the lowermost Santa Ynez River downstream of Lompoc. Water quality data from the California Integrated Water Quality System (CIWQS) indicated that effluent and receiving nitrate water quality associated with the Lompoc Regional Wastewater Treatment Plant frequently exceeded 10 mg/L. Elsewhere in the river basin, there is no data indication that treated wastewater is a significant source of nutrient pollution to monitored stream reaches.

Figure 21 illustrates the location of municipal wastewater treatment plants within the Santa Ynez River basin. According to the U.S. Environmental Protection Agency and the State Water Resources Control Board, all National Pollutant Discharge Elimination System (NPDES)-permitted point sources identified in a TMDL must be assigned a waste load allocation, even if their current load to receiving waters is zero.[28, 29]

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[28] Personal communication, February 18, 2015, Janet Parrish, Central Coast Regional Liason, U.S. Environmental Protection Agency, Region 9.

[29] Communication, August 2014, Phil Wyels, Assistant Chief Counsel, State Water Resources Control Board.

Figure 21. Location of NPDES-permitted wastewater treatment facilities in the Santa Ynez River basin.

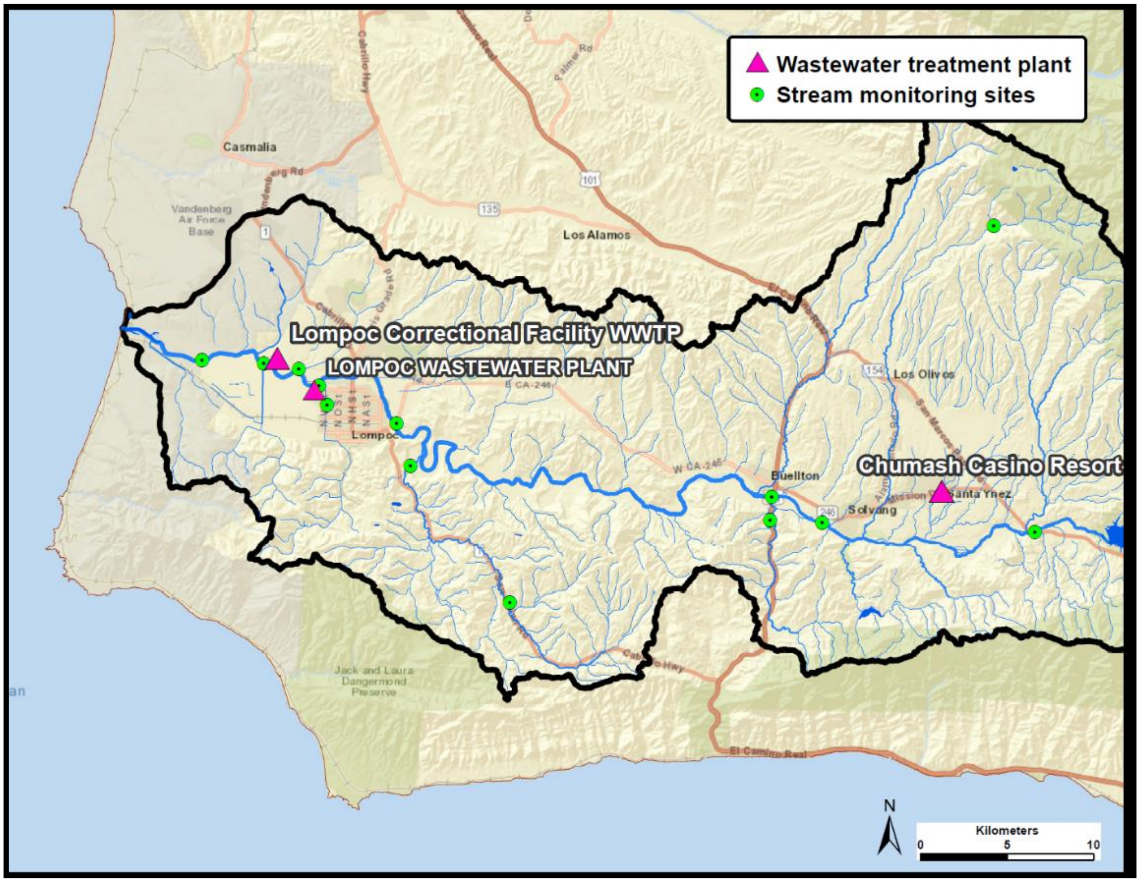


Table 28 tabulates the municipal wastewater treatment facilities in the river basin which will be required to have waste load allocations for nitrogen compounds, as described in the implementation strategy section of this report.

Table 28. Tabulation of all NPDES-permitted municipal wastewater treatment facilities in the Santa Ynez River basin. NPDES facilities are those that are authorized to discharge treated wastewater to waters of the United States.

Facility Name	Project Type	NPDES No.
City Of Lompoc Regional Wastewater Reclamation Plant	Wastewater Treatment Facility	NPDES Permit No. CA0048127
Santa Ynez Band of Chumash Indians Wastewater Treatment Plant	Wastewater Treatment Facility	NPDES Permit No. CA0050008

7.2 NPDES-Permitted Municipal Stormwater

Urban runoff, in the form of municipal separate storm sewer system (MS4) discharges, can be a contributor of nutrients to waterbodies. USEPA regulations explicitly state that discharges from municipal separate storm sewer systems are point source discharges and, therefore, must be addressed by the waste load allocation component of a TMDL.[30] The Central Coast Water

[30] 40 C.F.R. §§ 122.26, 130.2(g) & (h); see also USEPA Office of Water Memorandum (Nov. 2002) *"Establishing Total Maximum Daily Load (TMDL) Wasteload Allocations (WLAs) for Storm Water Sources and NPDES Permit Requirements Based on Those WLAs"*

Board is the permitting authority for NPDES urban stormwater permits in the Central Coast region.

Figure 22 illustrates the locations and extent of entities in the Santa Ynez River basin currently enrolled in the statewide general permit for stormwater discharges from small MS4s. Based on evidence and information provided in this section of the TMDL report, MS4s in the Santa Ynez River basin are not expected to be a significant risk or cause of the observed nutrient water quality impairments, and the permitted MS4s are generally expected to meet proposed waste load allocations. Therefore, at this time, additional regulatory measures for this source category are not expected.". To maintain existing water quality and prevent any further water quality degradation these types of facilities are expected to continue to implement and comply with the requirements of the statewide general permit.

Figure 22. Generalized and approximate boundaries of permitted MS4 entities in the Santa Ynez River basin, on the basis of shapefiles for census-designated urbanized areas and urban clusters.

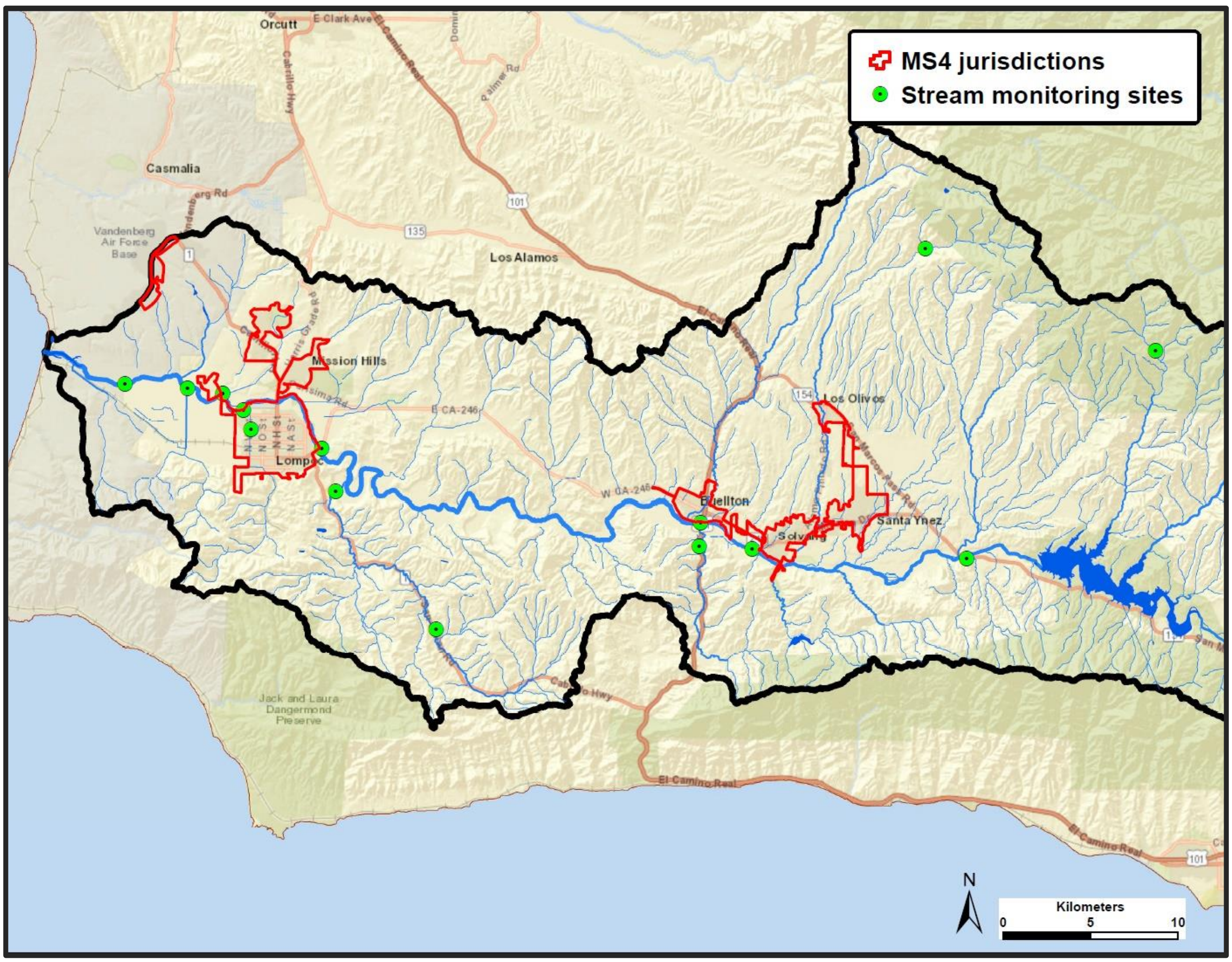


Table 29. Tabulation of jurisdictions in the Santa Ynez River basin with NPDES permit authorization to discharge municipal stormwater.[A]

Type	Status	Responsible Entity
Phase II Small MS4	Active	City of Santa Ynez
Phase II Small MS4	Active	City of Lompoc
Phase II Small MS4	Active	County of Santa Barbara

[A] On the basis of reporting from the: State Water Resources Control Board, Storm Water Multiple Application and Report Tracking System (SMARTS)

Site-specific urban stormwater runoff and storm drain outfall nutrient concentration data for the Santa Ynez River basin are not available, so estimates of nutrient loading to streams from these sources must be based on plausible approximations and indirect evidence. It should be noted that there is a large quantity of nationwide and California-specific data from the National Stormwater Quality Database characterizing nutrient concentrations in urban runoff. Staff filtered the available data to include only data regionally from California and other arid western states. These data (> 1,000 total samples) illustrate that total nitrogen concentrations in urban runoff virtually never exceed the 10 mg/L national drinking water regulatory standard for nitrate as N[31] (see Table 30). However, the available data suggest that urban runoff nutrient concentrations can episodically be elevated high enough above natural background to potentially contribute to a risk of biostimulation in surface waters (e.g., the data show urban runoff total nitrogen concentrations is episodically > 4 mg/L, and total phosphorus concentrations > 0.5 mg/L) – see Table 30, Figure 23, and Table 31.

Table 30. Total nitrogen concentrations in urban runoff (units = mg/L) from National Stormwater Quality Database (NSQD version 3) for sites in NSQD rain zones 5, 6, and 9 (arid west and southwest[A]). Temporal range of data is December 1978 to July 2002. Note that the nitrate as N national drinking water standard is not necessarily directly comparable to total nitrogen aqueous concentrations shown here,[B] but the nitrate as N drinking water standard is shown in the table for informational purposes.

Predominant land use	No. of Samples	Arithmetic Mean	Min	25%	75%	Max	No. Exceeding Drinking Water Standard (>10 mg/L)	% Samples Exceeding 10 mg/L
All Sites	1,085	3.08	0.03	1.30	3.62	68.03	35 of 1,085	**3.2%**
commercial	162	2.71	0.50	1.18	3.28	15.90	–	–
freeways	322	2.51	0.03	1.10	2.80	36.15	–	–
industrial	198	3.53	0.26	1.34	4.65	17.90	–	–
open space	68	2.75	0.73	1.45	3.34	9.14	–	–
residential	335	3.62	0.20	1.51	4.39	68.03	–	–

[A] Includes central and southern California, Arizona, Colorado, central and west Texas, and western South Dakota and includes monitoring locations from cities of Arlington (TX), Aurora (CO), Austin (TX), Castro Valley (CA), Colorado Springs (CA), Dallas (TX), Denver (CO), Fort Worth (TX), Fresno (CA), Garland (TX), Irving (TX), Los Angeles (CA), Maricopa City (AZ), Mesquite (TX), Orange County (CA), Plano (TX), Sacramento (CA), Rapid City (SD), Riverside (CA), San Bernardino (CA), San Diego (CA), Tucson (AZ).

[B] Total nitrogen measured in aqueous systems includes nitrate as well as other compounds and phases of nitrogen, such as ammonia and organic nitrogen. Often, but not always, nitrate makes up the largest fraction of the nitrogen compounds found in total nitrogen measurements from stream waters.

[31] Elevated nitrogen levels in urban runoff can, however, locally contribute to biostimulatory impairments of receiving waters where eutrophication has been identified as a water quality problem regardless of whether or not the nitrogen levels exceed the drinking water quality standard.

Figure 23. Box plot of total nitrogen concentrations in urban runoff from National Stormwater Quality Database (NSQD) monitoring locations in NSQD rain zones 5,6, and 9 (arid west and southwest). Raw statistics for this dataset were previously shown in Table 30. Note that the nitrate as N drinking water standard is not necessarily directly comparable to total nitrogen aqueous concentrations shown here, but the drinking water standard is shown on the graph for informational purposes. Temporal range of data is Dec. 1978 to July 2002.

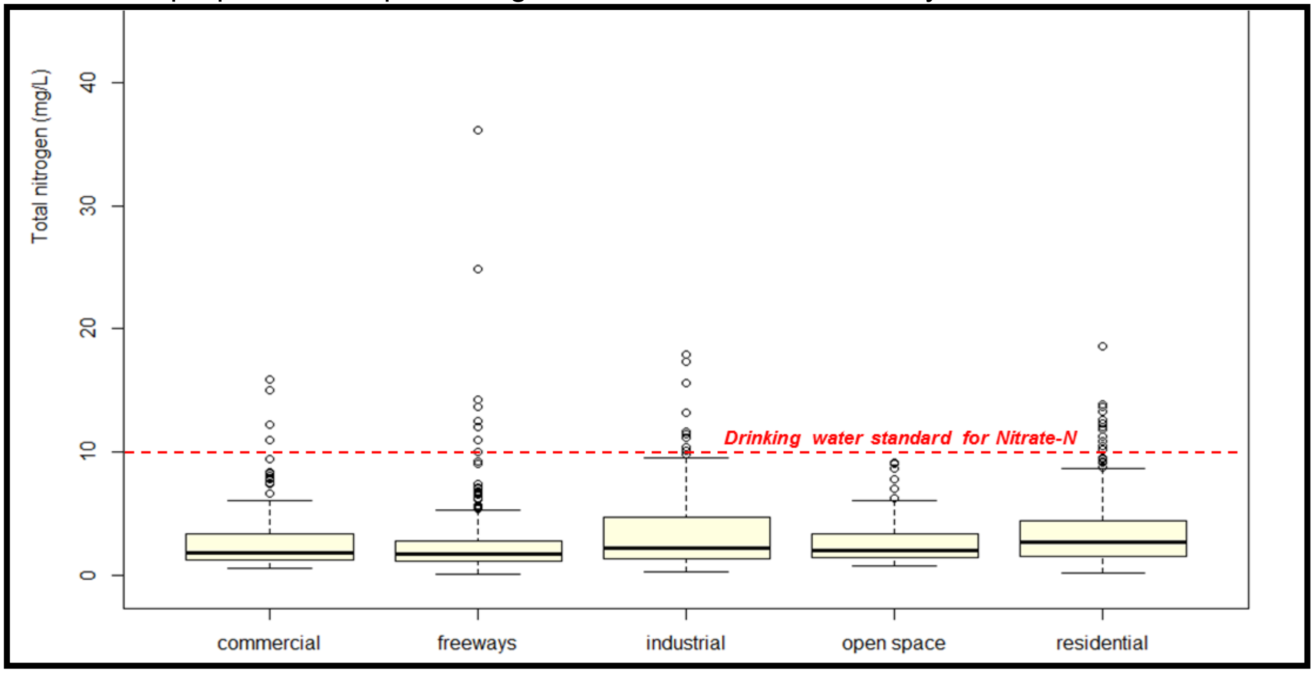
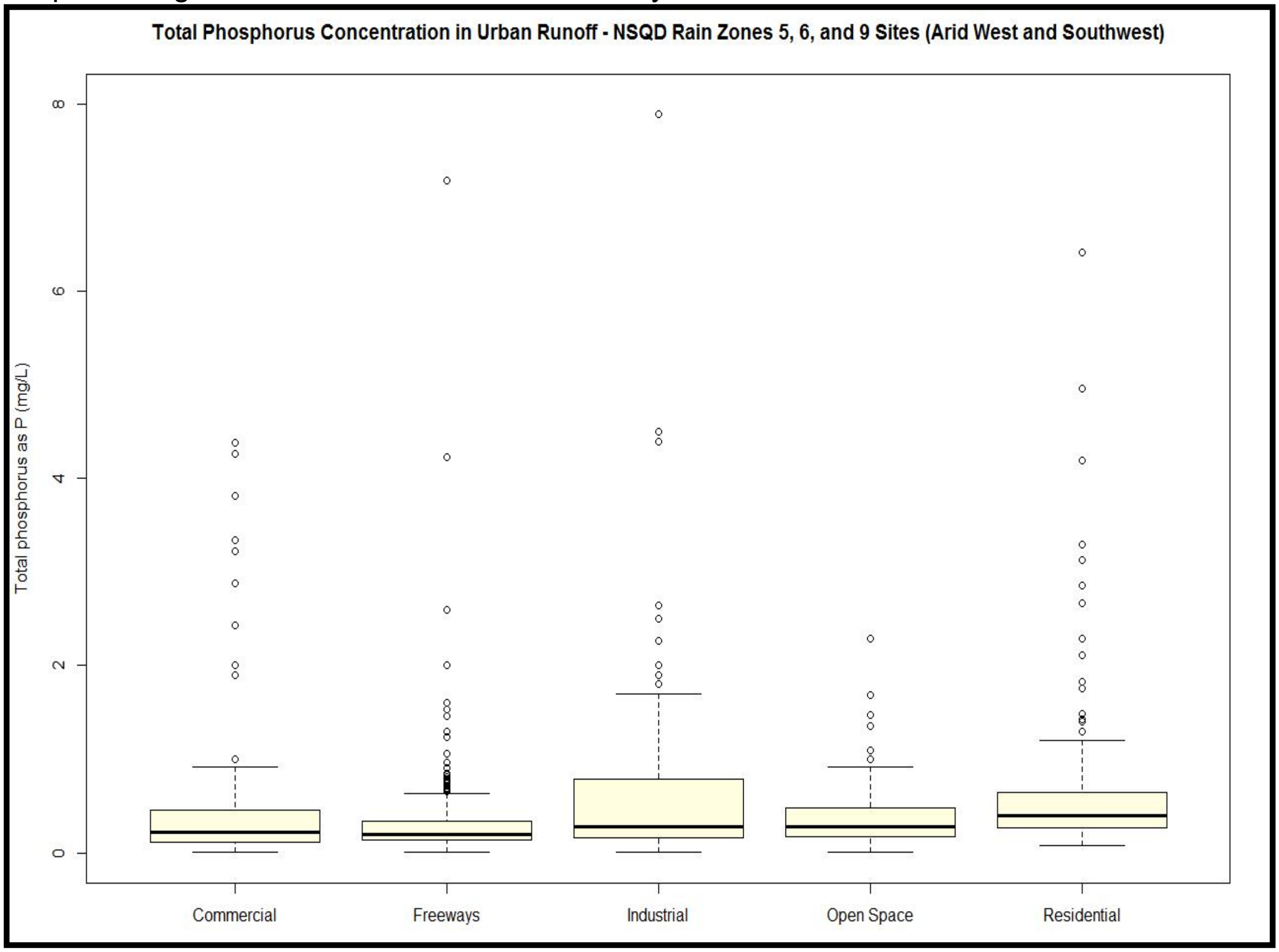


Table 31. Total phosphorus as P concentrations in urban runoff (units = mg/L) from National Stormwater Quality Database (NSQD version 3) for sites in NSQD rain zones 5, 6, and 9[A] (arid west and southwest). Temporal range of data is December 1978 to July 2002.

Predominant land use at monitoring site location	No. of Samples	Arithmetic Mean	Min	25%	50%	75%	Max
All Sites	1,160	0.550	0.01	0.16	0.29	0.49	80.2
commercial	381	0.590	0.01	0.11	0.22	0.46	15.60
freeways	192	0.525	0.01	0.14	0.20	0.34	80.20
industrial	76	0.614	0.01	0.16	0.28	0.78	7.90
open space	348	0.401	0.01	0.17	0.28	0.48	2.29
residential	381	0.555	0.08	0.27	0.40	0.64	6.42

Figure 24. Box plot of total phosphorus as P concentrations in urban runoff from National Stormwater Quality Database (NSQD) monitoring locations in NSQD rain zones 5,6, and 9 (arid west and southwest). Raw statistics for this dataset were previously shown in Table 31. Temporal range of data is December 1978 to July 2002.



Based on the aforementioned information, stormwater from MS4s is estimated to be a relatively minor source of nutrient loading to streams of the Santa Ynez River basin. This assessment comports well with an independent line of scientific reporting provided by Williamson et al. (1994). These researchers concluded that at the basin-scale, nutrient loads from municipal stormwater runoff were relatively insignificant.

7.3 NPDES-Permitted Industrial and Construction Stormwater

Based on evidence and information provided in this section of the TMDL report, NPDES stormwater-permitted industrial facilities and construction sites in the Santa Ynez River basin are not expected to be a significant risk or cause of the observed nutrient water quality impairments, and these types of facilities are generally expected to be currently meeting proposed waste load allocations. Therefore, at this time, additional regulatory measures for this source category are not expected. To maintain existing water quality and prevent any further water quality degradation these types of facilities are expected to continue to implement and comply with the requirements of the statewide Industrial General Permit or the Construction General Permit, or any subsequent Construction General Permit), respectively.

Nutrient pollution of Santa Ynez River basin streams is limited to the lowermost Santa Ynez River, precluding the possibility that industrial and construction stormwater are contributing to this type of water quality impairment elsewhere in the river basin.
Further indirect lines of evidence suggest that industrial and construction stormwater are not expected to be causing nutrient impairment of streams. Site specific industrial and construction stormwater runoff nutrient data for the Santa Ynez River basin is not available, so direct inferences about nutrient loading to surface waters from these facilities in the river basin are not possible. However, there is a large amount of statewide stormwater runoff nitrate water quality from a wide range of industrial facilities and also from some construction sites, providing a plausibly good spatial representation of a variety of these types of sites within California. These data can give some insight into expected nitrate and nitrogen concentrations typically found in stormwater runoff from industrial and construction sites throughout California.

Based on the available data, stormwater runoff from industrial and construction facilities throughout California typically have relatively low nitrogen concentrations averaging less than 2 mg/L for nitrate as N and for total nitrogen. Further, as the large number of samples collected statewide indicate, the nitrate concentrations in stormwater runoff from these facilities almost never exceed or even approach the numeric threshold for the water quality objective of 10 mg/L nitrate as N.

Therefore, indirect and anecdotal evidence suggests that NPDES stormwater-permitted industrial facilities and construction sites in the Santa Ynez River basin would not be expected to be a significant risk or cause of the observed nutrient water quality impairments, and these types of facilities are generally expected to already meet waste load allocations identified in this report. To maintain existing water quality and prevent any further water quality degradation, these permitted industrial facilities and construction operators shall continue to implement and comply with the requirements of the statewide Industrial General Permit or the Construction General Permit, respectively.

The information outlined above does not conclusively demonstrate that stormwater from all industrial facilities and construction sites are meeting proposed waste load allocations. More information will be obtained during the implementation phase of these TMDLs to further assess the level of nutrient contributions to surface waters from these source categories, and to identify any actions needed to reduce nutrient loading.

Table 32. Nitrate as N concentrations in industrial stormwater runoff (units = mg/L) from permitted California facility sites reported in the State Water Resources Control Board's Stormwater Multiple Application & Report Tracking System. Site specific data for the Santa Ynez River basin are not available, so statewide data are presented for informational purposes. Temporal range of data is Oct. 2005 to Nov. 2014.

Stormwater Runoff Category	**No. of Samples**	**Geometric Mean**	**Min**	**25%**	**50%**	**75%**	**Max**	**No. Exceeding Drinking Water Objective (>10 mg/L)**	**% Samples Exceeding 10 mg/L**
Industrial stormwater runoff	1,906	0.78	0	0.25	0.72	2.1	13,100	119 of 1,906	**3.2%**

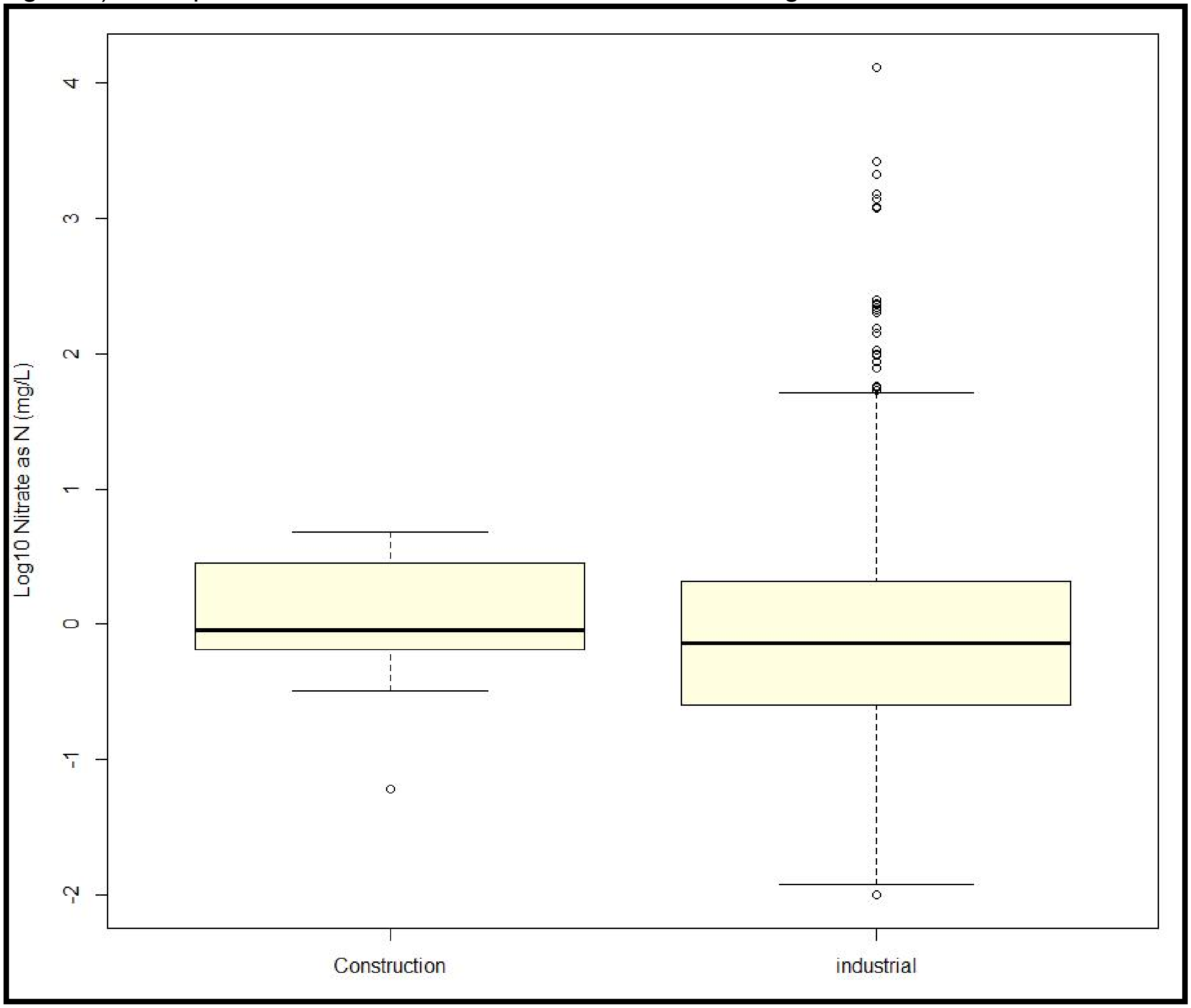
Table 33. Total nitrogen as N concentrations in industrial stormwater runoff (units = mg/L) from permitted California facility sites and as reported in the State Water Resources Control Board's Stormwater Multiple Application & Report and Tracking System. Site specific data for the Santa Ynez basin are not available, so statewide data are presented for informational purposes.

Industrial Stormwater: Type of Facility	No. of Samples	Arithmetic Mean	Min	25%	50%	75%	Max	No. of samples.
All industrial stormwater facilities	76	1.53	0.01	0.08	0.32	1.30	22.00	76
Aircraft Parts and Auxiliary Equipment	8	0.48	0.21	0.33	0.37	0.60	0.97	8.00
Aluminum Die-Castings	12	0.13	0.02	0.08	0.12	0.17	0.24	12.00
Chemicals and Allied Products	2	0.43	0.40	0.42	0.43	0.45	0.46	2.00
Coating Engraving and Allied Services	7	2.67	0.01	0.01	0.01	4.33	10.00	7.00
Electroplating Plating Polishing Anodizing and Coloring	5	0.05	0.02	0.03	0.04	0.05	0.10	5.00
Fabricated Plate Work (Boiler Shops)	3	0.15	0.07	0.08	0.09	0.19	0.28	3.00
Fertilizers Mixing Only	4	1.58	0.10	0.18	0.31	1.72	5.60	4.00
General Warehousing and Storage	1	9.50	9.50	9.50	9.50	9.50	9.50	1.00
Industrial Valves	1	0.53	0.53	0.53	0.53	0.53	0.53	1.00
Pesticides and Agricultural Chemicals	6	2.48	0.72	0.91	1.70	2.45	7.40	6.00
Plastics Material and Synthetic Resins and Nonvulcanizable Elastomers	2	0.06	0.02	0.04	0.06	0.08	0.10	2.00
Poultry Slaughtering and Processing	1	1.80	1.80	1.80	1.80	1.80	1.80	1.00
Prepared Feed and Feed Ingredients for Animals and Fowls	2	13.00	4.00	8.50	13.00	17.50	22.00	2.00
Printed Circuit Boards	2	0.02	0.01	0.02	0.02	0.03	0.03	2.00
Refuse Systems	4	0.47	0.05	0.34	0.46	0.59	0.92	4.00
Sheet Metal Work	2	0.10	0.07	0.08	0.10	0.11	0.13	2.00
Soaps and Other Detergents Except Specialty Cleaners	10	2.66	0.51	1.73	3.20	3.47	4.20	10.00
Trucking Except Local	2	1.43	0.16	0.80	1.43	2.07	2.70	2.00
Wood Office Furniture	2	0.01	0.01	0.01	0.01	0.01	0.01	2.00

Table 34. Nitrate as N concentrations in construction stormwater runoff (units = mg/L) from permitted California construction sites as reported in the State Water Resources Control Board's Stormwater Multiple Application & Report Tracking System. Site specific data for the Santa Ynez River basin are not available, so statewide data are presented for informational purposes. Temporal range of data is from July 2010 to February 2014.

Stormwater Runoff Category	No. of Samples	Arithmetic Mean	Min	25%	50%	75%	Max	No. Exceeding Drinking Water Standard (>10 mg/L)	% Samples Exceeding 10 mg/L
Construction stormwater runoff	21	1.64	0.06	0.65	0.9	2.8	4.8	0 of 21	**0%**

Figure 25. Boxplot of reported nitrate as N concentrations observed in California industrial and construction stormwater sites. Site specific data for the Santa Ynez River basin are not available, so statewide data are presented for informational purposes. Note the vertical axis is log concentrations, thus log10 value of one represents a concentration of 10 mg/L nitrate at N; a log10 value of 0 represents a concentration of 1 mg/L nitrate as N; a log10 value of (negative)one represents a nitrate as N concentration of 0.1 mg/L, as so on.



7.4 Irrigated Lands

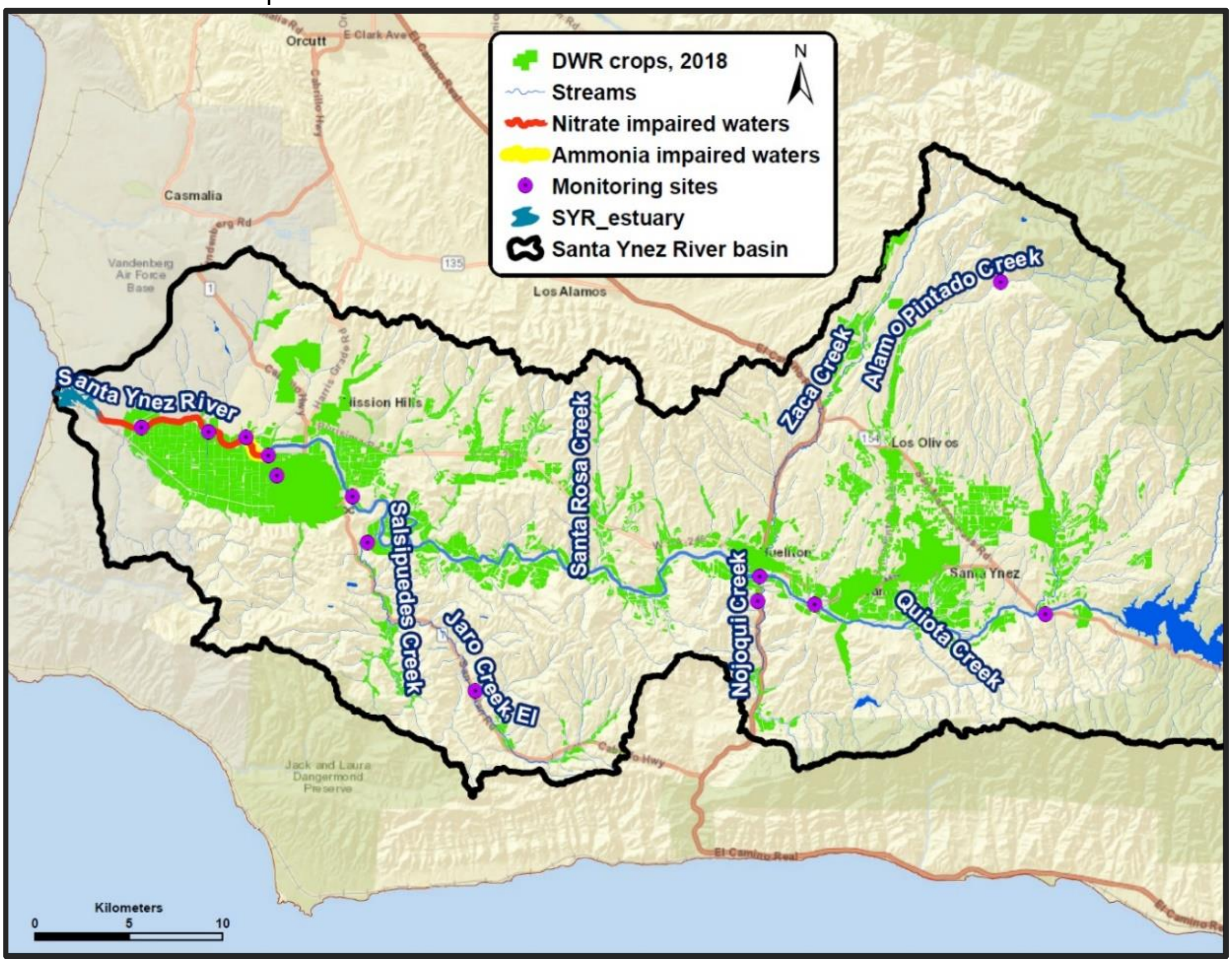
Fertilizers or compost applied to cropland can potentially constitute a significant source of nutrient loads to waterbodies. The primary concern with the application of fertilizers on crops or forage areas is that the application can exceed the uptake capability of the crop. If this occurs, the excess nutrients become mobile and can be transported to either nearby surface waters, groundwaters, or the atmosphere (Tetra Tech, 2004).

Based on available information, it is generally expected that owners and operators of irrigated croplands are currently achieving proposed nitrate and total nitrogen load allocations. As such, new regulatory measures are not warranted for this source category. An un-ionized ammonia listing on Sloans Canyon Creek is based on one year of data from 2008. Given the vintage of this data, additional monitoring on this creek is needed to determine if the listing is still warranted.

Irrigated agriculture occurs throughout much of the river basin, but the only identified nitrate impaired stream reach occurs in the lowermost Santa Ynez River, just downstream of the Lompoc Regional Wastewater Treatment facility discharge point. This suggests that wastewater is the primary source of elevated nitrogen compounds in the lower Santa Ynez River. Irrigated cropland in the lowermost river basin below Lompoc and about the Santa Ynez River estuary may be a relatively minor contributor to nutrient loads in that stream reach (See Figure 26).

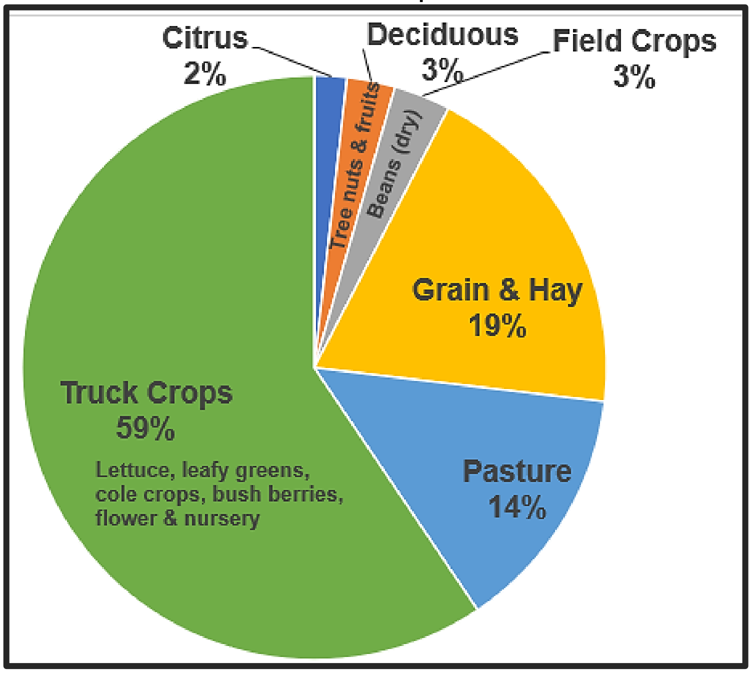
At the time we were doing data analysis for this project, available data from summer 2018 indicated there were 1,152 farming operations, entities, or operators in the Santa Ynez River basin enrolled in the Central Coast Water Board's, irrigated lands regulatory program.[32] The overwhelming majority of these farming operations are found in the middle and lower reaches of the river basin.

Figure 26. Map of the distribution of cropland (year 2018) in the Santa Ynez River basin and extent of nutrient impaired stream waters.



[32] Information available from State Water Resources Control Board's Geotracker information management system.

Figure 27. Pie chart illustrating crop types in the Santa Ynez River basin, based on Department of Water Resources 2018 crop dataset.



7.5 Grazing operations

Based on evidence and information provided in this section of the TMDL report, cattle grazing and domestic livestock operations in the Santa Ynez River basin are not expected to be a significant cause of the observed nutrient water quality impairments, and these types of operations are generally expected to be currently meeting proposed waste load allocations. Therefore, at this time, additional regulatory measures for this source category are not warranted. To maintain existing water quality and prevent any further water quality degradation these types of operations should begin or continue to self-assess, self-monitor and make animal management and manure management decisions which comport with accepted rangeland management practices or manure management practices recommended or published by reputable resource professionals or local agencies.

Grazing lands, as defined by the Farmland Mapping and Monitoring Program (FMMP) land cover dataset used in this report, refers to lands where the vegetation is *suitable* for cattle foraging; it does not imply those lands are necessarily actively being grazed by livestock. Therefore, the FMMP "grazing lands" land cover category could also be considered equivalent to rangeland – whether grazed or ungrazed – and therefore, Central Coast Water staff interchangeably use "rangeland" with "grazing lands" in this report to refer to grasslands of the Santa Ynez River basin, which may or may not be used locally for foraging by livestock.

The only human activity associated with grazing lands that could conceivably contribute to nutrient loading to surface waterbodies is livestock grazing. Livestock and other domestic animals that spend significant periods of time in or near surface waters can contribute significant loads of nitrogen and phosphorus through their manure because they use only a portion of the nutrients fed to them and the remaining nutrients are excreted (Tetra Tech, 2004). The remainder of nutrients loads to streams from grazing lands is associated with natural background.

Expected nutrient concentrations in rangeland runoff can be estimated from data reported by the University of California, Davis Rangeland Watershed Laboratory, and from the U.S. Department of Agriculture – see Figure 28 and Table 35. On the basis of these data, nutrient concentrations from ungrazed grasslands or from moderately grazed lands are expected to be typically relatively low.

Figure 28. Average nutrient creek water quality in California rangelands based on ten years of data as reported by the Rangeland Watershed Laboratory at University of California, Davis. Based on this reporting, the average nitrate as N creek water quality from moderately grazed rangelands and ungrazed rangelands is 0.25 mg/L (figure credit: Rangeland Watershed Laboratory: rangelandwatersheds.ucdavis.edu).

Stream Water Quality

Grazing Intensity	Sediment mg/L	Nitrate mg/L	*E. Coli* cfu/100ml
None 4000+ lb/ac RDM	2	0.1	310
Moderate 800 lb/ac RDM	7	0.4	425

Table 35. Total dissolved phosphorus as P concentrations in native grasslands runoff (units = mg/L) from the U.S. Department of Agriculture's MANAGE database. [A]

Runoff Category	Types of Land Cover at Monitoring Sites	No. of Samples	Arithmetic Mean	Min	10%	25%	50% (median)	75%	90%	Max
Runoff from Grazing Lands (aka, rangeland)	Native grassland Native grass (no grazing) Native grass (light grazing) Native grass (moderate grazing) Native grass (heavy grazing) Native prairie	19	0.21	0.01	0.028	0.09	0.17	0.24	0.526	0.67

[A] California or Santa Ynez River basin specific data for grasslands runoff are not available. Data available for phosphorus concentrations in grasslands runoff in the MANAGE database come from northern, south-central, and west Texas and from central Oklahoma.

7.6 Woodlands and Undeveloped Areas

Streams in lightly disturbed or undeveloped woodlands and open space are generally characterized by low concentrations of nutrients in surface waters on the basis of regional data and on the basis of water quality data collected from undeveloped stream basins across the conterminous United States – see Table 36. Thus, surface waters and surface runoff from woodland and undeveloped upland areas of the Santa Ynez basin would be expected to have quite low nutrient concentrations relative to other types of land use categories which are more influenced by human activities. Thus, this type of land cover is not anticipated to cause or contribute to any nutrient impairments in streams of the river basin.

Table 36. Mean annual flow-weighted nutrient concentrations observed in streams in undeveloped basins of the conterminous United States.

Water Quality Parameter	No. of sampled streams	Arithmetic Mean	Min	50% (median)	Max	No. Exceeding Drinking Water Standard (>10 mg/L)	% Samples Exceeding 10 mg/L
Nitrate as N	82	0.15	0.00	0.09	0.77	0 of 82	0%
Total nitrogen	63	0.39	0.10	0.25	2.57	N.A.	N.A.
Total phosphorus	63	0.04	0.02	0.02	0.20	N.A.	N.A.

Source data: Clark et al. (2000). Nutrient Concentrations and Yields in Undeveloped Basins of the United States.

8 NUMERIC TARGETS AND ASSESSMENT THRESHOLDS

This section describes the numeric targets used to develop the TMDLs. Numeric targets represent acceptable levels of pollutants in streams that will result in the desired conditions for the waterbodies.

8.1 Target for Nitrate (Human Health Standard)

The purpose of this target is to meet the water quality objective for nitrates in municipal and domestic drinking water sources and is applicable to waterbodies designated as municipal and domestic supply (MUN) and groundwater recharge (GWR). The Basin Plan contains a health-based numeric water quality objective for nitrate (as nitrogen) which is 10 mg/L nitrate as N. Therefore, the TMDL nitrate numeric target protective of the domestic and municipal water supply beneficial use is set at the Basin Plan water quality objective as follows:

Nitrate as nitrogen concentration not to exceed 10 mg/L.

8.2 Assessment Threshold for Biostimulatory Substances (Total Nitrogen)

We identify **2 mg/L total nitrogen** as a screening threshold. We used this value for informational purposes as one line of evidence in assessing biostimulatory conditions in the river basin in the water quality data analysis section of this report.

Although 2 mg/L total nitrogen is not a California regulatory standard, it is a generalized USEPA non-regulatory guidance value. The USEPA “Total Nitrogen” fact sheet, revised June 4, 2013, states that an acceptable range of total nitrogen is generally between 2 mg/L to 6 mg/L. Therefore, 2 mg/L is used provisionally as a numeric guideline indicating monitoring sites which may have elevated total nitrogen concentrations.

8.3 Assessment Threshold for Biostimulatory Substances (Total Phosphorus)

We identify **0.1 mg/L total phosphorus** as a screening threshold. We used this value for informational purposes as one line of evidence in assessing biostimulatory conditions in the river basin in the water quality data analysis section of this report.

Although 0.1 mg/L total phosphorus is not a California regulatory standard, it is a generalized water quality goal for total phosphorus published in the San Diego Regional Water Quality

Control Plan. It is used provisionally as a numeric guideline indicating monitoring sites which may have elevated total phosphorus concentrations.

8.4 Target for Un-ionized Ammonia

The purpose of this target is to protect surface waters against toxicity. The Basin Plan contains a numeric water quality objective for un-ionized ammonia, and thus the TMDL numeric target for un-ionized ammonia is as follows:

Un-ionized ammonia as nitrogen (NH3-N) concentration not to exceed 0.025 mg/L
(source: Water Quality Control Plan for the Central Coastal Basin, Section 3.3.2 Objectives for All Inland Surface Waters, Enclosed Bays, and Estuaries)

8.5 Targets for Nutrient Response Indicators

Dissolved oxygen, high chlorophyll *a,* excessive algae*,* and high algal toxins (microcystins) are nutrient-response indicators and represent both a primary biological response to excessive nutrient loading in waterbodies which exhibit biostimulatory conditions, and a direct linkage to the support or impairment of designated beneficial uses.

It is important to note that nutrient concentrations by themselves constitute indirect indicators of biostimulatory conditions and there is an interrelationship between high nutrient loads, excessive algal growth, and the subsequent impacts of excessive algae on dissolved oxygen and aquatic habitat. Accordingly, staff evaluated dissolved oxygen and chlorophyll *a,* and percent floating algal cover numeric targets to ensure that streams do not show evidence of biostimulatory conditions. These assessments were presented in the water quality data analysis section of this report. Microcystin numeric targets were not available to evaluate.

8.5.1 Dissolved Oxygen

The Basin Plan contains the following water quality objectives for dissolved oxygen (DO):

For waters designated the warm freshwater habitat (WARM) beneficial use in Table 2-1 of the Central Coast Basin Plan and for waters not mentioned by a specific beneficial use, dissolved oxygen concentrations **shall not be reduced below 5.0 mg/L at any time**.

For waters designated the spawning, reproduction, and/or early development (SPWN) or the cold freshwater habitat (COLD) beneficial uses, dissolved oxygen concentrations **shall not be reduced below 7.0 mg/L at any time.**

Median values for dissolved oxygen **should not fall below 85% saturation as a result of controllable conditions.**

8.5.2 Oxygen Supersaturation

In addition, due to the nature of algal respiration and photosynthesis and since daytime monitoring programs are unlikely to capture most low DO crashes, it is prudent to identify a numeric guideline that can measure daytime biostimulatory problems on the basis of DO supersaturation.[33] Peer-reviewed research in California's Central Coast region (Worcester et al., 2010) has established an upper limit of 13 mg/L for DO to screen for excessive DO

[33] Supersaturation occurs with a solution when the concentration of a solute exceeds the concentration specified by the value of solubility at equilibrium

supersaturation, and addresses the USEPA “Gold Book” water quality standard for excessive gas saturation. Of monitoring sites evaluated in the Central Coast region that are supporting designated aquatic habitat beneficial uses and do not show signs of biostimulation, DO virtually never exceeded 13 mg/L at any time.[34] Note that the 13 mg/L DO saturation target is not a regulatory standard, but it can be used as a TMDL nutrient-response indicator target to assess primary biological response to nutrient pollution reduction. Accordingly, the numeric target for DO supersaturation indicative of biostimulatory conditions is as follows:

Dissolved oxygen concentrations not to exceed 13 mg/L
(Source: Worcester, K., et al., 2010. Interpreting Narrative Objectives for Biostimulatory Substances for California Central Coast Waters. Central Coast Ambient Monitoring Program, California Central Coast Water Board, Technical Report.)

8.5.3 Chlorophyll a

Chlorophyll *a* is an algal biomass indicator. The Basin Plan does not include numeric or narrative? water quality objectives for chlorophyll *a*. Staff considered a range of published numeric criteria. The State of Oregon uses an average chlorophyll a concentration of > 15 mcg/L as a criterion for nuisance phytoplankton growth in lakes and rivers. The state of North Carolina has set a maximum acceptable chlorophyll *a* standard of 15 mcg/L for cold water (lakes, reservoir, and other waters subject to growths of macroscopic or microscopic vegetation designated as trout waters), and 40 mcg/L for warm water (lakes, reservoir, and other waters subject to growths of macroscopic or microscopic vegetation not designated as trout waters). A chlorophyll *a* concentration of 8 mcg/L is recommended as a threshold of eutrophy for plankton in EPA’s Nutrient Criteria Technical Guidance Manual for Rivers and Streams (USEPA, 2000a). The Central Coast Region has used 40 mcg/L as stand-alone evidence to support chlorophyll *a* listing recommendations for the 303(d) Impaired Water Bodies list.

A recent peer-reviewed study conducted by CCAMP reports that in the California Central Coast region, inland streams that do not show evidence of eutrophication all remained below the chlorophyll a threshold of 15 mcg/L (Worcester et al., 2010). As this value is consistent with several values reported in published literature and regulations shown above, and as the CCAMP study by Worcester et al. is central coast-specific, staff proposes the numeric target for chlorophyll *a* indicating biostimulatory conditions as follows:

For waterbodies designated with any of the aquatic habitat beneficial uses, water column chlorophyll a concentrations shall not exceed 15 mcg/L.

8.5.4 Floating Algal Cover

We identify 50 percent or greater floating algal cover in streams as a screening threshold. We used this value as one line of evidence in assessing biostimulatory conditions in the river basin in the water quality data analysis section of this report.

Floating algal cover not to exceed 50 percent (source: Worcester, K., et al., 2010. Interpreting Narrative Objectives for Biostimulatory Substances for California Central Coast Waters. Central Coast Ambient Monitoring Program, California Central Coast Water Board, Technical Report.)

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[34] Of 2,399 samples at these reference sites, only about 1% of the samples ever exceeded 13 mg/L DO.

9 LOADING CAPACITY, TMDLS, AND ALLOCATIONS

9.1 Loading Capacities, TMDLs

A TMDL is a measure of a waterbody's loading capacity. A loading capacity is the maximum amount of a given pollutant a waterbody can receive and still meet water quality objectives. The TMDL distributes, or "allocates," the waterbody's loading capacity among the various sources of that pollutant. Pollutant sources that can be characterized as point sources receive waste load allocations,[35] and nonpoint sources of pollution receive load allocations.[36] TMDLs also include a margin safety to account for uncertainty.

For this TMDL, NPDES-permitted wastewater sources, owners and operators of irrigated lands, NPDES-permitted municipal stormwater entities, NPDES-permitted industrial and construction stormwater entities, and natural sources are assigned nitrate, un-ionized ammonia, and total nitrogen allocations equal to the water quality numeric targets outlined previously in this report.

The proposed TMDLs are concentration-based. This means the TMDLs are equal to the receiving water numeric water quality targets described in the numeric target section above. Unlike a mass load-based TMDL, the concentration-based allocations do not add up to the TMDL because concentrations of individual pollution sources are not additive. Concentration-based TMDLs are an appropriate expression of TMDLs and meet USEPA requirements for TMDL approval. Concentration-based allocations are also the most appropriate linkage to the loading capacities of streams because drinking water and aquatic habitat beneficial uses are supported on the basis of concentration-based thresholds. Therefore, each waste load allocation and load allocation for these TMDLs are equal to the concentration-based nitrate, un-ioninzed ammonia, and total nitrogen numeric receiving water targets.

Numeric targets defining the loading capacity: The numeric targets for nitrate and un-ionized ammonia defining the loading capacity on all stream reaches in the Santa Ynez River basin, with exceptions noted below for the lower Santa Ynez River and San Miguelito Creek, were previously identified in Section 8 of this report.

For reasons outlined below, the TMDL Project proposes a numeric target and loading capacity for the Santa Ynez River at Floradale Rd. downstream to the confluence with the Santa Ynez River estuary, all reaches of San Miguelito Creek to the confluence with the Santa Ynez River, and all reaches of Sloans Canyon Creek from upstream of monitoring site 314DDE to the confluence with the Santa Ynez River based the Basin Plan's nutrient MUN water quality objective (10 mg/L nitrate) measured as total nitrogen and with a 20 percent explicit margin of safety, as described in detail below.

20 percent margin of safety for total nitrogen: At this time, staff proposes using an explicit margin of safety to establish a total nitrogen target and loading capacity for the lowermost Santa Ynez River that is more stringent that the Basin Plan numeric objective for nitrate (i.e., the 10 mg/L MUN objective). Staff proposes incorporating a 20% explicit margin of safety to the Basin Plan nitrate MUN numeric objective applied here as total nitrogen to help account for

[35] The portion of a receiving water's loading capacity that is allocated to NPDES-permitted point sources of pollution.
[36] The portion of the receiving water's loading capacity attributed to (1) nonpoint sources of pollution and (2) natural background sources.

uncertainty concerning the risk of potential biostimulatory problems in sensitive downstream coastal confluence receiving waters.

As such, the proposed numeric target and loading capacity for total nitrogen is 8 mg/L. Biostimulation is sensitive to the nitrogen cycle, therefore this numeric target should be based on total nitrogen rather than just nitrate. The basis for identifying the 8 mg/L total nitrogen loading capacity as follows:

1) The Santa Ynez River estuary is downstream of monitoring site 314SYN (Santa Ynez River at 13th Street, see Figure 12). Data was unavailable for the estuary. This estuary is designated by the California Coastal Commission as a high resource-value coastal waters known as a Critical Coastal Area (CCA). The Santa Ynez estuary's administrative status as a CCA, does merit the consideration of protecting the estuary from upstream nutrient enrichment and potential biostimulation.

2) This approach is consistent with previous California TMDLs.[37] The USEPA similarly established a nutrient TMDL for inland streams in southern California (RWQCB-Los Angeles, 2002), which contained a wintertime total nitrogen target of 8 mg/L, based on the application of a 20% margin of safety to the Los Angeles Basin Plan's numeric water quality objective for nitrate and to account for uncertainty regarding potential excess algae problems.

3) Research on biostimulation in inland surface waters from agricultural watersheds in the California Central Coast region indicates that existing nutrient numeric water quality objectives to protect the municipal and domestic supply beneficial use found in the Basin Plan (i.e., the 10 mg/L nitrate-nitrogen objective for MUN) is unlikely to reduce benthic algal growth below even the highest water quality benchmarks. This is because aquatic organisms respond to nutrients at lower concentrations. Therefore, the 10 mg/L nitrate-nitrogen objective is likely to be insufficiently protective against the risk of biostimulatory impairments. Consequently, to protect sensitive downstream coastal confluence waters from excessive nitrogen loads, staff concludes that it is necessary to set nutrient wet-season numeric targets more stringent than the existing numeric objectives found for nitrate in the Basin Plan.

4) Existing data available in the California Integrated Water Quality System (CIWQS) indicates that nitrate concentrations in effluent from the Lompoc Regional Wastewater Plant is frequently less than 8 mg/L total nitrogen, presumably due to upgrades at the facility in 2014. At effluent monitoring site EFF-001 from 2013 to 2022 average total nitrogen in effluent was 7 mg/L with a range of 5.23 to 12.03 mg/L.[38]Therefore, an allocation of 8 mg/L nitrate-nitrogen as N should be achievable by wastewater operators. NPDES wastewater permits would need to be written to incorporate the waste load allocation of 8 mg/L total nitrogen for the first permit renewal after the TMDL is in effect.

Table 37 summaries the loading capacities for stream reaches in the River basin based on the numeric targets identified above.

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[37] For example, RWQCB-Los Angeles Region, Calluguas Creek Nitrogen Compounds TMDL, 2002. Resolution No. 02-017, and approved by the California Office of Administrative Law, OAL File No. 03-0519-02 SR; and RWQCB-Central Coast Region, TMDLs for Nitrogen Compounds and Orthophosphate in the Lower Salinas River and Reclamation Canal Basin and the Moro Cojo Slough Subwatershed, Resolution No. R3-2013-0008 and approved by the California Office of Administrative Law, OAL File No. 2014-0325-01S.

[38] Lompoc wastewater plant does not report total nitrogen in effluent in the CIWQS database, but we were able to calculate a limited amount of total nitrogen data by taking the sums of nitrate and nitrite (as N) plus total ammonia (as N) plus total organic nitrogen (as N) where these data were collected concurrently at site EFF-001.

Table 37. Tabulation of loading capacities for nitrogen compounds in stream reaches of the Santa Ynez River basin.

Pollutant	**Stream reaches**	**Loading capacity**	**Primary beneficial uses protected**
Nitrate as N (NO_3-N)	All stream reaches	10 mg/L	MUN, GWR
Un-ionized ammonia as N (NH_3-N)	All stream reaches	0.025 mg/L	Toxicity to aquatic habitat
Total nitrogen (N)	Santa Ynez River at Floradale Road downstream to the confluence with the Santa Ynez River estuary and all tributaries including San Miguelito Creek and Sloans Canyon Creek, all reaches to the confluence with the Santa Ynez River	8 mg/L	Aquatic habitat: protect against risk of biostimulation in sensitive downstream coastal confluence waters

9.2 Allocations

Table 38 and Table 39 presents summary tabulations of the final waste load allocations (WLAs) and load allocations (LAs) for pollutant source categories associated with relevant stream reaches.

Table 38. Waste load allocation (WLA) table: NPDES-permitted facilities shall attain the following WLAs in receiving surface waters.[A,B]

Stream reaches[C]	Party Responsible for WLA & NPDES/WDR number[D]	Receiving Water Nitrate as N WLA	Receiving Water Un-ionized ammonia (NH_3 as N) WLA	Receiving Water Total Nitrogen WLA
Santa Ynez River, all reaches and tributaries upstream of the river's confluence with San Miguelito Creek which receive MS4, industrial, and construction stormwater discharges and NPDES wastewater discharges.	City of Lompoc (Storm drain discharges to MS4s) Storm Water Permit NPDES No. CAS000004 County of Santa Barbara (Storm drain discharges to MS4s) Storm Water General Permit NPDES No. CAS000004 Santa Ynez Band of Chumash Indians Wastewater Treatment Plant NPDES Permit No. CA0050008 Industrial stormwater general permit (storm drain discharges from industrial facilities) NPDES No. CAS000001 Construction stormwater general permit (storm drain discharges from construction operations) NPDES No. CAS000002	10 mg/L	0.025 mg/L	Not applicable

Stream reaches[C]	Party Responsible for WLA & NPDES/WDR number[D]	Receiving Water Nitrate as N WLA	Receiving Water Un-ionized ammonia (NH_3 as N) WLA	Receiving Water Total Nitrogen WLA
San Miguelito Creek and Lower Santa Ynez River and all tributaries from downstream of the river's confluence with San Miguelito Creek to the estuary which receive MS4, industrial, and construction stormwater discharges and NPDES wastewater discharges.	Lompoc Regional Wastewater Treatment Plant NPDES Permit No. CA0048127 City of Lompoc (Storm drain discharges to MS4s) Storm Water Permit NPDES No. CAS000004 County of Santa Barbara (Storm drain discharges to MS4s) Storm Water General Permit NPDES No. CAS000004	10 mg/L	0.025 mg/L	8 mg/L

[A] Federal and state anti-degradation requirements apply to all waste load and load allocations.

[B] Achievement of final waste load to be determined on the basis of the number of measured exceedances and/or other criteria set forth in Section 4 of the *Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List,* September 2004, amended February 2015 (Listing Policy).

[C] Stream reach name includes all reaches of surface waterbodies and all tributary reaches; "stream reaches" refers to any body of water (such as a river, creek, brook, slough, canal, ditch, ephemeral drainage) within the Santa Ynez River basin.

[D] Current permit numbers are shown. WLAs apply to the current permit or future permits regulating the discharge of waste from these sources.

Table 39. Load allocation (LA) table: nonpoint sources must attain the following LAs in receiving surface waters.[A,B]

Stream Reaches[C]	**Party Responsible for LA[D]**	**Receiving Water Nitrate as N LA**	**Receiving Water Un-ionized ammonia (NH_3 as N) as N LA**	**Receiving Water Total Nitrogen as N LA**
Santa Ynez River, all reaches and tributaries upstream of the river's confluence with San Miguelito Creek receiving nonpoint source discharges.	Owners/operators of irrigated agricultural lands (Discharges from irrigated lands) Owners/operators of livestock and domestic animal operations (Discharges from grazing lands and livestock operations) Natural background sources	10 mg/L	0.025 mg/L	Not applicable
San Miguelito Creek and Lower Santa Ynez River and all tributaries from downstream of the river's confluence with San Miguelito Creek to the estuary receiving nonpoint source discharges.	Owners/operators of irrigated agricultural lands (Discharges from irrigated lands) Owners/operators of livestock and domestic animal operations (Discharges from grazing lands and livestock operations) Natural background sources	10 mg/L	0.025 mg/L	8 mg/L

[A] Federal and state anti-degradation requirements apply to all waste load and load allocations.

[B] Achievement of final load allocations to be determined on the basis of the number of measured exceedances and/or other criteria set forth in Section 4 of the *Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List,* September 2004, amended February 2015 (Listing Policy).

[C] Stream reach name includes all reaches of surface waterbodies and all tributary reaches; "stream reaches" refers to any body of water (such as a river, creek, brook, slough, canal, ditch, ephemeral drainage) within the Santa Ynez River basin.

[D] Current permit numbers are shown. LAs apply to the current permit or future permits regulating the discharge of waste from these responsible parties.

9.3 Linkage Analysis

The goal of the linkage analysis is to establish the connection between TMDLs and numeric targets. The linkage analysis therefore represents the critical quantitative link between the TMDLs and attainment of the water quality standards. The total nitrogen, nitrate, and un-ionized ammonia TMDLs are equal to the numeric targets, which are in turn based on the water quality objectives. Therefore, attainment of the nitrogen compounds TMDLs will result in the attainment of the relevant nutrient water quality objectives, the protection and restoration of beneficial uses of waterbodies in the Santa Ynez River basin.

9.4 Margin of Safety

The Clean Water Act and federal regulations require that TMDLs provide a margin of safety to account for uncertainty concerning the relationship between pollution controls and water quality responses (see 40 C.F.R. § 130.7(c)(1)). These proposed TMDLs provide both implicit and explicit margins of safety to account for several types of uncertainty in the analysis. This section discusses analytical factors that are uncertain and describes how the TMDL provides the requisite margin of safety.

Relationship between algae growth and nutrient loading and downstream impacts

There currently is no substantial evidence of excessive algal growth in the Santa Ynez River associated with elevated nutrient loads. Impacts of elevated nutrient loads to sensitive downstream coastal confluence waters is uncertain at this time. The Santa Ynez River estuary is downstream of monitoring site 314SYN (Santa Ynez River at 13th Street). Data was unavailable for the estuary. This estuary is designated for high resource-value coastal waters. The Santa Ynez estuary's administrative status as a California Critical Coastal Area merits the consideration of protecting the estuary from upstream nutrient enrichment and potential biostimulation. The TMDLs account for the uncertainty of biostimulation risk in the estuary by incorporating a 20% margin of safety, setting the total nitrogen numeric target at 8 mg/l instead of the conventional 10 mg/L target intended to protect human health.

9.5 Critical Conditions and Seasonal Variations

Critical conditions refer to a combination of environmental factors (e.g., flow, temperature, etc.) during which the waterbody is most vulnerable and has the lowest pollutant assimilative capacity. The condition is considered critical because any unknown factor regarding environmental conditions or the calculation of the load allocation could result in not achieving the water quality standard. Therefore, critical conditions are particularly important with load-based allocations and TMDLs. However, this TMDL is concentration-based. As such, the numeric targets and allocations are the concentrations equal to the water quality objectives, or equal to a water quality objective with a margin of safety applies. While critical conditions shall be considered even in concentration-based

TMDLs, once the concentration-based allocations are met over all flow conditions (seasonal conditions or other critical conditions) then there is no uncertainty whether the allocations and TMDLs will result in achieving water quality objectives.

Seasonal or flow-based variability in nitrogen loading is accounted for and addressed by use of the allocations equal to the water quality objectives and concentration-based allocations which assures the loading capacity of the waterbody be met under all flow and seasonal conditions.

10 IMPLEMENTATION STRATEGY

10.1 Introduction

The purpose of the proposed TMDL Implementation Plan is to describe the steps necessary to reduce nutrient loads and to achieve these TMDLs. The TMDL Implementation Plan provides a series of actions and schedules for implementing parties to implement management practices to comply with the TMDL. Furthermore, the TMDL Implementation Plan is designed to provide implementing parties flexibility to implement appropriate management practices and strategies to address nitrate and un-ionized ammonia impairments and to reduce the risk of biostimulatory conditions. Implementation consists of 1) identification of parties responsible for taking these actions; 2) development of management/monitoring plans to reduce controllable sources of nitrogen compounds and orthophosphate in surface waters; 3) mechanisms by which the Central Coast Water Board will assure these actions are taken; 4) reporting and evaluation requirements that will indicate progress toward completing the actions; 5) and a timeline for completion of implementation actions.

10.2 Regulatory Framework

This section presents information on the legal authority and regulatory framework for assigning specific responsibilities and accountability to implementing parties for implementation and monitoring actions. The laws and policies pertaining to point sources and nonpoint sources are identified. The legal authority and regulatory framework are described in terms of the following:

- Controllable Water Quality Conditions
- Manner of Compliance
- Anti-degradation Policies
- Point Source Discharges (NPDES-permitted discharges)
- Nonpoint Source Discharges

<u>Controllable Water Quality Conditions</u>

In accordance with the Water Quality Control Plan for the Central Coast Basin (Basin Plan), controllable water quality shall be managed to conform or to achieve the water quality objectives and load allocations contained in this TMDL. The Basin Plan defines controllable water quality conditions as follows:

"Controllable water quality conditions are those actions or circumstances resulting from man's activities that may influence the quality of the waters of the State and that may be reasonably controlled."

Source: Water Quality Control Plan for the Central Coast Basin, Chapter 3. Water Quality Objectives, Section 3.3

Examples of non-controllable water quality conditions may include atmospheric deposition of nitrogen and phosphorus, and non-controllable natural sources of nutrient compounds.

<u>Manner of Compliance</u>

In accordance with Section 13360 of the California Water Code the Water Board cannot specify or mandate the specific type, manner, or design of on-site actions necessary to reduce nutrient loading, or to meet allocations by the various responsible parties. Specific types of potential management practices identified in this TMDL Report constitute examples or suggestions of management practices known to mitigate or reduce nutrient loading to waterbodies. Stakeholders, local public entities, property owners, and/or resource professionals are in the best position to identify appropriate management measures, where needed, to reduce nutrient loading based on site-specific conditions, with the Water Board providing an oversight role in accordance with adopted permits, waivers, or prohibitions.

<u>Anti-degradation Policies</u>

State and federal anti-degradation policies require, in part, that where surface waters are of higher quality than necessary to protect designated beneficial uses, the high quality of those waters must be maintained unless otherwise provided by the policies. The beneficial uses of waterbodies, water quality objectives, and anti-degradation policies collectively constitute water quality standards. Therefore, anti-degradation requirements are a component of every water quality standard. High quality waters are determined on a "pollutant-by-pollutant," or "parameter-by-parameter" basis, by determining whether water quality is better than the criterion for each parameter using chemical or biological data.[39]

Both the U.S. Environmental Protection Agency (40 C.F.R. § 131.12) and the State of California (State Board Resolution 68-16) have adopted anti-degradation policies as part of their approaches to regulating water quality. Both state and federal anti-degradation policies apply to point source and nonpoint source discharges that could lower water quality. Although there are some differences, where the federal and state policies

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[39] See: State Water Resources Control Board (2008), *Water Quality Standards Academy, Basic Course, Module 14*. Presented by U.S. Environmental Protection Agency, Region 9 – Office of Science and Technology (May 12, 2008).

overlap, they are consistent with each other. Further, state anti-degradation policy incorporates the federal policy where applicable. The Central Coast Water Board must ensure that its actions do not violate the federal or State anti-degradation policies. These policies acknowledge that minor, or repeated activities, even if individually small, can result in violation of anti-degradation policies through cumulative effects.

Federal Anti-degradation Policy
The federal antidegradation policy, 40 C.F.R. § 131.12(a), states in part:

(1) Existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected.
(2) Where the quality of waters exceed levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, that quality shall be maintained and protected unless the State finds, after full satisfaction of the intergovernmental coordination and public participation provisions of the State's continuing planning process, that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located . . . .
(3) Where high quality waters constitute an outstanding National resource, such as waters of National and State parks and wildlife refuges and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected.

State Anti-degradation Policy

State Water Board Resolution No. 68-16 ("Statement of Policy With Respect to Maintaining High Quality Waters in California") states, in part:

(1) Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated to the State that any change will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water and will not result in water quality less than that prescribed in the policies.

Also noteworthy, Section 3.2 of the Central Coast Basin Plan explicitly references anti-degradation requirements, and states:

Wherever the existing quality of water is **better than the quality of water established herein as objectives**, **such existing quality shall be maintained*** unless otherwise provided by the provisions of the State Water Resources Control Board Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California," including any revisions thereto.
***** emphasis added

Accordingly, anti-degradation policies apply to the proposed concentration-based waste load and load allocations proposed in these TMDLs, and can be summarized as follows:

Summary of TMDL Anti-degradation Expectations

> Where the quality of water in a stream reach or waterbody is better than necessary (i.e., lower/better than the water quality objective/criteria/allocation) to support the designated beneficial uses, that existing water quality shall be maintained and protected, unless and until a lowering of water quality is warranted pursuant to provisions in federal and state anti-degradation policies

During TMDL implementation, compliance with anti-degradation requirements may be determined on the basis of trends in declining water quality in applicable waterbodies, consistent with the methodologies and criteria provided in Section 3.10 of the California 303(d) Listing Policy (adopted, Sept. 20, 2004, State Water Board Resolution No. 2004-0063). Section 3.10 of the California 303(d) Listing Policy explicitly addresses the anti-degradation component of water quality standards as defined in 40 C.F.R. § 130.2(j) and provides for identifying trends of declining water quality as a metric for assessing compliance with anti-degradation requirements.

Section 3.10 of the California 303(d) Listing Policy states that pollutant-specific water quality objectives need not be exceeded to be considered non-compliance with anti-degradation requirements *"if the water segment exhibits concentrations of pollutants or water body conditions for any listing factor that shows a trend of declining water quality standards attainment"*[40] (State Water Board, 2004).

Practically speaking, this means that, for example, if a stream reach has a concentration-based TMDL allocation of 10 mg/L nitrate as N and current water quality data or future water quality assessments in the stream reach indicate nitrate as N concentrations are in fact well under 10 mg/L nitrate as N, the allocation does not give license for controllable nitrogen sources to degrade the water resource all the way up to the maximum allocation of 10 mg/L nitrate as N. Data demonstrating trends of declining water quality in these reaches may constitute non-compliance with anti-degradation requirements, where applicable

10.3 Point Sources (NPDES-permitted Facilities)

The National Pollutant Discharge Elimination System (NPDES) permit is the mechanism for translating waste load allocations (WLAs) into enforceable requirements for point sources. Under Clean Water Act § 402, discharges of pollutants to waters of the United States are authorized by obtaining and complying with the terms of an NPDES permit. USEPA regulations explicitly state that discharges from municipal separate storm sewer systems are point source discharges and, therefore, must be addressed by the waste load allocation component of a TMDL. The Central Coast Water Board is the permitting authority for NPDES permits in California's Central Coast region.

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[40] Section 3.10 of the California Impaired Waters 303(d) Listing Policy (adopted, Sept. 20, 2004, State Water Board Resolution No. 2004-0063)

USEPA regulations require that a TMDL include WLAs that identify the portion of the loading capacity allocated to existing and future point sources. Thus, the WLA is the maximum amount of a pollutant that may be contributed to a waterbody by point source discharges[41] of the pollutant in order to attain and maintain water quality objectives and restore beneficial uses. 40 C.F.R. § 122.44(d)(1)(vii)(B) requires effluent limits to be consistent with the WLAs in an approved TMDL. The State Water Board Office of Chief Counsel has indicated that permit conditions are not necessarily required to contain a literal incorporation of the TMDL's numeric allocations, and that the Regional Boards have discretion to implement the assumptions of a TMDL and its allocations through methodologies other than a direct, literal translation of the numeric WLA, as long as they are "consistent with the assumptions" of the TMDL.[42] When the permit is reissued, the effluent limit needs to be consistent with the WLA."

10.3.1 NPDES-Permitted Wastewater Treatment Plants

Based on available data, discharges of treated wastewater from municipal wastewater treatment facilities are expected to be the most significant controllable source of nitrogen compounds in the lowermost Santa Ynez River, generally associated with discharges from the Lompoc Regional wastewater treatment plant. Water quality data from CIWQS indicated that effluent and receiving nitrate water quality associated with the plant frequently exceeded 10 mg/L. According to the State Water Resources Control Board, all NPDES-permitted point sources identified in a TMDL must be assigned a waste load allocation, even if their current load to receiving waters is zero. Therefore, all NPDES-permitted wastewater treatment facilities in the River basin are assigned waste load allocations, which are implemented in the NPDES permit as effluent limitations. Table 40 tabulates the NPDES-permitted wastewater treatment plants in the Santa Ynez River basin.

Table 40. NPDES-permitted wastewater treatment plants in the Santa Ynez River basin.

Facility	Permit Number
Lompoc Regional Wastewater Plant	NPDES Permit No. CA004812
Santa Ynez Band of Chumash Indians Wastewater Treatment Plant	NPDES Permit No. CA0050008

The Lompoc Regional Wastewater Treatment Plant (NPDES Permit No. CA004812) is permitted to discharge treated wastewater to San Miguelito Creek which flows into the Santa Ynez River just upstream of the Floradale Road bridge. The Santa Ynez River below Floradale Road is impaired by nitrogen compounds.

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[41] See 40 C.F.R. § 130.2(h). A wasteload allocation is the portion of the receiving water's loading capacity that is allocated to its point sources of pollution.

[42] State Water Resources Control Board, Office of Chief Counsel Memo dated June 12, 2002. Subject: The Distinction Between a TMDL's Numeric Target and Water Quality Standards.

The Santa Ynez Band of Chumash Indians is authorized by U.S. EPA Region 9 to discharge treated wastewater from the Santa Ynez Band of Chumash Indians Wastewater Treatment Plant (NPDES Permit No. CA0050008) to Zanja de Cota Creek.

Based on available data, discharges of treated wastewater from municipal wastewater treatment facilities are expected to be the most significant controllable source of nitrogen compounds in the lowermost Santa Ynez River, generally associated with discharges from the Lompoc Regional wastewater treatment plant. Elsewhere in the River basin, there are no data indicating that treated wastewater is a significant source of nitrogen pollution to monitored stream reaches.

Permits issued to the identified wastewater treatment plants will implement the TMDLs and include effluent water limitations for surface water discharges. Future revisions to effluent limitations in any NPDES permit “shall” be “consistent with the assumptions and requirements of any available waste load allocations.” (40 C.F.R. section 122.44(d)(1)(vii)(B).) Therefore, NPDES wastewater permits will implement the waste load allocation of 8 mg/L total nitrogen in the first permit renewal after the TMDL allocation is in effect.

On the basis of the information outlined above, the permitting authorities will establish effluent and receiving water limitations for the surface water discharges at the identified wastewater treatment plants.

10.3.2 MS4 Stormwater Entities

Based on available information, it is generally expected MS4 entities (County of Santa Barbara, City of Lompoc, City of Solvang, City of Buellton) are currently achieving proposed nitrogen compounds waste load allocations. As such, at this time compliance with existing or future MS4 permits are expected to show continued attainment of waste load allocations for this source category.

To maintain existing water quality and prevent any further water quality degradation, The County is subject to the General Permit for Waste Discharge Requirements for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (Water Quality (WQ) Order 2013-0001-DWQ NPDES NO. CAS000004, as amended by Order WQ 2015-0133-EXEC, Order WQ 2016-0069-EXEC, WQ Order 2017-XXXX-DWQ, Order WQ 2018-0001-EXEC, and Order WQ 2018-0007-EXEC) (Phase II Small MS4 Permit) or any future NPDES permits regulating the County’s MS4 discharges. Any future modifications or replacements of the General Permit will implement TMDLs, such as establishing the 8 mg/L total nitrogen receiving water limit for discharges to San Miguelito Creek and the Lower Santa Ynez River and its tributaries downstream of the confluence with San Miguelito Creek, and incorporate the associated compliance date.

It should be noted that information developed in this TMDL Report does not conclusively demonstrate that discharges from all MS4 jurisdictions are meeting proposed waste load allocations. More information may be obtained during the implementation phase of these

TMDLs to further assess the level of nutrient contributions to surface waters from these source categories, and to identify any actions needed to reduce nutrient loading.

10.3.3 Industrial and Construction Stormwater

NPDES-permitted industrial facilities and construction operators are expected to meet the proposed waste load allocations through their existing permits after such time when these TMDLs have been incorporated into those permits or at the time of the next permit renewal after the effective date of the TMDL. To maintain existing water quality and prevent any further water quality degradation, these permitted industrial facilities and construction operators shall continue to implement and comply with the requirements of the statewide General Permit for Stormwater Discharges Associated with Industrial Activities (Order No.97-03-DWQ, as amended by Order No. 2014-0057-DWQ, NPDES No. CAS000001) or the statewide General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order No. 2009-0009, as amended by Order No. 2012-0006-DWQ, NPDES No. CAS000002), or any subsequent Industrial or Construction General Permits.

It should be noted that information developed in this TMDL Report does not conclusively demonstrate that discharges from all industrial and construction operations are meeting proposed waste load allocations. More information may be obtained during the implementation phase of these TMDLs to further assess the level of nutrient contributions to surface waters from these source categories, and to identify any actions needed to reduce nutrient loading.

10.4 Nonpoint Sources

Nonpoint sources (NPS) refer to pollution that is not released through pipes but rather originates from multiple sources over a relatively large area. Nonpoint sources are assigned the load allocation component of a TMDL. The load allocation is the portion of the receiving water’s pollutant loading capacity attributed to (1) the existing or future nonpoint sources of pollution and (2) natural background sources. Control of nonpoint source pollution is controlled by state programs developed under state law. California’s Porter-Cologne Water Quality Control Act applies to both point and nonpoint sources of pollution and serves as the principle legal authority in California for the application and enforcement of TMDL load allocations for nonpoint sources.

In July 2000 the State Water Resources Control Board and the California Coastal Commission developed the Plan for California's Nonpoint Source Pollution Control Program to reduce and prevent nonpoint source pollution in California, expanding the State's nonpoint source pollution control efforts. The NPS Program’s long-term goal is to “improve water quality by implementing the management measures identified in the California Management Measures for Polluted Runoff Report (CAMMPR) by 2013. Under the California NPS Program Pollution Control Plan, TMDLs are considered one type of planning tool that will enhance the State’s ability to foster implementation of appropriate NPS management measures.

The State Water Board's Policy for Implementation and Enforcement of the Nonpoint Source Pollution Control Program adopted in August 2004 explains how authorities granted by the Porter-Cologne Water Quality Control Act will be used to implement the California NPS Program Plan. The Porter-Cologne Act authorizes the Regional Water Boards to regulate nonpoint sources (NPS) of pollution through waste discharge requirements (WDRs), waivers of WDRs, and basin plan prohibitions. NPS pollution control implementation programs are developed by a Water Board, individual dischargers, or a coalition of dischargers in cooperation with a third-party representative, organization, or government agency, for dischargers to comply with WDRs, waivers, or prohibitions. The "third-party" programs are restricted to entities that are not actual dischargers under Water Board permitting and enforcement jurisdiction and may include non-governmental organizations, citizen groups, industry groups, watershed coalitions, government agencies, or any mix of these. NPS pollution control programs must meet the requirements of the following five key elements described in the NPS Implementation and Enforcement Policy. Each program must be endorsed or approved by the Regional Water Board or its authorized delegee.

Table 41. Key elements of a nonpoint source pollution control program.

Key Element 1:	A Nonpoint Source Pollution Control Implementation Program's ultimate purpose must be explicitly stated and at a minimum address NPS pollution control in a manner that achieves and maintains water quality objectives.
Key Element 2:	The Program shall include a description of the management practices (MPs) and other program elements dischargers expect to implement, along with an evaluation program that ensures proper implementation and verification.
Key Element 3:	The Program shall include a time schedule and quantifiable milestones, should the Regional Water Board require these.
Key Element 4:	The Program shall include sufficient feedback mechanisms so that the Regional Water Board, dischargers, and the public can determine if the implementation program is achieving its stated purpose(s), or whether additional or different MPs or other actions are required (See Section 12, Monitoring Program).
Key Element 5:	Each Regional Water Board shall make clear, in advance, the potential consequences for failure to achieve a Program's objectives, emphasizing that it is the responsibility of individual dischargers to take all necessary implementation actions to meet water quality requirements.
Key Element 1:	A Nonpoint Source Pollution Control Implementation Program's ultimate purpose must be explicitly stated and at a minimum address NPS pollution control in a manner that achieves and maintains water quality objectives.

10.4.1 Irrigated Croplands

Based on available information, it is generally expected that owners and operators of irrigated croplands are currently achieving proposed nitrate and total nitrogen load allocations. An un-ionized ammonia impairment on Sloans Canyon Creek is based on one year of data from 2008. Given the vintage of this data, additional monitoring on this creek is recommended to confirm the status of water quality standards attainment.

To maintain existing water quality and prevent any further water quality degradation, owners and operators of irrigated agricultural land used for commercial crop production must comply with the Central Coast Water Board's Order No. R3-2021-0040, General Waste Discharge Requirements for Discharges from Irrigated Lands (Agricultural Order), which establishes the following surface receiving water limits currently applicable to discharges to the Santa Ynez Basin: 10 mg/L for nitrate as N, and 0.025 mg/L for un-ionized ammonia. These limits are identical to the load allocations in these TMDLs. Any future modification or replacements of the Agricultural Order will implement the TMDLs, such as establishing the 8 mg/L total nitrogen load allocation as a receiving water limit and the associated compliance date.

Current requirements in the Agricultural Order and the associated Monitoring and Reporting Program (Agricultural Order, Attachment B) that will achieve and maintain the load allocations include:

A. Surface receiving water limits and compliance dates.[43]
B. Surface receiving water quality monitoring and reporting, follow-up monitoring and reporting to meet interim milestones and limits, and the potential for ranch-level surface discharge monitoring and reporting where water quality issues persist, or applicable limits are not met by their compliance dates.
C. Fertilizer nitrogen application targets / limits, and nitrogen discharge targets / limits.
D. Total nitrogen applied and total nitrogen removed reporting.
E. Irrigation and nutrient management planning, management practice implementation and assessment, and reporting on outcomes that address both groundwater and surface water discharges.
F. Protection of existing, naturally occurring or established, native riparian vegetative cover and monitoring and reporting on average width and length of riparian areas.
G. Proper destruction of permanently inactive groundwater wells.
H. Proper handling, storage, and disposal of fertilizers.

More information may be obtained during the implementation phase of these TMDLs to further assess the level of nutrient contributions to surface waters of the state from these source categories, and to identify any actions needed to reduce nutrient loading.

[43] The Agricultural Order establishes surface receiving water limits for owners and operators of irrigated lands in TMDL project areas that are equivalent to the applicable load allocations.

10.4.2 Livestock and Domestic Animal Operations

Based on available information, it is generally expected that owners and operators of livestock and domestic animals on grazing lands or in rural residential areas are currently achieving proposed nitrogen compounds load allocations. As such, new regulatory measures and formal regulatory oversight are not warranted for this source category.

To maintain existing water quality and prevent any further water quality degradation, owners and operators of unconfined livestock on rangelands or confined livestock and domestic animals in rural residential areas which do not drain to a municipal separate stormwater sewer system should begin or continue to self-assess, self-monitor and make animal management and manure management decisions which comport with accepted rangeland management practices or manure management practices recommended or published by reputable resource professionals or local agencies.

It should be noted that information developed in this TMDL Report does not conclusively demonstrate that discharges from all livestock facilities are meeting proposed load allocations. More information may be obtained during the implementation phase of these TMDLs to further assess the level of nutrient contributions to surface waters from these source categories, and to identify any actions needed to reduce nutrient loading.

10.5 TMDL Attainment Date

Monitored surface waterbodies in the Santa Ynez River basin are generally relatively low in concentrations of nitrogen compounds, with the exception of the lower Santa Ynez River, which historically has had elevated concentrations of nitrate and total nitrogen downstream of the Lompoc Regional Wastewater Treatment Plant. Upgrades to the wastewater treatment plant have resulted in improved nitrogen water quality in recent years. As such, implementation and attainment of waste load allocations and load allocations are not expected to require an extended attainment time schedule.

Within five years after the OAL approval date of this Basin Plan amendment, implementing parties will achieve the nitrogen compounds waste load allocations and load allocations or meet all regulatory and policy requirements necessary for removing the impaired waters from the Clean Water Act section 303(d) List of impaired waters.

Attainment of the nitrate and un-ionized ammonia allocations within five years of the OAL approval will be sufficient to demonstrate compliance with human health and aquatic toxicity water quality objectives in the lower Santa Ynez River, its tributaries, and the downstream estuary.

Attainment of the total nitrogen allocations within five years of the OAL approval will be sufficient to demonstrate a reduction in the risk of unsatisfactory biostimulatory conditions to the lower Santa Ynez River and the downstream estuary.

Maintain existing nitrogen compounds levels in stream reaches where existing water quality is better than TMDL numeric targets, unless any lowering of water quality is otherwise consistent with the anti-degradation policy.[44]

10.6 Monitoring and Assessment

After the basin plan amendment comprising this TMDL project is approved by OAL, the Central Coast Water Board will periodically review implementation actions, monitoring results, and responsible parties' evaluations of their progress toward achieving their allocations. The Central Coast Water Board will use updates to the federal Clean Water Act section 303(d) List of impaired waters (303(d) List), annual reports from dischargers required to submit such reports, nonpoint source program monitoring data and reports, evaluations submitted by responsible parties, and other available information to determine progress toward implementing required actions and achieving the allocations and numeric targets.

The Agricultural Order Monitoring and Reporting program currently conducts monitoring for nitrogen compounds in the River basin. Staff has concluded that the existing CMP monitoring locations and frequency are sufficient to help evaluate compliance with load allocations.

Central Coast Ambient Monitoring Program (CCAMP) monitors nutrients and nutrient-related compounds in the Santa Ynez River basin as part of its regional ambient monitoring program. We conclude that the existing CCAMP monitoring locations and frequencies are sufficient to help evaluate compliance with load allocations.

An un-ionized ammonia listing on Sloans Canyon Creek is based on one year of data from 2008. Given the vintage of this data, additional monitoring on this creek is recommended to determine the current status of water quality in the creek.

The Lompoc Regional Wastewater facility conducts water quality monitoring pursuant to NPDES Permit No. CA004812 which became effective on May 1, 2022. This permit includes effluent limits for nitrate (as N), and un-ionized ammonia which are consistent with the proposed waste load allocations. The permit does not currently include effluent limits for total nitrogen. During the next permit renewal, we recommend adding total nitrogen effluent limitations (8 mg/L) and associated monitoring and reporting requirements consistent with those currently found in the permit to ensure total nitrogen discharges do not cause or contribute to an increased risk of biostimulation in downstream waters.

[44] USEPA guidance says that TMDLs are typically written for restoring impaired waters; however, the states can prepare TMDLs geared towards maintaining a "better than water quality standard" condition for a given waterbody-pollutant combination, and TMDLs can be a useful tool for high quality waters (see: USEPA: Opportunities to Protect Drinking Water Sources and Advance Watershed Goals Through the Clean Water Act: A Toolkit for State, Interstate, Tribal and Federal Water Program Managers. November 2014).

Central Coast Water Board staff may conclude in future reviews that ongoing implementation efforts are insufficient to ultimately achieve the allocations and numeric targets. If this occurs, Central Coast Water Board staff will recommend revisions to the TMDL Implementation Plan. Alternatively, Central Coast Water Board staff may conclude and articulate in the reviews that implementation efforts are likely to result in achieving the allocations and numeric targets, in which case existing and anticipated implementation efforts should continue. When allocations and/or numeric targets are met, Central Coast Water Board staff will recommend the waterbody be removed from the 303(d) List.

11 PUBLIC OUTREACH AND PARTICIPATION

Public outreach is a part of the TMDL development process. Leveraging knowledge about the Santa Ynez River basin from local residents, resource professionals, public agency staff, landowners and land operators is very helpful to the Central Coast Water Board. Public outreach and public participation will be an ongoing element of TMDL development activities.

Published U.S. Environmental Protection Agency guidance states that, among other things, the public's role in the TMDL development process can be to:

- Provide data and information and work with the state in the TMDL development process.
- Review and comment on a proposed TMDL.
- Provide independent analysis to the state. Stakeholders are not simply limited to review and comment on state work.
- Attend public TMDL meetings to become informed and to provide oral feedback.
- Contact state staff by correspondence or phone communication at any time during the TMDL development process with questions, comments, and feedback.

Our public engagement process included regular TMDL updates, progress reports, scheduled public meetings, and solicitation of public feedback via our stakeholder email subscription list consisting of over 175 stakeholders. These stakeholders represented a wide range of interests, including agricultural interests, local residents, public agencies, environmental groups, local businesses, researchers, local resource professionals, and others.

The Central Coast Water Board staff conducted a public workshop in the City of Lompoc on May 2, 2016. The goal of this workshop was to present background information on TMDLs and water quality in the Santa Ynez River basin, engage and inform stakeholders, and solicit input, questions, and comments.

Staff also conducted a combined TMDL update presentation and CEQA scoping workshop remotely via Zoom on September 28, 2022. The California Environmental Quality Act (CEQA) requires staff to conduct a scoping meeting when drafting any water quality control plan amendments. The purpose of a scoping meeting is to seek input from public agencies and members of the public on the range of project actions, alternatives, reasonably foreseeable means of compliance, significant impacts to be analyzed, cumulative impacts if any, and mitigation measures.

The stakeholders who were contacted or who participated in public outreach meetings included representatives of irrigated agriculture, municipal and county agencies, resource professionals, wastewater facility operators, Chumash Nation tribal leaders, environmental advocates, and other interested parties.

Water Code section 189.73, which became effective on January 1, 2023, requires the Water Boards, during their planning processes, to conduct equitable, culturally relevant outreach when considering proposed discharges of waste that may have disproportionate impacts on water quality in disadvantaged communities or tribal communities. Although the TMDLs do not directly authorize discharges of waste, waste load allocations and load allocations must be implemented in waste discharge permits. Central Coast Water Board staff have determined that the TMDLs will not have disproportionate impacts on water quality in disadvantaged communities, as defined in AB 2108, or tribal communities.

12 Existing Plans to Improve Water Quality and Aquatic Habitat

Protecting California's water resources depends on the proactive engagement of citizens, landowners, researchers, and businesses. Proactive efforts by citizens in the Santa Ynez River basin that may result in improved water quality protection are commendable and should be recognized. Regional stakeholders have been participating in efforts to protect and improve water quality, water supply, and aquatic habitat in the Santa Ynez River basin. Reported activities include:

- The Santa Barbara Countywide Integrated Regional Water Management (IRWM) Plan (2013), with cooperating partners City of Lompoc, City of Solvang, and City of Buellton, is the main integrated regional water management planning document for the county and the Santa Ynez River basin. The objectives addressed in the plan focus on improving water quality, protecting water supply, and maintaining and enhancing water infrastructure.
- The Santa Barbara Countywide IRWM Plan (2013) published a summary of water resource management plans and programs that exist in the county and in the Santa Ynez River basin[45], including Urban Water Management Plans, Groundwater Management Plans, stormwater management programs, clean water, and annual bioassessment programs.

[45] The Santa Barbara County Wide IRWM Plan (2013) does not provide adoption dates associated with the myriad plans and programs reported. However, additional details of the plans and programs can be accessed by clicking the hyperlink provided.

- The Cachuma Resource Conservation District reports that local landowners and groups throughout Santa Barbara County implement conservation projects related to water quality, irrigation and nutrient management, and habitat restoration.

Dr. Timothy Robinson, senior scientist with the Cachuma Operation and Maintenance Board reported recently (personal communication via phone, September 2022) that monitoring and restoration projects for the threatened southern steelhead are underway along the Santa Ynez River downstream of Lake Cachuma.

13 REFERENCES

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