

DRAFT MEMORANDUM

To: Jo Ann Weber (San Diego Co.),
Kyle Cook (Camp Pendleton),
Kyle Gallup, Stuart McKibbin,
(Riverside County)

Cc: Ashli Desai (LWA)

From: J. Butcher, M. Schmidt, C. Boschen

Date: May 15, 2017

Subject: At-Source and Delivered MS4 Loads
for WY 2008 (DRAFT)

An HSPF model of the Santa Margarita watershed (Tetra Tech, 2013, 2014; Sutula et al., 2016) was developed to support the Santa Margarita Estuary nutrient investigation and Total Maximum Daily Load (TMDL) alternative. This model runs through the end of water year 2010 and is based on older land use information from 2005 and 2009. San Diego County authorized an update of the watershed model for areas that affect the calculation of Municipal Separate Storm Sewer System (MS4) loads from San Diego County, United States Marine Corps (USMC) Camp Pendleton, and other MS4 permittees in the watershed downstream of the Riverside – San Diego County border. Model drainage areas and hydrography have been refined and updated for San Diego County and recent (2015) land use information has been incorporated. The representation of the watershed within Riverside County has not been updated, except for the headwaters of tributaries (e.g., De Luz, Sandia, and Rainbow Creeks) that originate in Riverside County and flow to the Santa Margarita River within San Diego County. Many other refinements were made to improve the model calibration, as discussed in *Santa Margarita River Watershed Model – San Diego County Update (DRAFT)* (Tetra Tech, 2017).

A nutrient loading analysis was completed in January 2017 based on the previous HSPF model (Tetra Tech, 2017). At-source and delivered nutrient loads were reported for MS4 and non-MS4 areas. Loads were tabulated by jurisdiction and land use in the January 2017 memorandum. This memorandum provides the MS4 and non-MS4 dry weather nutrient loads based on the updated watershed model. Both at-source loads and loads delivered to the Santa Margarita Estuary are included in this memorandum.

Note that loads reported for Riverside County are a hybrid of the revised 2017 model and the older model. Loads originating upstream of the confluence of Murrieta and Temecula Creek have not been updated. Loads originating downstream of that point reflect both the updates to model calibration and the changes to MS4 boundaries provided by San Diego County (Figure 1).

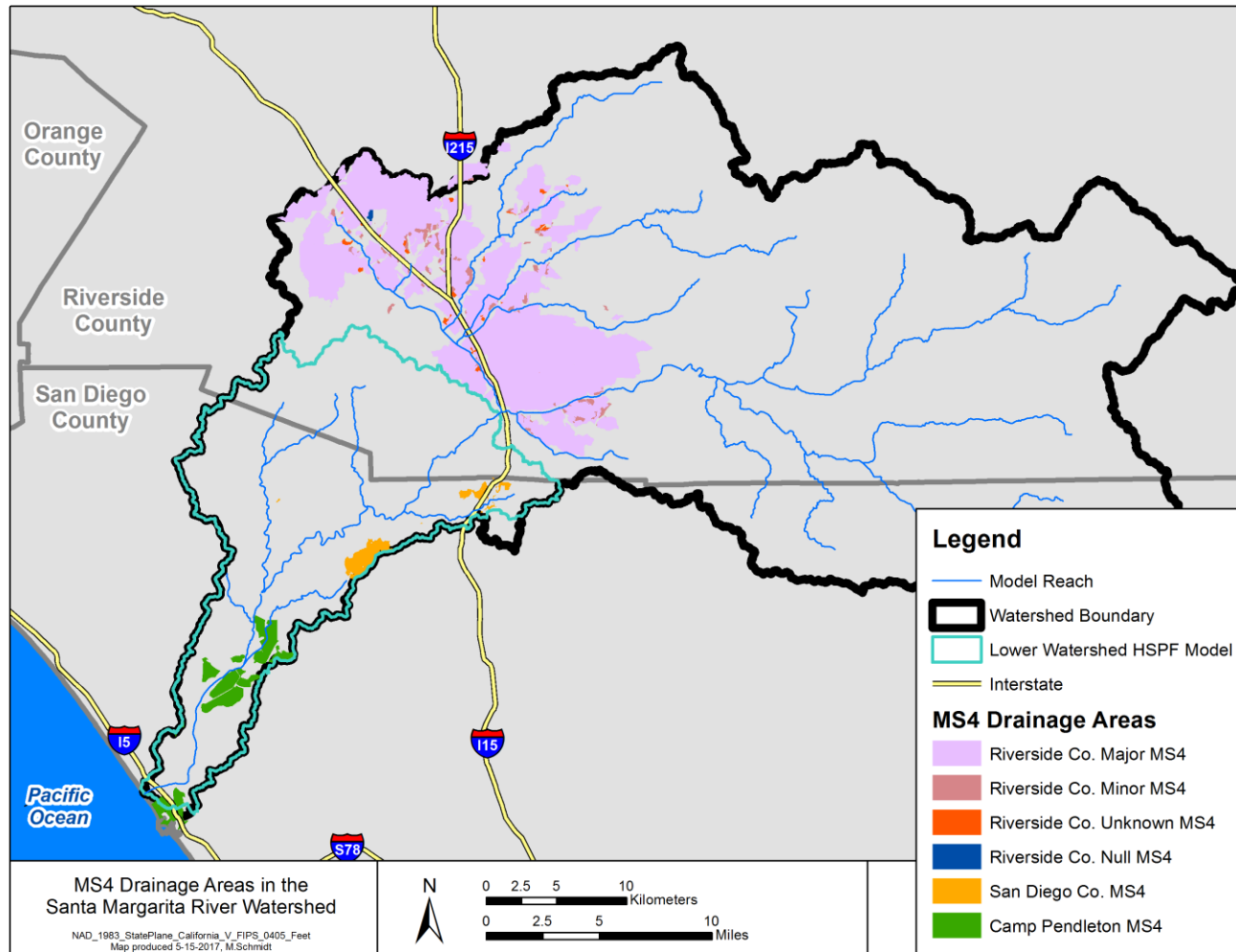


Figure 1. MS4 Drainage Areas in the Santa Margarita River Watershed

At-Source and Delivered MS4 Loads for WY 2008 (DRAFT)

Table 1. Full Year, Dry Weather, At-Source Total Nitrogen Loads (lb/year) by Land Use and MS4 in the Santa Margarita Watershed (WY 2008)

Land Use Category	San Diego County		Riverside County		Camp Pendleton, Other Federal Land		Other CALTRANS	SMR Watershed	
	MS4	Non-MS4	MS4	Non-MS4	MS4	Non-MS4	MS4	Total MS4	Total Upland Load
Low density residential	57.6	3,068.1	2,930.5	5,124.8	180.7	1,022.7	0.0	3,168.8	12,384.5
High density residential	0.0	56.8	4,134.9	267.2	9.3	0.3	0.0	4,144.2	4,468.4
Commercial, institutional	2.4	10.2	1,003.9	205.0	71.8	65.1	0.0	1,078.2	1,358.5
Industrial	5.7	75.1	493.1	497.9	221.4	28.4	0.0	720.2	1,321.6
Road, freeway	7.0	363.0	379.0	1,057.0	46.5	247.1	0.0	432.5	2,099.5
Parks and recreation	1.2	9.9	232.9	223.2	0.0	0.0	0.0	234.2	467.3
Open and recreation	0.0	1.9	15.1	8.5	0.0	0.5	0.0	15.1	26.0
Irrigated agriculture	14.3	2,498.5	484.4	2,701.0	1.1	207.9	0.0	499.8	5,907.2
Non-irrigated agriculture	0.0	19.9	62.0	251.0	0.0	1.7	0.0	62.0	334.6
Dairy, livestock	0.0	0.0	0.0	48.5	0.0	0.0	0.0	0.0	48.5
Horse ranches	0.0	0.0	742.8	2,457.4	0.0	0.0	0.0	742.8	3,200.1
Forest	0.1	63.4	18.9	88.1	0.2	24.9	0.0	19.2	195.6
Chaparral, scrub	36.2	3,119.4	681.5	5,791.3	64.8	3,099.3	0.0	782.4	12,792.3
Grassland, herbaceous	0.1	162.0	253.4	896.3	2.1	886.9	0.0	255.6	2,200.7
Transitional	0.0	0.3	554.8	433.2	0.6	6.9	0.0	555.4	995.8
CALTRANS	0.0	0.0	117.6	0.0	0.0	0.0	286.1	403.7	403.7
Orchard, vineyard*	65.2	18,399.3	1,786.9	38,627.4	0.0	103.8	0.0	1,852.1	58,982.7
Nurseries*	97.3	9,326.8	0.0	3.4	0.0	38.4	0.0	97.3	9,465.9
Total	287.0	37,174.6	13,891.8	58,681.2	598.4	5,733.9	286.1	15,063.3	116,653.0

Note: Tables 1 – 8 include loads from CALTRANS MS4 and Federal land draining through county MS4 outlets with the county totals; these loads are tabulated separately in Tables 9 – 16. Total upland load is the sum of MS4-regulated and non-MS4 loads from the land surface. The previous model aggregated orchards, vineyards, and nurseries into a single land use class and the updated model separates nurseries. Orchard, vineyard, and nursery loads tabulated from the previous model (e.g. Riverside County MS4 loads) are included in the orchard and vineyard class.

At-Source and Delivered MS4 Loads for WY 2008 (DRAFT)

Table 2. Summer, Dry Weather, At-Source Total Nitrogen Loads (lb/year) by Land Use and MS4 in the Santa Margarita Watershed (WY 2008)

Land Use Category	San Diego County		Riverside County		Camp Pendleton, Other Federal Land		Other CALTRANS	SMR Watershed	
	MS4	Non-MS4	MS4	Non-MS4	MS4	Non-MS4	MS4	Total MS4	Total Upland Load
Low density residential	0.9	434.0	363.4	798.6	33.2	160.2	0.0	397.5	1,790.3
High density residential	0.0	1.2	505.0	32.4	1.6	0.0	0.0	506.6	540.3
Commercial, institutional	0.0	0.7	110.4	24.3	9.9	8.9	0.0	120.3	154.2
Industrial	0.4	11.3	54.3	74.6	34.2	4.4	0.0	88.9	179.2
Road, freeway	0.1	56.2	37.8	147.6	6.8	39.6	0.0	44.7	288.0
Parks and recreation	0.0	1.1	24.3	25.6	0.0	0.0	0.0	24.3	50.9
Open and recreation	0.0	0.3	1.5	1.0	0.0	0.0	0.0	1.5	2.8
Irrigated agriculture	2.3	182.7	12.2	142.4	0.0	2.9	0.0	14.4	342.5
Non-irrigated agriculture	0.0	2.2	5.0	23.9	0.0	0.1	0.0	5.0	31.2
Dairy, livestock	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.4
Horse ranches	0.0	0.0	54.1	209.6	0.0	0.0	0.0	54.1	263.8
Forest	0.0	12.7	2.4	11.5	0.0	4.2	0.0	2.4	30.8
Chaparral, scrub	0.7	490.2	61.8	904.4	12.0	518.5	0.0	74.4	1,987.6
Grassland, herbaceous	0.0	20.0	25.5	108.7	0.3	114.9	0.0	25.8	269.4
Transitional	0.0	0.0	52.1	51.6	0.1	1.0	0.0	52.3	105.0
CALTRANS	0.0	0.0	13.6	0.0	0.0	0.0	26.0	39.6	39.6
Orchard, vineyard*	21.7	6,654.6	13.5	12,056.4	0.0	33.7	0.0	35.2	21,021.2
Nurseries*	51.8	5,369.3	0.0	1.8	0.0	19.8	0.0	51.8	3,201.4
Total	77.8	13,236.5	1,337.1	14,614.6	98.1	908.4	26.0	1,539.0	30,298.5

Note: Tables 1 – 8 include loads from CALTRANS MS4 and Federal land draining through county MS4 outlets with the county totals; these loads are tabulated separately in Tables 9 – 16. Total upland load is the sum of MS4-regulated and non-MS4 loads from the land surface. The previous model aggregated orchards, vineyards, and nurseries into a single land use class and the updated model separates nurseries. Orchard, vineyard, and nursery loads tabulated from the previous model (e.g. Riverside County MS4 loads) are included in the orchard and vineyard class.

At-Source and Delivered MS4 Loads for WY 2008 (DRAFT)

Table 3. Full Year, Dry Weather, Total Nitrogen Loads (lb/year) Delivered to the Estuary by Land Use and MS4 in the Santa Margarita Watershed (WY 2008)

Land Use Category	San Diego County		Riverside County		Camp Pendleton, Other Federal Land		Other CALTRANS	SMR Watershed	
	MS4	Non-MS4	MS4	Non-MS4	MS4	Non-MS4	MS4	Total MS4	Total Upland Load
Low density residential	35.2	1,745.8	889.3	1,692.3	66.5	466.1	0.0	991.1	4,895.3
High density residential	0.0	34.7	1,262.8	92.6	5.4	0.0	0.0	1,268.2	1,395.6
Commercial, institutional	1.4	6.1	348.7	68.8	36.1	35.4	0.0	386.3	496.6
Industrial	3.3	41.6	205.2	157.6	59.3	15.3	0.0	267.8	482.3
Road, freeway	4.3	204.9	116.3	406.2	19.3	119.8	0.0	139.9	870.8
Parks and recreation	0.7	5.9	77.8	112.9	0.0	0.0	0.0	78.6	197.4
Open and recreation	0.0	1.1	5.5	3.1	0.0	0.2	0.0	5.5	9.8
Irrigated agriculture	7.7	1,542.4	124.7	1,273.2	0.0	194.1	0.0	132.4	3,142.1
Non-irrigated agriculture	0.0	11.9	24.1	64.5	0.0	0.8	0.0	24.1	101.4
Dairy, livestock	0.0	0.0	0.0	23.8	0.0	0.0	0.0	0.0	23.8
Horse ranches	0.0	0.0	181.7	623.7	0.0	0.0	0.0	181.7	805.4
Forest	0.0	34.8	6.1	34.2	0.1	12.2	0.0	6.3	87.5
Chaparral, scrub	22.0	1,771.4	204.6	2,765.5	13.3	1,506.7	0.0	239.9	6,283.5
Grassland, herbaceous	0.0	94.2	75.5	239.6	0.7	347.6	0.0	76.3	757.6
Transitional	0.0	0.2	192.6	98.8	0.3	2.4	0.0	193.0	294.3
CALTRANS	0.0	0.0	39.4	0.0	0.0	0.0	131.9	171.3	171.3
Orchard, vineyard*	28.9	8,223.2	389.3	14,949.4	0.0	47.3	0.0	418.2	23,638.1
Nurseries*	32.6	2,925.5	0.0	1.2	0.0	14.1	0.0	32.6	2,973.3
Total	136.4	16,643.6	4,143.6	22,607.2	201.2	2,762.1	131.9	4,613.1	46,626.0

Note: Tables 1 – 8 include loads from CALTRANS MS4 and Federal land draining through county MS4 outlets with the county totals; these loads are tabulated separately in Tables 9 – 16. Total upland load is the sum of MS4-regulated and non-MS4 loads from the land surface. The previous model aggregated orchards, vineyards, and nurseries into a single land use class and the updated model separates nurseries. Orchard, vineyard, and nursery loads tabulated from the previous model (e.g. Riverside County MS4 loads) are included in the orchard and vineyard class.

At-Source and Delivered MS4 Loads for WY 2008 (DRAFT)

Table 4. Summer, Dry Weather, Total Nitrogen Loads (lb/year) Delivered to the Estuary by Land Use and MS4 in the Santa Margarita Watershed (WY 2008)

Land Use Category	San Diego County		Riverside County		Camp Pendleton, Other Federal Land		Other CALTRANS	SMR Watershed	
	MS4	Non-MS4	MS4	Non-MS4	MS4	Non-MS4	MS4	Total MS4	Total Upland Load
Low density residential	0.1	36.4	9.1	32.4	8.9	44.5	0.0	18.1	131.3
High density residential	0.0	0.1	11.8	0.6	0.7	0.0	0.0	12.5	13.2
Commercial, institutional	0.0	0.1	3.7	0.7	2.7	3.8	0.0	6.4	11.0
Industrial	0.0	1.0	2.3	2.2	0.5	0.9	0.0	2.9	7.0
Road, freeway	0.0	4.8	0.9	7.4	1.3	7.2	0.0	2.1	21.5
Parks and recreation	0.0	0.1	0.6	1.9	0.0	0.0	0.0	0.6	2.6
Open and recreation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Irrigated agriculture	0.2	15.1	0.1	10.9	0.0	2.0	0.0	0.3	28.2
Non-irrigated agriculture	0.0	0.2	0.1	0.4	0.0	0.0	0.0	0.1	0.6
Dairy, livestock	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Horse ranches	0.0	0.0	0.6	2.5	0.0	0.0	0.0	0.6	3.1
Forest	0.0	1.1	0.1	0.5	0.0	0.5	0.0	0.1	2.2
Chaparral, scrub	0.1	42.0	0.9	64.1	0.9	77.5	0.0	1.9	185.5
Grassland, herbaceous	0.0	1.8	0.5	2.2	0.0	10.3	0.0	0.5	14.8
Transitional	0.0	0.0	1.2	0.9	0.0	0.2	0.0	1.2	2.3
CALTRANS	0.0	0.0	0.3	0.0	0.0	0.0	2.5	2.8	2.8
Orchard, vineyard*	1.8	566.2	0.2	1,058.6	0.0	3.2	0.0	2.0	1,629.9
Nurseries*	4.4	454.4	0.0	0.1	0.0	1.9	0.0	4.4	460.8
Total	6.6	1,123.2	32.4	1,185.2	15.1	152.0	2.5	56.7	2,517.1

Note: Tables 1 – 8 include loads from CALTRANS MS4 and Federal land draining through county MS4 outlets with the county totals; these loads are tabulated separately in Tables 9 – 16. Total upland load is the sum of MS4-regulated and non-MS4 loads from the land surface. The previous model aggregated orchards, vineyards, and nurseries into a single land use class and the updated model separates nurseries. Orchard, vineyard, and nursery loads tabulated from the previous model (e.g. Riverside County MS4 loads) are included in the orchard and vineyard class.

At-Source and Delivered MS4 Loads for WY 2008 (DRAFT)

Table 5. Full Year, Dry Weather, At-Source Total Phosphorus Loads (lb/year) by Land Use and MS4 in the Santa Margarita Watershed (WY 2008)

Land Use Category	San Diego County		Riverside County		Camp Pendleton, Other Federal Land		Other CALTRANS	SMR Watershed	
	MS4	Non-MS4	MS4	Non-MS4	MS4	Non-MS4	MS4	Total MS4	Total Upland Load
Low density residential	3.8	199.2	291.9	462.7	13.5	74.7	0.0	309.2	1,045.9
High density residential	0.0	4.2	412.1	26.6	1.0	0.0	0.0	413.0	443.9
Commercial, institutional	0.2	0.8	100.2	20.4	7.6	5.4	0.0	108.0	134.6
Industrial	0.3	3.9	49.2	48.5	22.6	2.1	0.0	72.1	126.6
Road, freeway	0.9	38.1	37.7	107.4	7.2	26.3	0.0	45.9	217.7
Parks and recreation	0.0	0.1	23.0	10.5	0.0	0.0	0.0	23.0	33.6
Open and recreation	0.0	0.0	1.5	0.8	0.0	0.0	0.0	1.5	2.4
Irrigated agriculture	0.8	144.5	48.5	224.9	0.0	6.5	0.0	49.4	425.3
Non-irrigated agriculture	0.0	9.5	9.4	38.3	0.0	0.6	0.0	9.4	57.7
Dairy, livestock	0.0	0.0	0.0	4.8	0.0	0.0	0.0	0.0	4.8
Horse ranches	0.0	0.0	74.3	243.8	0.0	0.0	0.0	74.3	318.0
Forest	0.0	7.7	2.9	12.5	0.0	3.2	0.0	2.9	26.4
Chaparral, scrub	2.2	188.5	108.8	490.6	4.3	201.1	0.0	115.3	995.4
Grassland, herbaceous	0.0	1.6	38.4	121.5	0.1	69.3	0.0	38.5	231.0
Transitional	0.0	0.0	54.9	42.5	0.1	0.7	0.0	54.9	98.1
CALTRANS	0.0	0.0	11.7	0.0	0.0	0.0	34.5	46.2	46.2
Orchard, vineyard*	2.0	538.6	179.8	1,665.1	0.0	3.2	0.0	181.7	2,388.6
Nurseries*	7.4	453.1	0.0	0.3	0.0	3.0	0.0	7.4	463.8
Total	17.7	1,589.9	1,444.1	3,521.1	56.5	396.4	34.5	1,552.7	7,060.0

Note: Tables 1 – 8 include loads from CALTRANS MS4 and Federal land draining through county MS4 outlets with the county totals; these loads are tabulated separately in Tables 9 – 16. Total upland load is the sum of MS4-regulated and non-MS4 loads from the land surface. The previous model aggregated orchards, vineyards, and nurseries into a single land use class and the updated model separates nurseries. Orchard, vineyard, and nursery loads tabulated from the previous model (e.g. Riverside County MS4 loads) are included in the orchard and vineyard class.

At-Source and Delivered MS4 Loads for WY 2008 (DRAFT)

Table 6. Summer, Dry Weather, At-Source Total Phosphorus Loads (lb/year) by Land Use and MS4 in the Santa Margarita Watershed (WY 2008)

Land Use Category	San Diego County		Riverside County		Camp Pendleton, Other Federal Land		Other CALTRANS	SMR Watershed	
	MS4	Non-MS4	MS4	Non-MS4	MS4	Non-MS4	MS4	Total MS4	Total Upland Load
Low density residential	0.1	27.1	36.3	69.5	2.1	10.3	0.0	38.5	145.4
High density residential	0.0	0.1	50.5	3.2	0.1	0.0	0.0	50.6	53.9
Commercial, institutional	0.0	0.0	11.0	2.3	0.5	0.5	0.0	11.5	14.3
Industrial	0.0	0.6	5.4	7.1	1.7	0.2	0.0	7.2	15.1
Road, freeway	0.0	5.6	3.8	14.8	0.7	4.0	0.0	4.5	28.8
Parks and recreation	0.0	0.0	2.4	1.1	0.0	0.0	0.0	2.4	3.5
Open and recreation	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.2	0.3
Irrigated agriculture	0.3	61.1	1.2	48.4	0.0	0.4	0.0	1.5	111.4
Non-irrigated agriculture	0.0	1.0	0.8	3.6	0.0	0.0	0.0	0.8	5.5
Dairy, livestock	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Horse ranches	0.0	0.0	5.4	20.6	0.0	0.0	0.0	5.4	26.1
Forest	0.0	1.5	0.4	1.6	0.0	0.5	0.0	0.4	4.0
Chaparral, scrub	0.0	29.5	9.8	72.4	0.7	32.8	0.0	10.5	145.2
Grassland, herbaceous	0.0	0.1	3.9	14.5	0.0	5.8	0.0	3.9	24.3
Transitional	0.0	0.0	5.2	5.0	0.0	0.1	0.0	5.2	10.3
CALTRANS	0.0	0.0	1.4	0.0	0.0	0.0	2.5	3.9	3.9
Orchard, vineyard*	0.7	213.3	1.5	413.9	0.0	1.0	0.0	2.3	630.4
Nurseries*	4.1	247.0	0.0	0.1	0.0	1.6	0.0	4.1	252.8
Total	5.2	587.0	139.2	678.4	5.8	57.2	2.5	152.7	1,475.3

Note: Tables 1 – 8 include loads from CALTRANS MS4 and Federal land draining through county MS4 outlets with the county totals; these loads are tabulated separately in Tables 9 – 16. Total upland load is the sum of MS4-regulated and non-MS4 loads from the land surface. The previous model aggregated orchards, vineyards, and nurseries into a single land use class and the updated model separates nurseries. Orchard, vineyard, and nursery loads tabulated from the previous model (e.g. Riverside County MS4 loads) are included in the orchard and vineyard class.

At-Source and Delivered MS4 Loads for WY 2008 (DRAFT)

Table 7. Full Year, Dry Weather, Total Phosphorus Loads (lb/year) Delivered to the Estuary by Land Use and MS4 in the Santa Margarita Watershed (WY 2008)

Land Use Category	San Diego County		Riverside County		Camp Pendleton, Other Federal Land		Other CALTRANS	SMR Watershed	
	MS4	Non-MS4	MS4	Non-MS4	MS4	Non-MS4	MS4	Total MS4	Total Upland Load
Low density residential	3.1	147.2	169.5	239.9	6.4	41.2	0.0	179.0	607.4
High density residential	0.0	3.4	223.8	16.9	0.7	0.0	0.0	224.5	244.8
Commercial, institutional	0.2	0.7	55.8	11.8	5.7	3.8	0.0	61.7	77.9
Industrial	0.2	2.8	30.7	27.8	14.2	1.5	0.0	45.2	77.2
Road, freeway	0.8	27.8	21.6	64.6	4.5	15.7	0.0	26.9	134.9
Parks and recreation	0.0	0.1	13.1	7.2	0.0	0.0	0.0	13.2	20.4
Open and recreation	0.0	0.0	0.9	0.5	0.0	0.0	0.0	0.9	1.5
Irrigated agriculture	0.4	73.2	34.0	117.1	0.0	5.9	0.0	34.4	230.5
Non-irrigated agriculture	0.0	7.3	6.3	17.7	0.0	0.4	0.0	6.3	31.7
Dairy, livestock	0.0	0.0	0.0	3.8	0.0	0.0	0.0	0.0	3.8
Horse ranches	0.0	0.0	50.0	148.9	0.0	0.0	0.0	50.0	198.8
Forest	0.0	5.4	1.6	8.0	0.0	2.0	0.0	1.6	17.0
Chaparral, scrub	1.8	136.6	69.2	305.2	1.2	117.1	0.0	72.2	631.1
Grassland, herbaceous	0.0	1.2	23.2	67.2	0.1	28.5	0.0	23.3	120.2
Transitional	0.0	0.0	35.2	17.3	0.1	0.3	0.0	35.3	52.9
CALTRANS	0.0	0.0	7.2	0.0	0.0	0.0	25.5	32.7	32.7
Orchard, vineyard*	1.1	282.7	87.8	748.1	0.0	1.7	0.0	88.9	1,121.4
Nurseries*	2.9	176.5	0.0	0.1	0.0	1.3	0.0	2.9	180.8
Total	10.5	864.8	829.9	1,802.0	33.0	219.4	25.5	898.9	3,785.1

Note: Tables 1 – 8 include loads from CALTRANS MS4 and Federal land draining through county MS4 outlets with the county totals; these loads are tabulated separately in Tables 9 – 16. Total upland load is the sum of MS4-regulated and non-MS4 loads from the land surface. The previous model aggregated orchards, vineyards, and nurseries into a single land use class and the updated model separates nurseries. Orchard, vineyard, and nursery loads tabulated from the previous model (e.g. Riverside County MS4 loads) are included in the orchard and vineyard class.

At-Source and Delivered MS4 Loads for WY 2008 (DRAFT)

Table 8. Summer, Dry Weather, Total Phosphorus Loads (lb/year) Delivered to the Estuary by Land Use and MS4 in the Santa Margarita Watershed (WY 2008)

Land Use Category	San Diego County		Riverside County		Camp Pendleton, Other Federal Land		Other CALTRANS	SMR Watershed	
	MS4	Non-MS4	MS4	Non-MS4	MS4	Non-MS4	MS4	Total MS4	Total Upland Load
Low density residential	0.0	0.8	0.2	0.7	0.5	2.4	0.0	0.7	4.5
High density residential	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.3	0.4
Commercial, institutional	0.0	0.0	0.1	0.0	0.1	0.2	0.0	0.2	0.4
Industrial	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.2
Road, freeway	0.0	0.2	0.0	0.2	0.1	0.5	0.0	0.1	1.1
Parks and recreation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Open and recreation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Irrigated agriculture	0.0	1.8	0.0	1.2	0.0	0.1	0.0	0.0	3.1
Non-irrigated agriculture	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Dairy, livestock	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Horse ranches	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1
Forest	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Chaparral, scrub	0.0	0.9	0.0	1.2	0.0	3.1	0.0	0.1	5.3
Grassland, herbaceous	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.1
Transitional	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
CALTRANS	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1
Orchard, vineyard*	0.0	5.8	0.0	10.2	0.0	0.0	0.0	0.0	16.0
Nurseries*	0.1	5.3	0.0	0.0	0.0	0.0	0.0	0.1	5.4
Total	0.1	14.8	0.8	13.7	0.8	6.5	0.1	1.9	36.9

Note: Tables 1 – 8 include loads from CALTRANS MS4 and Federal land draining through county MS4 outlets with the county totals; these loads are tabulated separately in Tables 9 – 16. Total upland load is the sum of MS4-regulated and non-MS4 loads from the land surface. The previous model aggregated orchards, vineyards, and nurseries into a single land use class and the updated model separates nurseries. Orchard, vineyard, and nursery loads tabulated from the previous model (e.g. Riverside County MS4 loads) are included in the orchard and vineyard class.

At-Source and Delivered MS4 Loads for WY 2008 (DRAFT)

Table 9. At-Source Total Nitrogen Loads (lb/year) for Dry Weather (Full Year) by MS4 and Land Use in the Santa Margarita Watershed (WY 2008)

Land Use Category	Low density residential	High density residential	Commercial and institutional	Industrial	Road, freeway	Parks and recreation	Open and recreation	Irrigated agriculture	Non-irrigated agriculture
San Diego County									
San Diego Co MS4	57.6	0.0	2.4	5.7	7.0	1.2	0.0	14.3	0.0
Total San Diego County	57.6	0.0	2.4	5.7	7.0	1.2	0.0	14.3	0.0
Riverside County									
City of Wildomar	432.5	237.7	21.8	5.3	52.4	0.1	0.0	5.6	10.2
City of Murrieta	450.6	1,214.0	245.9	111.9	83.6	63.8	3.7	65.8	6.3
City of Temecula	1,074.4	1,805.2	534.5	283.9	127.8	87.9	8.8	80.4	8.1
Other Unincorporated Riverside Co	945.7	863.3	166.3	92.0	109.0	79.1	2.0	332.6	36.5
Total Riverside County	2,903.2	4,120.2	968.4	493.1	372.9	230.9	14.5	484.4	61.1
State of California									
CALTRANS via San Diego MS4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CALTRANS via Riverside MS4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CALTRANS, outside county MS4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total State	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Federal									
Camp Pendleton MS4	180.7	9.3	71.8	221.4	46.5	0.0	0.0	1.1	0.0
Other Federal, via Riverside MS4	27.4	14.7	35.5	0.0	6.1	2.0	0.7	0.0	0.8
Total Federal	208.1	23.9	107.4	221.4	52.6	2.0	0.7	1.1	0.8

At-Source and Delivered MS4 Loads for WY 2008 (DRAFT)

Table 9 continued

Land Use Category	Dairy, livestock	Horse ranches	Forest	Chaparral, scrub	Grassland, herbaceous	Transitional	CALTRANS	Orchard, vineyard *	Nurseries *	Total
San Diego County										
San Diego Co MS4	0.0	0.0	0.1	36.2	0.1	0.0	0.0	65.2	97.3	287.0
Total San Diego County	0.0	0.0	0.1	36.2	0.1	0.0	0.0	65.2	97.3	287.0
Riverside County										
City of Wildomar	0.0	41.0	0.0	153.0	45.7	49.9	0.1	38.7	0.0	1,094.1
City of Murrieta	0.0	67.8	2.4	105.9	29.9	116.8	0.3	162.5	0.0	2,731.1
City of Temecula	0.0	31.0	6.5	49.9	45.4	206.1	0.5	14.3	0.0	4,364.9
Other Unincorporated Riverside Co	0.0	603.0	8.8	352.7	127.3	182.0	0.2	1,571.3	0.0	5,471.7
Total Riverside County	0.0	742.8	17.7	661.5	248.3	554.8	1.1	1,786.9	0.0	13,661.8
State of California										
CALTRANS via San Diego MS4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CALTRANS via Riverside MS4	0.0	0.0	0.0	0.0	0.0	0.0	116.5	0.0	0.0	116.5
CALTRANS, outside county MS4	0.0	0.0	0.0	0.0	0.0	0.0	286.1	0.0	0.0	286.1
Total State	0.0	0.0	0.0	0.0	0.0	0.0	402.6	0.0	0.0	402.6
Federal										
Camp Pendleton MS4	0.0	0.0	0.2	64.8	2.1	0.6	0.0	0.0	0.0	598.4
Other Federal, via Riverside MS4	0.0	0.0	1.2	20.0	5.1	0.0	0.0	0.0	0.0	113.5
Total Federal	0.0	0.0	1.4	84.7	7.2	0.6	0.0	0.0	0.0	711.9

Note: The previous model aggregated orchards, vineyards, and nurseries into a single land use class and the updated model separates nurseries. Orchard, vineyard, and nursery loads tabulated from the previous model (e.g. Riverside County MS4 loads) are included in the orchard and vineyard class.

At-Source and Delivered MS4 Loads for WY 2008 (DRAFT)

Table 10. At-Source Total Nitrogen Loads (lb/year) for Dry Weather (Summer) by MS4 and Land Use in the Santa Margarita Watershed (WY 2008)

Land Use Category	Low density residential	High density residential	Commercial and institutional	Industrial	Road, freeway	Parks and recreation	Open and recreation	Irrigated agriculture	Non-irrigated agriculture
San Diego County									
San Diego Co MS4	0.9	0.0	0.0	0.4	0.1	0.0	0.0	2.3	0.0
Total San Diego County	0.9	0.0	0.0	0.4	0.1	0.0	0.0	2.3	0.0
Riverside County									
City of Wildomar	49.6	30.6	2.8	0.6	5.0	0.0	0.0	0.0	0.8
City of Murrieta	53.3	148.4	27.3	12.2	8.0	7.4	0.5	1.2	0.4
City of Temecula	124.9	214.4	57.5	30.0	12.1	9.4	0.8	2.2	0.4
Other Unincorporated Riverside Co	132.0	109.7	19.0	11.6	12.1	7.1	0.1	8.7	3.4
Total Riverside County	359.8	503.1	106.6	54.3	37.2	24.0	1.5	12.2	4.9
State of California									
CALTRANS via San Diego MS4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CALTRANS via Riverside MS4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CALTRANS, outside county MS4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total State	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Federal									
Camp Pendleton MS4	33.2	1.6	9.9	34.2	6.8	0.0	0.0	0.0	0.0
Other Federal, via Riverside MS4	3.6	1.9	3.9	0.0	0.7	0.3	0.0	0.0	0.0
Total Federal	36.8	3.5	13.7	34.2	7.4	0.3	0.0	0.0	0.0

At-Source and Delivered MS4 Loads for WY 2008 (DRAFT)

Table 10 continued

Land Use Category	Dairy, livestock	Horse ranches	Forest	Chaparral, scrub	Grassland, herbaceous	Transitional	CALTRANS	Orchard, vineyard *	Nurseries *	Total
San Diego County										
San Diego Co MS4	0.0	0.0	0.0	0.7	0.0	0.0	0.0	21.7	51.8	77.8
Total San Diego County	0.0	0.0	0.0	0.7	0.0	0.0	0.0	21.7	51.8	77.8
Riverside County										
City of Wildomar	0.0	2.3	0.0	9.4	4.4	4.8	0.0	0.2	0.0	110.6
City of Murrieta	0.0	5.3	0.2	7.7	2.4	8.8	0.0	0.7	0.0	283.8
City of Temecula	0.0	1.8	0.9	6.8	4.4	19.3	0.1	0.1	0.0	485.2
Other Unincorporated Riverside Co	0.0	44.8	1.1	35.4	13.8	19.2	0.0	12.5	0.0	430.6
Total Riverside County	0.0	54.1	2.2	59.3	25.0	52.1	0.1	13.5	0.0	1,310.2
State of California										
CALTRANS via San Diego MS4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CALTRANS via Riverside MS4	0.0	0.0	0.0	0.0	0.0	0.0	13.5	0.0	0.0	13.5
CALTRANS, outside county MS4	0.0	0.0	0.0	0.0	0.0	0.0	26.0	0.0	0.0	26.0
Total State	0.0	0.0	0.0	0.0	0.0	0.0	39.5	0.0	0.0	39.5
Federal										
Camp Pendleton MS4	0.0	0.0	0.0	12.0	0.3	0.1	0.0	0.0	0.0	98.1
Other Federal, via Riverside MS4	0.0	0.0	0.2	2.4	0.5	0.0	0.0	0.0	0.0	13.4
Total Federal	0.0	0.0	0.2	14.4	0.8	0.1	0.0	0.0	0.0	111.5

Note: The previous model aggregated orchards, vineyards, and nurseries into a single land use class and the updated model separates nurseries. Orchard, vineyard, and nursery loads tabulated from the previous model (e.g. Riverside County MS4 loads) are included in the orchard and vineyard class.

At-Source and Delivered MS4 Loads for WY 2008 (DRAFT)

Table 11. Total Nitrogen Loads (lb/year) Delivered to the Estuary for Dry Weather (Full Year) by MS4 and Land Use in the Santa Margarita Watershed (WY 2008)

Land Use Category	Low density residential	High density residential	Commercial and institutional	Industrial	Road, freeway	Parks and recreation	Open and recreation	Irrigated agriculture	Non-irrigated agriculture
San Diego County									
San Diego Co MS4	35.2	0.0	1.4	3.3	4.3	0.7	0.0	7.7	0.0
Total San Diego County	35.2	0.0	1.4	3.3	4.3	0.7	0.0	7.7	0.0
Riverside County									
City of Wildomar	112.1	60.6	5.5	1.4	14.2	0.0	0.0	1.6	2.7
City of Murrieta	160.9	432.7	92.8	49.3	32.1	19.6	1.4	27.0	2.7
City of Temecula	402.0	483.9	175.4	125.9	41.4	22.6	3.0	18.3	3.2
Other Unincorporated Riverside Co	202.7	278.2	59.4	28.6	26.1	35.0	0.9	77.8	15.1
Total Riverside County	877.7	1,255.5	333.2	205.2	113.9	77.2	5.2	124.7	23.7
State of California									
CALTRANS via San Diego MS4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CALTRANS via Riverside MS4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CALTRANS, outside county MS4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total State	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Federal									
Camp Pendleton MS4	66.5	5.4	36.1	59.3	19.3	0.0	0.0	0.0	0.0
Other Federal, via Riverside MS4	11.6	7.3	15.5	0.0	2.4	0.6	0.3	0.0	0.4
Total Federal	78.1	12.8	51.7	59.3	21.7	0.6	0.3	0.0	0.4

At-Source and Delivered MS4 Loads for WY 2008 (DRAFT)

Table 11 continued

Land Use Category	Dairy, livestock	Horse ranches	Forest	Chaparral, scrub	Grassland, herbaceous	Transitional	CALTRANS	Orchard, vineyard *	Nurseries *	Total
San Diego County										
San Diego Co MS4	0.0	0.0	0.0	22.0	0.0	0.0	0.0	28.9	32.6	136.4
Total San Diego County	0.0	0.0	0.0	22.0	0.0	0.0	0.0	28.9	32.6	136.4
Riverside County										
City of Wildomar	0.0	11.2	0.0	45.1	12.9	13.5	0.0	11.5	0.0	292.5
City of Murrieta	0.0	20.4	0.7	39.1	11.6	47.1	0.1	70.0	0.0	1,007.4
City of Temecula	0.0	14.4	2.3	12.5	16.9	77.8	0.1	5.8	0.0	1,405.5
Other Unincorporated Riverside Co	0.0	135.7	2.6	100.4	32.5	54.2	0.1	302.1	0.0	1,351.3
Total Riverside County	0.0	181.7	5.5	197.2	73.8	192.6	0.4	389.3	0.0	4,056.6
State of California										
CALTRANS via San Diego MS4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CALTRANS via Riverside MS4	0.0	0.0	0.0	0.0	0.0	0.0	39.1	0.0	0.0	39.1
CALTRANS, outside county MS4	0.0	0.0	0.0	0.0	0.0	0.0	131.9	0.0	0.0	131.9
Total State	0.0	0.0	0.0	0.0	0.0	0.0	171.0	0.0	0.0	171.0
Federal										
Camp Pendleton MS4	0.0	0.0	0.1	13.3	0.7	0.3	0.0	0.0	0.0	201.2
Other Federal, via Riverside MS4	0.0	0.0	0.6	7.4	1.7	0.0	0.0	0.0	0.0	47.9
Total Federal	0.0	0.0	0.7	20.7	2.4	0.3	0.0	0.0	0.0	249.1

Note: The previous model aggregated orchards, vineyards, and nurseries into a single land use class and the updated model separates nurseries. Orchard, vineyard, and nursery loads tabulated from the previous model (e.g. Riverside County MS4 loads) are included in the orchard and vineyard class.

At-Source and Delivered MS4 Loads for WY 2008 (DRAFT)

Table 12. Total Nitrogen Loads (lb/year) Delivered to the Estuary for Dry Weather (Summer) by MS4 and Land Use in the Santa Margarita Watershed (WY 2008)

Land Use Category	Low density residential	High density residential	Commercial and institutional	Industrial	Road, freeway	Parks and recreation	Open and recreation	Irrigated agriculture	Non-irrigated agriculture
San Diego County									
San Diego Co MS4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
Total San Diego County	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
Riverside County									
City of Wildomar	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
City of Murrieta	0.7	1.9	0.4	0.4	0.1	0.1	0.0	0.0	0.0
City of Temecula	6.6	7.4	2.5	1.8	0.5	0.3	0.0	0.0	0.0
Other Unincorporated Riverside Co	1.5	2.3	0.6	0.2	0.2	0.2	0.0	0.1	0.1
Total Riverside County	8.9	11.7	3.5	2.3	0.8	0.6	0.0	0.1	0.1
State of California									
CALTRANS via San Diego MS4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CALTRANS via Riverside MS4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CALTRANS, outside county MS4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total State	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Federal									
Camp Pendleton MS4	8.9	0.7	2.7	0.5	1.3	0.0	0.0	0.0	0.0
Other Federal, via Riverside MS4	0.2	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0
Total Federal	9.1	0.9	2.9	0.5	1.3	0.0	0.0	0.0	0.0

At-Source and Delivered MS4 Loads for WY 2008 (DRAFT)

Table 12 continued

Land Use Category	Dairy, livestock	Horse ranches	Forest	Chaparral, scrub	Grassland, herbaceous	Transitional	CALTRANS	Orchard, vineyard *	Nurseries *	Total
San Diego County										
San Diego Co MS4	0.0	0.0	0.0	0.1	0.0	0.0	0.0	1.8	4.4	6.6
Total San Diego County	0.0	0.0	0.0	0.1	0.0	0.0	0.0	1.8	4.4	6.6
Riverside County										
City of Wildomar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
City of Murrieta	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	4.0
City of Temecula	0.0	0.1	0.0	0.2	0.2	0.7	0.0	0.0	0.0	20.5
Other Unincorporated Riverside Co	0.0	0.4	0.0	0.5	0.2	0.3	0.0	0.1	0.0	6.6
Total Riverside County	0.0	0.6	0.1	0.8	0.5	1.2	0.0	0.2	0.0	31.4
State of California										
CALTRANS via San Diego MS4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CALTRANS via Riverside MS4	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.3
CALTRANS, outside county MS4	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.0	0.0	2.5
Total State	0.0	0.0	0.0	0.0	0.0	0.0	2.8	0.0	0.0	2.8
Federal										
Camp Pendleton MS4	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	15.1
Other Federal, via Riverside MS4	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.8
Total Federal	0.0	0.0	0.0	1.1	0.1	0.0	0.0	0.0	0.0	15.9

Note: The previous model aggregated orchards, vineyards, and nurseries into a single land use class and the updated model separates nurseries. Orchard, vineyard, and nursery loads tabulated from the previous model (e.g. Riverside County MS4 loads) are included in the orchard and vineyard class.

At-Source and Delivered MS4 Loads for WY 2008 (DRAFT)

Table 13. At-Source Total Phosphorus Loads (lb/year) for Dry Weather (Full Year) by MS4 and Land Use in the Santa Margarita Watershed (WY 2008)

Land Use Category	Low density residential	High density residential	Commercial and institutional	Industrial	Road, freeway	Parks and recreation	Open and recreation	Irrigated agriculture	Non-irrigated agriculture
San Diego County									
San Diego Co MS4	3.8	0.0	0.2	0.3	0.9	0.0	0.0	0.8	0.0
Total San Diego County	3.8	0.0	0.2	0.3	0.9	0.0	0.0	0.8	0.0
Riverside County									
City of Wildomar	43.1	23.7	2.2	0.5	5.2	0.0	0.0	0.6	1.5
City of Murrieta	44.9	121.0	24.5	11.2	8.3	6.3	0.4	6.6	1.0
City of Temecula	107.1	180.0	53.3	28.3	12.7	8.7	0.9	8.0	1.2
Other Unincorporated Riverside Co	94.0	86.0	16.6	9.2	10.8	7.8	0.2	33.3	5.5
Total Riverside County	289.2	410.6	96.6	49.2	37.1	22.8	1.4	48.5	9.3
State of California									
CALTRANS via San Diego MS4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CALTRANS via Riverside MS4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CALTRANS, outside county MS4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total State	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Federal									
Camp Pendleton MS4	13.5	1.0	7.6	22.6	7.2	0.0	0.0	0.0	0.0
Other Federal, via Riverside MS4	2.7	1.5	3.5	0.0	0.6	0.2	0.1	0.0	0.1
Total Federal	16.2	2.4	11.1	22.6	7.9	0.2	0.1	0.0	0.1

At-Source and Delivered MS4 Loads for WY 2008 (DRAFT)

Table 13 continued

Land Use Category	Dairy, livestock	Horse ranches	Forest	Chaparral, scrub	Grassland, herbaceous	Transitional	CALTRANS	Orchard, vineyard *	Nurseries *	Total
San Diego County										
San Diego Co MS4	0.0	0.0	0.0	2.2	0.0	0.0	0.0	2.0	7.4	17.7
Total San Diego County	0.0	0.0	0.0	2.2	0.0	0.0	0.0	2.0	7.4	17.7
Riverside County										
City of Wildomar	0.0	4.1	0.0	23.8	6.9	4.9	0.0	3.9	0.0	120.5
City of Murrieta	0.0	6.8	0.4	16.8	4.5	11.6	0.0	16.4	0.0	280.6
City of Temecula	0.0	3.1	1.0	9.2	6.9	20.4	0.1	1.4	0.0	442.2
Other Unincorporated Riverside Co	0.0	60.3	1.3	55.6	19.3	18.0	0.0	158.0	0.0	576.0
Total Riverside County	0.0	74.3	2.7	105.3	37.6	54.9	0.1	179.8	0.0	1,419.3
State of California										
CALTRANS via San Diego MS4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CALTRANS via Riverside MS4	0.0	0.0	0.0	0.0	0.0	0.0	11.6	0.0	0.0	11.6
CALTRANS, outside county MS4	0.0	0.0	0.0	0.0	0.0	0.0	34.5	0.0	0.0	34.5
Total State	0.0	0.0	0.0	0.0	0.0	0.0	46.1	0.0	0.0	46.1
Federal										
Camp Pendleton MS4	0.0	0.0	0.0	4.3	0.1	0.1	0.0	0.0	0.0	56.5
Other Federal, via Riverside MS4	0.0	0.0	0.2	3.5	0.8	0.0	0.0	0.0	0.0	13.1
Total Federal	0.0	0.0	0.2	7.7	0.9	0.1	0.0	0.0	0.0	69.6

Note: The previous model aggregated orchards, vineyards, and nurseries into a single land use class and the updated model separates nurseries. Orchard, vineyard, and nursery loads tabulated from the previous model (e.g. Riverside County MS4 loads) are included in the orchard and vineyard class.

At-Source and Delivered MS4 Loads for WY 2008 (DRAFT)

Table 14. At-Source Total Phosphorus Loads (lb/year) for Dry Weather (Summer) by MS4 and Land Use in the Santa Margarita Watershed (WY 2008)

Land Use Category	Low density residential	High density residential	Commercial and institutional	Industrial	Road, freeway	Parks and recreation	Open and recreation	Irrigated agriculture	Non-irrigated agriculture
San Diego County									
San Diego Co MS4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0
Total San Diego County	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0
Riverside County									
City of Wildomar	5.0	3.1	0.3	0.1	0.5	0.0	0.0	0.0	0.1
City of Murrieta	5.3	14.8	2.7	1.2	0.8	0.7	0.1	0.1	0.1
City of Temecula	12.5	21.4	5.8	3.0	1.2	0.9	0.1	0.2	0.1
Other Unincorporated Riverside Co	13.2	11.0	1.9	1.2	1.2	0.7	0.0	0.9	0.5
Total Riverside County	36.0	50.3	10.7	5.4	3.7	2.4	0.1	1.2	0.7
State of California									
CALTRANS via San Diego MS4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CALTRANS via Riverside MS4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CALTRANS, outside county MS4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total State	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Federal									
Camp Pendleton MS4	2.1	0.1	0.5	1.7	0.7	0.0	0.0	0.0	0.0
Other Federal, via Riverside MS4	0.4	0.2	0.4	0.0	0.1	0.0	0.0	0.0	0.0
Total Federal	2.4	0.3	0.9	1.7	0.7	0.0	0.0	0.0	0.0

At-Source and Delivered MS4 Loads for WY 2008 (DRAFT)

Table 14 continued

Land Use Category	Dairy, livestock	Horse ranches	Forest	Chaparral, scrub	Grassland, herbaceous	Transitional	CALTRANS	Orchard, vineyard *	Nurseries *	Total
San Diego County										
San Diego Co MS4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	4.1	5.2
Total San Diego County	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	4.1	5.2
Riverside County										
City of Wildomar	0.0	0.2	0.0	1.5	0.7	0.5	0.0	0.0	0.0	11.9
City of Murrieta	0.0	0.5	0.0	1.2	0.4	0.9	0.0	0.1	0.0	29.0
City of Temecula	0.0	0.2	0.1	1.2	0.7	1.9	0.0	0.0	0.0	49.3
Other Unincorporated Riverside Co	0.0	4.5	0.2	5.5	2.1	1.9	0.0	1.4	0.0	46.2
Total Riverside County	0.0	5.4	0.3	9.4	3.8	5.2	0.0	1.5	0.0	136.3
State of California										
CALTRANS via San Diego MS4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CALTRANS via Riverside MS4	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	1.3
CALTRANS, outside county MS4	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.0	0.0	2.5
Total State	0.0	0.0	0.0	0.0	0.0	0.0	3.8	0.0	0.0	3.8
Federal										
Camp Pendleton MS4	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	5.8
Other Federal, via Riverside MS4	0.0	0.0	0.0	0.4	0.1	0.0	0.0	0.0	0.0	1.5
Total Federal	0.0	0.0	0.0	1.1	0.1	0.0	0.0	0.0	0.0	7.3

Note: The previous model aggregated orchards, vineyards, and nurseries into a single land use class and the updated model separates nurseries. Orchard, vineyard, and nursery loads tabulated from the previous model (e.g. Riverside County MS4 loads) are included in the orchard and vineyard class.

At-Source and Delivered MS4 Loads for WY 2008 (DRAFT)

Table 15. Total Phosphorus Loads (lb/year) Delivered to the Estuary for Dry Weather (Full Year) by MS4 and Land Use in the Santa Margarita Watershed (WY 2008)

Land Use Category	Low density residential	High density residential	Commercial and institutional	Industrial	Road, freeway	Parks and recreation	Open and recreation	Irrigated agriculture	Non-irrigated agriculture
San Diego County									
San Diego Co MS4	3.1	0.0	0.2	0.2	0.8	0.0	0.0	0.4	0.0
Total San Diego County	3.1	0.0	0.2	0.2	0.8	0.0	0.0	0.4	0.0
Riverside County									
City of Wildomar	28.6	15.4	1.4	0.3	3.5	0.0	0.0	0.4	1.1
City of Murrieta	31.0	83.1	17.2	8.0	5.9	4.2	0.2	5.1	0.7
City of Temecula	55.5	74.2	24.6	17.4	5.7	3.3	0.5	5.6	0.7
Other Unincorporated Riverside Co	52.8	50.0	10.5	5.1	6.0	5.5	0.1	22.8	3.7
Total Riverside County	167.9	222.7	53.7	30.7	21.2	13.0	0.9	34.0	6.3
State of California									
CALTRANS via San Diego MS4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CALTRANS via Riverside MS4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CALTRANS, outside county MS4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total State	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Federal									
Camp Pendleton MS4	6.4	0.7	5.7	14.2	4.5	0.0	0.0	0.0	0.0
Other Federal, via Riverside MS4	1.6	1.0	2.1	0.0	0.4	0.1	0.0	0.0	0.1
Total Federal	8.0	1.8	7.9	14.2	4.9	0.1	0.0	0.0	0.1

At-Source and Delivered MS4 Loads for WY 2008 (DRAFT)

Table 15 continued

Land Use Category	Dairy, livestock	Horse ranches	Forest	Chaparral, scrub	Grassland, herbaceous	Transitional	CALTRANS	Orchard, vineyard *	Nurseries *	Total
San Diego County										
San Diego Co MS4	0.0	0.0	0.0	1.8	0.0	0.0	0.0	1.1	2.9	10.5
Total San Diego County	0.0	0.0	0.0	1.8	0.0	0.0	0.0	1.1	2.9	10.5
Riverside County										
City of Wildomar	0.0	2.9	0.0	16.9	4.7	3.3	0.0	2.9	0.0	81.5
City of Murrieta	0.0	4.7	0.2	12.2	3.3	8.5	0.0	12.9	0.0	197.4
City of Temecula	0.0	2.0	0.5	3.3	3.6	12.1	0.0	0.8	0.0	209.7
Other Unincorporated Riverside Co	0.0	40.3	0.8	34.8	11.1	11.3	0.0	71.2	0.0	326.1
Total Riverside County	0.0	50.0	1.5	67.1	22.7	35.2	0.1	87.8	0.0	814.7
State of California										
CALTRANS via San Diego MS4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CALTRANS via Riverside MS4	0.0	0.0	0.0	0.0	0.0	0.0	7.1	0.0	0.0	7.1
CALTRANS, outside county MS4	0.0	0.0	0.0	0.0	0.0	0.0	25.5	0.0	0.0	25.5
Total State	0.0	0.0	0.0	0.0	0.0	0.0	32.7	0.0	0.0	32.7
Federal										
Camp Pendleton MS4	0.0	0.0	0.0	1.2	0.1	0.1	0.0	0.0	0.0	33.0
Other Federal, via Riverside MS4	0.0	0.0	0.1	2.2	0.5	0.0	0.0	0.0	0.0	8.1
Total Federal	0.0	0.0	0.1	3.4	0.6	0.1	0.0	0.0	0.0	41.1

Note: The previous model aggregated orchards, vineyards, and nurseries into a single land use class and the updated model separates nurseries. Orchard, vineyard, and nursery loads tabulated from the previous model (e.g. Riverside County MS4 loads) are included in the orchard and vineyard class.

At-Source and Delivered MS4 Loads for WY 2008 (DRAFT)

Table 16. Total Phosphorus Loads (lb/year) Delivered to the Estuary for Dry Weather (Summer) by MS4 and Land Use in the Santa Margarita Watershed (WY 2008)

Land Use Category	Low density residential	High density residential	Commercial and institutional	Industrial	Road, freeway	Parks and recreation	Open and recreation	Irrigated agriculture	Non-irrigated agriculture
San Diego County									
San Diego Co MS4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total San Diego County	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Riverside County									
City of Wildomar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
City of Murrieta	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
City of Temecula	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Other Unincorporated Riverside Co	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Riverside County	0.2	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0
State of California									
CALTRANS via San Diego MS4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CALTRANS via Riverside MS4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CALTRANS, outside county MS4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total State	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Federal									
Camp Pendleton MS4	0.5	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0
Other Federal, via Riverside MS4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Federal	0.5	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0

At-Source and Delivered MS4 Loads for WY 2008 (DRAFT)

Table 16 continued

Land Use Category	Dairy, livestock	Horse ranches	Forest	Chaparral, scrub	Grassland, herbaceous	Transitional	CALTRANS	Orchard, vineyard *	Nurseries *	Total
San Diego County										
San Diego Co MS4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Total San Diego County	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Riverside County										
City of Wildomar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
City of Murrieta	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
City of Temecula	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5
Other Unincorporated Riverside Co	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Total Riverside County	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8
State of California										
CALTRANS via San Diego MS4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CALTRANS via Riverside MS4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CALTRANS, outside county MS4	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1
Total State	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1
Federal										
Camp Pendleton MS4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8
Other Federal, via Riverside MS4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Federal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9

Note: The previous model aggregated orchards, vineyards, and nurseries into a single land use class and the updated model separates nurseries. Orchard, vineyard, and nursery loads tabulated from the previous model (e.g. Riverside County MS4 loads) are included in the orchard and vineyard class.

References

- Tetra Tech. 2013. Santa Margarita River Watershed, Phase I – Hydrology Update and Re-calibration Memorandum. Prepared for U.S. Environmental Protection Agency, Region IX by Tetra Tech, Inc., San Diego, CA.
- Tetra Tech. 2014. Santa Margarita River Watershed, Phase II – Sediment and Nutrient Calibration Memorandum. Prepared for U.S. Environmental Protection Agency, Region IX by Tetra Tech, Inc., San Diego, CA.
- Tetra Tech. 2017. SMR Estuary MS4 Nutrient Loads for WY 2008. Prepared for San Diego County, San Diego, CA, by Tetra Tech, Inc., Research Triangle Park, NC.
- Tetra Tech. 2017. Santa Margarita River Watershed Model – San Diego County Update (DRAFT). Prepared for the County of San Diego Watershed Planning Program, San Diego, CA, by Tetra Tech., Inc., Research Triangle Park, NC.
- Sutula, M., J. Butcher, C. Boschen, and M. Molina. 2016. Application of Watershed Loading and Estuary Water Quality Models to Inform Nutrient Management in the Santa Margarita River Watershed. Technical Report 933. Southern California Coastal Water Research Project, Costa Mesa, CA.
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