Ventura Countywide Stormwater Quality Management Program

2014-2015 Permit Year

Ventura Countywide Stormwater Quality Management Program Annual Report

Attachment E17 Algae, Eutrophic Conditions, and Nutrients in the Ventura River and its Tributaries TMDL DRAFT Implementation Plan

Camarillo
County of Ventura
Fillmore
Moorpark
Ojai
Oxnard
Port Hueneme
Santa Paula
Simi Valley
Thousand Oaks
Ventura
Ventura County Watershed Protection District

December 14, 2015

June 27, 2015

COUNTY OF VENTURA, VENTURA COUNTY WATERSHED PROTECTION DISTRICT, CITY OF OJAI, CITY OF VENTURA, CALTRANS

Total Maximum Daily Load for Algae, Eutrophic Conditions, and Nutrients in the Ventura River and its Tributaries

DRAFT Implementation Plan

prepared by
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DRAFT Implementation Plan for Ventura River Watershed Algae TMDL
June 27, 2015

Executive Summary

The Total Maximum Daily Load for Algae, Eutrophic Conditions, and Nutrients in the Ventura River and its Tributaries (Algae TMDL) was adopted by the Los Angeles Regional Water Quality Control Board on December 6, 2012 (Resolution No. R12-011). The TMDL established numeric targets for algal-biomass (various parameters), pH and dissolved oxygen (DO) in receiving waters. Dry weather and wet weather waste load allocations (WLAs) were assigned to(5 mg/L nitrate+nitrite-N) (5 mg/L nitrate+nitrite-N) the County of Ventura, Ventura County Watershed Protection District, City of Ojai, City of Ventura, and Caltrans (hereinafter, Parties). The dry weather WLAs are expressed as daily loads of total nitrogen (TN) and total phosphorus (TP). The wet weather WLAs are expressed as concentrations of nitrate+nitrite-N (for discharges to Reach 2 and upstream) or TN (for discharges to the Estuary and Reach 1). No interim allocations were assigned to the Parties for either dry weather or wet weather. Dry weather WLAs become effective on June 27, 2019 (six years after the effective date of the Algae TMDL). Wet weather WLAs apply immediately upon renewal or modification of permits for the Ventura County MS4 and Caltrans. The Ventura County MS4 Permit is expected to be renewed in late 2015. The Algae TMDL was incorporated into the Caltrans general permit (State Board Order 2012-0011-DWQ) in the July 1, 2014 amendment.

The Algae TMDL requires the Parties to submit an Implementation Plan (IP) for achieving compliance with their WLAs by June 27, 2015 (two years after the effective date of the Algae TMDL). The required elements of the IP are described in the TMDL as follows:

> *"Ventura County MS4 permittees and Caltrans shall provide an implementation plan to the Regional Board outlining how they intend to achieve compliance with the WLAs. The report shall include implementation methods and a quantitative analysis of the expected water quality outcomes of the implementation methods, an implementation schedule, proposed interim milestones, and compliance points. The report shall provide reasonable assurance that implementation methods will be sufficient to achieve the WLAs."* (Algae TMDL Implementation Plan narrative, emphasis added)

General Approach

The IP is a compliance plan that includes separate attainment strategies for dry weather and wet weather WLAs. In both cases, an adaptive management strategy is described that bases decisions for action on the evolving quality of receiving waters and urban discharge. Available outfall and receiving water monitoring data collected by the Ventura Countywide Stormwater Quality Management Program (VCSQMP) indicate that the wet weather WLAs are already met in the watershed and that significant progress has occurred in meeting the dry weather WLAs since the TMDL was developed. The adaptive management approach described in the IP acknowledges this condition by requiring implementation of new best management practices (BMPs) only if monitoring data indicate that WLAs are not being met going forward.

The Algae TMDL was developed using numeric models that established and documented a linkage between the WLAs and receiving water quality. The IP provides reasonable assurance that the adaptive management strategy will result in attainment of the WLAs.

Consequently, through a demonstration that the proposed actions by the Parties will attain the WLAs, the IP meets the Algae TMDL requirement of "*a quantitative analysis of the expected water quality outcomes of the implementation methods*."

Dry Weather WLA Attainment Strategy

The dry weather attainment strategy was influenced by available outfall monitoring data from the upper watershed that suggest that substantial progress has already occurred toward meeting the WLAs since the TMDL loads and allocations were developed. The data indicated that (1) urban runoff may have declined as much as 38% from the baseline urban flows used to develop the TMDL allocations, and (2) and estimated nutrient loads in urban runoff are near, or below, the WLAs. Together, the findings supported a technical approach in which BMP choices in the future are justified based on their ability to reduce runoff volumes, with an assumed concomitant reduction in nutrient loads. The technical approach accounted for apparent early progress toward meeting the WLAs and involved the following principal steps:

1. Delineation of jurisdictional areas subject to the WLAs,
2. Computation of TMDL baseline dry weather flows,
3. Computation of target reductions in dry weather flows starting from the baseline,
4. Estimation of post-baseline urban flow reductions (2011-2014),
5. Quantification of additional future targeted flow reductions (post-2014),
6. Description of an adaptive management approach to achieve the additional targeted flow reductions, with priority given to non-structural BMPs.

The adaptive management approach for dry weather is a structure for selecting BMPs through an iterative process to obtain additional load reductions if future compliance monitoring indicates they are needed. The BMP strategy prioritizes dry weather BMPs in the following order:

1. Planned structural BMPs;
2. Low Impact Development (LID) implemented under redevelopment requirements (for MS4 permittees);
3. Non-structural BMPs, and;
4. Distributed structural BMPs if needed.

Load reductions for planned structural BMPs (87 are currently planned for the watershed) were based on treatment areas and BMP characteristics. Load reductions associated with LID were estimated based on land use categories and redevelopment rates. Load reductions for non-structural BMPs were estimated based on literature that assigns effectiveness ratings (based on *participation* and *loading* factors) to programmatic actions such as public education and outreach, inspection and evaluations, enforcement, and incentives. One assumption underlying the BMP strategy is that load reductions from the first two categories in the list above (currently planned structural BMPs and load reductions from LID redevelopment) are expected regardless of WLA compliance status, and that load

reductions from the second two categories (non-structural and distributed structural BMPs) will occur if needed based on demonstrated progress toward meeting the WLAs. Detailed lists of pertinent specific BMPs are included in the IP for non-structural and distributed structural BMPs and are properly viewed as a menu from which dischargers can select future BMPs if the need arises.

Wet Weather WLA Attainment Strategy

The wet weather WLA attainment strategy was influenced by available monitoring data from the watershed that suggest the wet weather WLAs are already met. The evidence includes wet event outfall concentrations of nitrate+nitrite-N that are below the most restrictive WLA in the TMDL (5 mg/L nitrate+nitrite-N) and a fourteen-year record from the VCSQMP mass emission station near the base of the watershed (2001-2014) that shows that receiving water concentrations of TN during wet weather are almost always below all of the wet weather WLAs that apply to discharges from urban outfalls (i.e., concentrations are below WLAs expressed as either TN or nitrate+nitrite-N).

Because wet-weather WLAs are not an anticipated compliance issue for the Parties, the wet weather WLA attainment strategy in the IP does not include a quantification of the nutrient reduction benefits associated with a suite of hypothetical future wet weather BMPs. Instead, appropriate BMPs are listed for the Parties that could address wet weather discharges in the future, if needed, and an adaptive management process is described that identifies triggers for future BMPs based on monitoring data. The list of potential BMPs includes LID incentive programs and distributed structural BMPs. Additionally, the IP recognizes that many of the BMPs that could be implemented to address dry weather discharges (if needed) will also reduce wet weather loads, particularly the planned distributed structural BMPs.

Compliance Points

The Algae TMDL does not specify the number or locations of monitoring sites required to evaluate compliance with the dry- and wet weather WLAs for the Parties. Four outfalls are proposed in the IP as effluent compliance points, one each to represent the discharges of the County of Ventura unincorporated urban infill area, City of Ventura, City of Ojai, and Caltrans. One of the sites (MO-OJA) is an existing monitoring site for the VCSQMP. Outfalls were selected based on several criteria:

- The drainage area is representative of urban land covers in the parties overall jurisdictional subject to the Algae TMDL;
- Property owners are responsible parties in the Algae TMDL and will allow access;
- The required sampling can be conducted safely during dry and wet weather; and
- Outfall characteristics will enable quantitative measurements of flow during dry weather, so that loads can be computed.

A sampling strategy is provided in the IP detailing the minimum parameters needed to evaluate compliance with WLAs and the required minimum sampling frequency for both wet (twice per year) and dry weather (quarterly).

Interim Milestones and Implementation Schedule

Wet weather WLAs in the Algae TMDL apply immediately upon their incorporation in pertinent permits. The Ventura County MS4 Permit is expected to be renewed in late 2015. In all likelihood, the wet weather WLAs will be in effect for MS4 permittees by the time this IP is approved by the Regional Board. The Algae TMDL was incorporated into the Caltrans general permit (State Board Order 2012-0011-DWQ) in the July 1, 2014 amendment. Consequently, interim milestones were not proposed in the IP for the attainment of wet weather WLAs.

Interim limits were not assigned to the Parties for dry weather in the TMDL; the dry weather WLAs are final limits that apply six years after the TMDL effective date (June 27, 2019). However, post baseline monitoring data described above implies that significant progress toward meeting the dry weather WLAs has already occurred. Multi-faceted interim milestones for attainment of the dry weather WLAs are proposed for each year between 2016-2019 that (1) focus on reductions in dry weather flow rates, (2) provide opportunity for confirmation of available post-baseline monitoring results, and (3) allow for prioritization of non-structural BMPs over structural BMPs. The interim milestones incorporate triggers based on monitoring data; additional BMPs are triggered only if monitoring data indicates that incremental progress toward meeting the target reductions in runoff volume is not occurring. The implementation schedule and the interim milestones (Table ES-1) account for the estimated 38% reduction in dry weather flow that may have already occurred in the watershed.

The implementation schedule includes an optional dry weather outfall screening step that would be underway by June 2016. The purpose of the screening exercise would be to identify neighborhoods, sources, or land uses to focus on with BMP implementation. The outfall screening would occur at the discretion of individual dischargers and the goals and methods would be determined by individual dischargers. Jurisdictions that elect to perform the outfall screening would be considered in compliance with the dry weather WLAs at that point in the implementation schedule.

Adaptive Management Process

As introduced in the summaries above, the WLA attainment strategies will be implemented using an adaptive management process that bases decisions for action on the current and evolving quality of receiving waters and urban discharge. On an annual basis, data will be evaluated from the receiving water monitoring program conducted by the TMDL responsible parties and the outfall monitoring established for the compliance points described in the IP. During the implementation period for the dry weather WLAs (through June 27, 2019), compliance during dry weather can be achieved in three ways: (1) attainment of water quality objectives in receiving water, (2) attainment of dry weather WLAs, or (3) achievement of interim milestones.

Wet weather WLAs will already apply during the implementation period for the dry weather WLAs. As explained above, based on historic monitoring data, wet weather WLA exceedances are not expected. Accordingly, decisions regarding wet weather BMPs will not be based on single, sporadic wet weather exceedances that could represent anomalies rather than a watershed issue. Instead, a wet weather WLA will need be exceeded during more than one wet weather monitoring event in a monitoring year to trigger wet weather

BMP planning in the jurisdiction where the exceedance occurred. In addition, if exceedances of a wet weather WLA are observed at one or more outfalls but receiving water concentrations of TN or nitrate+nitrite-N are below the WLA concentrations that apply to outfalls in all the downstream reaches, the monitoring event data will not trigger planning or implementation of wet weather BMPs. After the dry weather WLAs are in effect (after June 27, 2019), a similar principal will apply to dry event outfall monitoring data; the dry weather WLAs must be exceeded during more than one of the quarterly dry events during a monitoring year to trigger evaluation of additional dry weather BMPs in the pertinent jurisdiction.

When the adaptive management process triggers implementation of new BMPs, non-structural BMPs will be prioritized to address sources through public education and outreach, inspections and evaluations, enforcement, or some form of incentive. If non-structural programs do not effectively address sources identified by inspection and evaluation or enforcement programs, additional structural BMPs will be planned. If the dry weather WLAs and receiving water targets are not met by June 27, 2019, more time might be needed to implement structural BMPs. In this case, a Time Schedule Order or TMDL modification might be needed to allow for implementation of structural BMPs.

Table ES-1. Implementation Schedule and Interim Milestones for Dry Weather WLAs

Date	Milestones
June 2015	Implementation Plan is Submitted June 27, 2015
June 2016	• Monitoring confirms ≥38% flow reduction compared to baseline; **OR** • Optional outfall screening has commenced; **OR** • Planning for new non-structural BMPs has commenced. Enhanced outdoor water conservation measures by other agencies satisfy this interim milestone.
June 2017	• Results of outfall screening (if performed) have been used to prioritize neighborhoods for BMP implementation and targeted BMP planning has commenced; **OR** • Dry weather runoff volumes have been reduced by ≥40% compared to baseline; **OR** • Implementation of new non-structural BMPs has commenced in pertinent jurisdictions.
June 2018	• Dry weather runoff volumes have been reduced by ≥45% compared to baseline; **OR** • Additional BMPs are being implemented
June 27, 2019	• Dry weather WLAs have been attained. (Dry weather TN and TP loads have been reduced 50% compared to the baseline.)

DRAFT Implementation Plan for the Ventura River Watershed Algae TMDL
June 27, 2015

Introduction and Background

The Ventura River Estuary and the Ventura River (including its tributaries), located in Ventura County, are identified on the 1998, 2002, 2006, and 2010 Clean Water Act (CWA) Section 303(d) lists of impaired water bodies due to algae, eutrophic conditions, low dissolved oxygen, and nitrogen (Table 1).

Table 1. CWA Section 303(d) List of Impairments in the Ventura River and its Tributaries

Waterbody Name	Pollutants
Ventura River Estuary	Algae, eutrophic
Ventura River Reach 1 and 2 (Estuary to Weldon Canyon)	Algae
San Antonio Creek	Nitrogen
Cañada Larga	Low Dissolved Oxygen

The Los Angeles Regional Water Quality Control Board (Regional Board) adopted the Total Maximum Daily Load for Algae, Eutrophic Conditions, and Nutrients in the Ventura River and its Tributaries (Algae TMDL) on December 6, 2012 (Resolution No. R12-011). The TMDL became effective on June 28, 2013. The TMDL established numeric targets for several algal-biomass-related parameters and for pH and dissolved oxygen (DO) in receiving waters (Table 2). The algal-biomass-related parameters apply during the critical algal growth season, May 1-September 30. The pH and DO targets apply year round. Progress toward attainment of numeric targets will be assessed through a receiving water monitoring program that was described in a monitoring plan submitted to the Regional Board on June 27, 2014 (VCWPD 2014).

Table 2. Numeric Targets Assigned in the Algae TMDL

Indicator	Numeric Target	Water Body
Total Algal Biomass	150 mg/m2 chlorophyll a as seasonal average	Ventura River and Tributaries
Macroalgal Cover (attached and unattached)	≤ 30 percent as seasonal average	Ventura River and Tributaries
Phytoplankton Biomass	20 µg/L chlorophyll a as seasonal average	Estuary (shallow subtidal area)
Macroalgal Cover	≤ 15 percent as seasonal average	Estuary (intertidal and shallow subtidal area)
Dissolved Oxygen	≥ 7 mg/L as a daily minimum	Ventura River, Tributaries and Estuary
pH	6.5 – 8.5 (instantaneous value)	Ventura River, Tributaries and Estuary
Biomass and percent cover indicator targets apply during the dry season when algae growth primarily occurs. The seasonal averaging period for algal biomass and percent cover is the dry season of May 1 – September 30.		

In the TMDL, separate dry weather and wet weather waste load allocations (WLAs) were assigned to the "Ventura County MS4 Permittees" (County of Ventura, Ventura County Watershed Protection District (VCWPD), City of Ojai, City of Ventura) and Caltrans. For simplicity, the Ventura County MS4 Permittees and Caltrans are referred to collectively as "the Parties", where appropriate, in this document. The dry weather WLAs for the Parties are in the form of daily loads of total nitrogen (TN) and total phosphorus (TP). They apply during dry weather year-round, although exceedances of the WLAs that may be observed during dry weather outfall monitoring events apply only to the day of sampling. The dry weather WLAs were designed to achieve a 50% reduction in nutrient loading, starting with an estimated baseline load (LARWQCB 2012). The wet weather WLAs are in the form of concentrations of nitrate+nitrite-N (for discharges to Reach 2 and upstream) or TN (for discharges to the Estuary and Reach 1). No interim allocations were assigned to the Parties for either dry weather or wet weather. Wet weather WLAs apply immediately upon renewal or modification of permits for the Ventura County MS4 and Caltrans. The Ventura County MS4 Permit is expected to be renewed in late 2015. The Algae TMDL was incorporated into the Caltrans general permit (State Board Order 2012-0011-DWQ) in the July 1, 2014 amendment. More detail about the WLAs is provided in the WLA attainment strategies described in this document.

The Algae TMDL requires the Parties to submit an Implementation Plan (IP) for achieving compliance with their WLAs by June 27, 2015 (two years after the effective date of the Algae TMDL). The required elements of the IP are described in two places in the TMDL, as follows:

> *"Ventura County MS4 permittees and Caltrans shall provide an implementation plan to the Regional Board outlining how they intend to achieve compliance with the WLAs. The report shall include implementation methods and a quantitative analysis of the expected water quality outcomes of the implementation methods, an implementation schedule, proposed interim milestones, and compliance points. The report shall provide reasonable assurance that implementation methods will be sufficient to achieve the WLAs."* (Implementation Plan narrative)
>
> *"Submit implementation plan to achieve compliance with the WLAs. The plan shall include implementation methods, an implementation schedule, proposed interim milestones, and compliance points."* (Implementation Schedule)

To meet these requirements the IP is structured as follows:

- Watershed Description
- IP Implementation Planning Area
- Dry Weather WLA Attainment Strategy
    - Target Reductions in Dry Weather Flow
        - Baseline Dry Weather Urban Flow Rates
        - Estimated Target Reductions in Dry Weather Urban Flow
    - Dry Weather BMP Strategy

        - Existing Structural BMPs
        - Planned Structural BMPs
        - Low Impact Development (LID) Redevelopment
        - Non-structural BMPs
        - Future Distributed Structural BMPs
        - Factors Contributing to Decisions about Future BMPs
        - Summary of Dry Weather BMP Evaluation
- Wet Weather WLA Attainment Strategy
    - Wet Weather BMP Strategy
        - LID Incentives
        - Future Distributed Structural BMPs
- Compliance Points
- Interim Milestones and Implementation Schedule
- Adaptive Management Process

Owing to differences in the land covers in their jurisdictions, permit structure and requirements, authorities, and available methods of stormwater management, the WLA attainment strategies and categories of pertinent BMPs described for the County of Ventura, City of Ojai, and City of Ventura as a group differ in certain respects from those of Caltrans or the VCWPD, and are distinguished accordingly where appropriate in the IP.

The approach used to develop the WLA attainment strategies in the IP relies on existing water quality data and previous modeling used by Regional Board staff to develop the loads and allocations in the Algae TMDL. The Algae TMDL was developed using flows from a calibrated HSPF model for the watershed as input in a QUAL2K model that calculated the estimated load reductions of total nitrogen and total phosphorus necessary to achieve the numeric targets for algal biomass, pH and DO in the receiving water. This modeling established and documented a linkage between the WLAs and receiving water quality. Consequently, through a demonstration that that proposed actions by the Parties will attain the WLAs, the IP meets the Algae TMDL requirement of "a quantitative analysis of the expected water quality outcomes of the implementation methods."

Watershed Description

The Ventura River Watershed (Figure 1) is located in the northwestern portion of Ventura County with a small portion in the southeastern Santa Barbara County. The watershed drains a fan-shaped area of about 220 square miles ranging in elevation from 6,000 feet to sea level. The Ventura River has several major tributaries, including Matilija Creek, North Fork Matilija Creek, San Antonio Creek, Coyote Creek and Cañada Larga. Approximately eighty-five percent of the watershed is classified as open space and approximately one half of the watershed lies within the Los Padres National Forest.

Agricultural land use occupies about 4.5 percent of the watershed area (LARWQCB 2012). Urban areas in the watershed include the cities of Ojai and Ventura, and the communities of Casitas Springs, Foster Park, Oak View, Valley Vista, Mira Monte, Meiners Oaks, Upper Ojai and Live Oak Acres within unincorporated areas of the County of Ventura. High density and low density residential land uses account for 1.9 and 2.9 percent of the watershed area, respectively. Oil production and mining are the predominant industrial land uses and account for 2.1 percent of the watershed area (LARWQCB 2012). The remaining land uses (public facilities, recreation, commercial, education institutions, horse ranch/livestock, transportation, and mixed urban) each account for less than 1 percent of the land use within the watershed. Three state highways (Highways 101, 33, and 150) traverse the watershed.

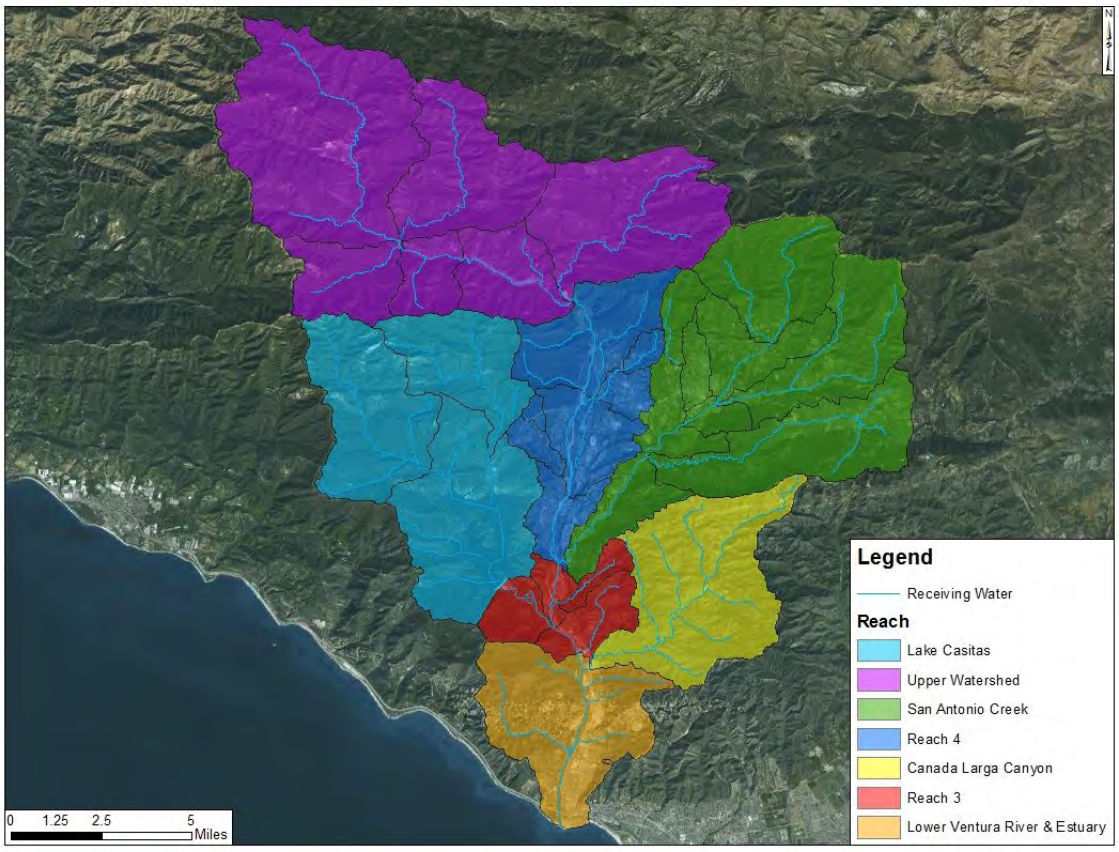

Figure 1. Ventura River Watershed

Implementation Planning Area

Several sources of information were used to delineate the jurisdictional areas to which the WLAs for the Parties apply. Spatial data sources included the Southern California Association of Governments (SCAG) 2005 land use database, the County of Ventura Assessors Parcel database (downloaded December 2014), aerial imagery (Google Earth), VCWPD parcels, (shapefile provided by the County of Ventura), County of Ventura

unincorporated infill areas (shapefile provided by County of Ventura), Caltrans jurisdictional area in the lower watershed (shapefile provided by Caltrans), hydrologic units in the Ventura River watershed, and city boundaries. In addition, limited ground truthing was performed to verify the locations of industrial facilities that are covered by the Industrial General Permit (IGP). The delineation process involved the following steps:

Step 1. The catchment of Lake Casitas and the undeveloped watershed above Reach 4 ("Upper Watershed" in Figure 1) were omitted.[1]

Step 2. Non-urban SCAG 2005 land use classes were categorically excluded within the Cities of Ojai and Ventura. They included the following land uses:

Abandoned Orchards and Vineyards

Beach Parks

Dairy, Intensive Livestock

Horse Ranches

Improved Flood Waterways

Irrigated Cropland and Improved Pasture Land

Mineral Extraction - Oil and Gas

Mineral Extraction - Other Than Oil and Gas

Natural Gas and Petroleum Facilities

Non-irrigated Cropland and Improved Pasture Land

Other Agriculture

Other Open Space and Recreation

Packing Houses and Grain Elevators

Petroleum Refining and Processing

Vacant Undifferentiated

Vacant with Limited Improvements

Water Storage Facilities

Water Transfer Facilities

Water, Undifferentiated

Wildlife Preserves and Sanctuaries

Step 3. Acreage occupied by the facilities of most of the IGP permittees in the watershed was excluded. Some of the IGP-associated acreage was removed in Step 2 by the

[1] Urban land covers in the catchment of Lake Casitas do not drain to the Ventura River. The subwatersheds above Reach 4 (drainages of Matilija Creek and north Fork Matilija Creek) have negligible residences and the majority of the land area lies within the Los Padres National Forest.

omission of mineral extraction land uses identified the SCAG dataset. The IGP permittees whose facilities were individually located and excluded were as follows:

Site/Facility Name	Site/Facility Address
Holliday Rock Ventura	5438 N Ventura Ave
Ventura Rental Center Inc.	320 W Stanley Avenue
Trinity Steel Corporation	184 Rocklite Road
Coordinated Wire Rope of Ventura Inc.	300 W Stanley Ave
Production Tool Specialties	4285 Crooked Palm Rd
Key Energy Services	3587 N Ventura Blvd
Mosler Rock Ojai Quarry	1555 Highway 33
Interstate Rebar Inc.	2457 N Ventura Ave Unit L
Berry General Eng Contractors Inc.	350 W Lewis St
Certex USA Inc.	1621 Ventura Ave
Wl Rubottom Co Inc.	320 W Lewis St
R & R Pumping Unit Repair & Service	2457 N Ventura Ave
Weatherford Oil Country Manufa	250 W Stanley Ave
Vista Steel	331 W Lewis St
Ecology Control Industries	2055 N Ventura Ave
Dairy Farmers America	4375 Ventura Ave.
Ost Trucking	2951 N Ventura Ave
Offshore Crane & Service Co	1375 N Olive St
Tri County Motorcycle Salvage	2220 N Ventura Ave
Nabors Completion & Production	2567 N Ventura Ave

Step 4. Some areas not excluded by Steps 1-3 were excluded on a case-by-case basis in the lower watershed, such as the following land areas:

- State-owned fairgrounds
- Seaside Park condos[2]
- Ojai Valley WWTP
- Abandoned oil refinery
- Major electric transmission line rights-of-way

[2] Although these buildings are in the Ventura River watershed polygon, the stormdrains in this area drain directly to the ocean.

- Some regional and local parks classified as "developed" in the SCAG dataset, but lacking structures or parking lots

Step 5. Buildings and grounds of public school districts were identified and omitted for the Cities of Ventura and Ojai.

Step 6. Caltrans jurisdiction in the Reach 3, Reach 4, and San Antonio Creek subwatersheds was completed by aggregating the road surfaces of Hwys 150 and 33.

Step 7. Shapefiles provided by the dischargers for VCWPD properties; the unincorporated County of Ventura urban infill areas; and Caltrans roadways, rights-of-way (lower watershed only), and maintenance yards were reconciled and used to delineate the IP-pertinent jurisdictional areas for the VCWPD, County of Ventura, and Caltrans.

The jurisdictional areas subject to the WLAs in the Algae TMDL are summarized in Table 3 and illustrated in Figure 2.

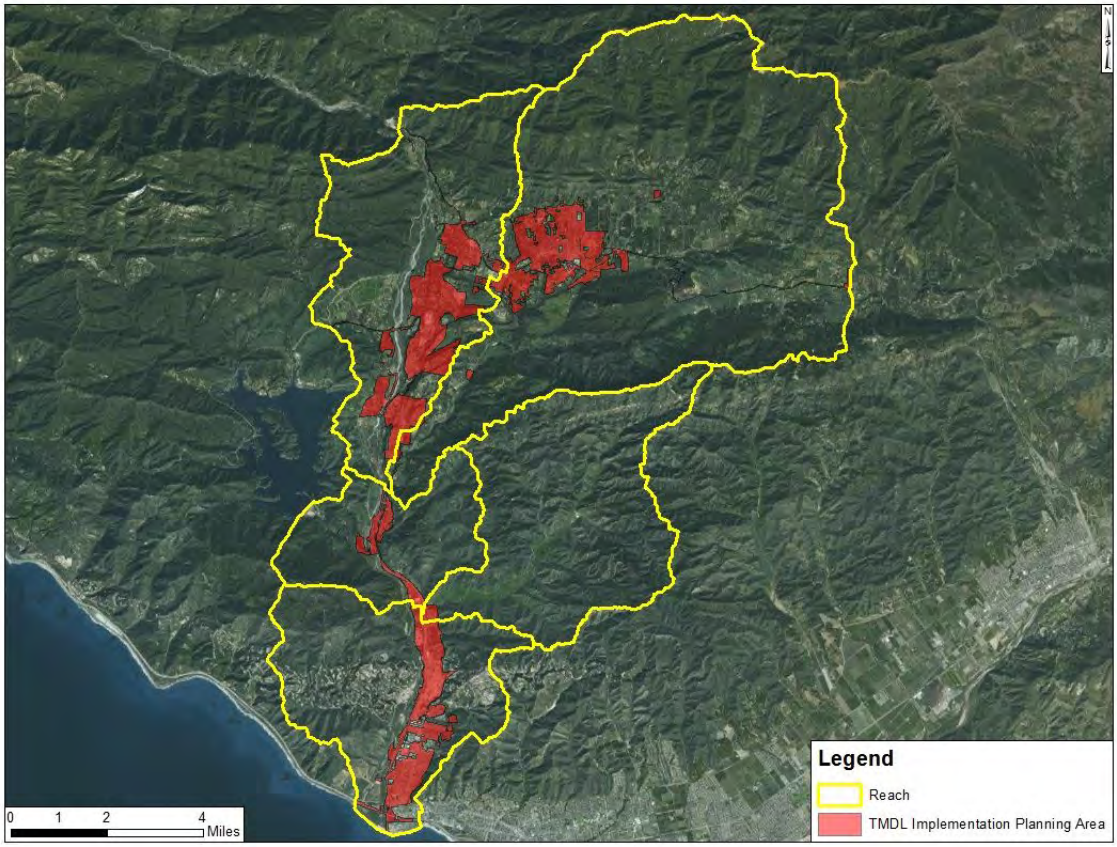

Figure 2. Ventura River Algae TMDL Implementation Planning Area

Table 3. Jurisdictional Acreage Applicable to WLAs in the Algae TMDL

Jurisdiction	Subwatershed	Jurisdictional Area (Acres)	Percent of Combined Total Jurisdictional Acres in Watershed
County of Ventura (unincorporated urban infill)	Lower Watershed	564	50%
	Cañada Larga	54	
	Reach 3	269	
	Reach 4	2,198	
	San Antonio Creek	155	
	Total	3,239	
Ventura County Watershed Protection District	Lower Watershed	88	4%
	Reach 3	25	
	Reach 4	49	
	San Antonio Creek	63	
	Total	225	
Caltrans	Lower Watershed	189	8%
	Cañada Larga	14	
	Reach 3	73	
	Reach 4	121	
	San Antonio Creek	91	
	Total	488	
City of Ventura	Lower Watershed	701	11%
	Total	701	
City of Ojai	Reach 4	88	27%
	San Antonio Creek	1,673	
	Total	1,761	
Combined Total in Watershed		6,414	100%

Dry Weather WLA Attainment Strategy

The dry weather WLAs for the Parties are expressed in the Algae TMDL as daily loads of TN and TP. They apply year-round during dry weather.[3] The TMDL provides two options for expressing allocations for evaluating compliance:

[3] The WLAs were designed assuming that there are on average 331 dry days per year in the Ventura River Watershed.

(1) as watershed daily loads (lb/day)

(2) as jurisdiction-specific area-weighted loads (lb/acre/day).

Both expressions of the WLAs are provided in Table 4. No interim allocations were assigned by the TMDL. The dry weather WLAs in Table 4 are final allocations that apply six years after the effective date of the TMDL (i.e., June 27, 2019).

Table 4. Dry Weather Waste Load Allocations

Responsible Party	Dry Weather WLAs			
	Total Nitrogen		Total Phosphorus	
	Watershed Daily Load (lb/day)	Area-Weighted Daily Load (lb/acre/day)	Watershed Daily Load (lb/day)	Area-Weighted Daily Load (lb/acre/day)
Ventura County MS4 Permittees	28	0.0025	0.26	2.3×10^{-5}
Caltrans	1.1	0.0042	0.11	4.2×10^{-4}

The dry weather WLA attainment strategy for the Ventura County MS4 permittees prioritizes actions that are also consistent with the effective prohibition of non-stormwater discharges to the MS4 during dry weather in the Ventura County MS4 permit (Order R4-2010-0108). As a result, the attainment strategy focuses on actions that reduce dry weather discharge volumes rather than actions that reduce nutrient concentrations in urban runoff *per se*. Reducing flows is anticipated to result in a corresponding reduction in nutrient loads. The dry weather WLAs for the Parties in the TMDL were developed by requiring a 50% reduction from baseline loads estimated by Regional Board staff. Accordingly, the dry weather WLA attainment strategy consists of a plausible strategy for reducing urban runoff volumes by 50% by June 27, 2019. Ultimately, progress towards compliance will be assessed in part by TN and TP loads measured during outfall monitoring. The adaptive management process accounts for the potential adjustment of future actions if reductions in flow are not accompanied by required reductions in loads of TN and TP.

Regional Board staff used discharge rates from an urban outfall monitoring event in April 2010 to calculate the baseline loads for both the Ventura County MS4 Permittees and Caltrans (LARWQCB 2012). Consequently, for the purposes of implementation planning, urban flow rates observed between 2011-2014 were used to estimate a post-baseline reduction in flow rate, and actions taken starting in 2015 are eligible to contribute to the remaining required reduction in urban flows. The principal steps that were followed to develop the dry weather WLA attainment strategy were as follows:

1. Compute baseline dry weather flows,
2. Compute overall target reductions in dry weather flows,
3. Estimate post-baseline urban flow reductions (2011-2014),

4. Quantify additional future target flow reductions (post-2014),
5. Describe adaptive management approach to achieve the additional (post-2014) targeted flow reductions, with priority given to non-structural BMPs.

TARGET REDUCTIONS IN DRY WEATHER FLOW

Baseline Dry Weather Urban Flow Rates

Baseline dry weather urban loads for TN and TP for the Algae TMDL were derived using flow rates from a dry weather monitoring event conducted on March 17, 2010, by the Ventura Countywide Stormwater Quality Management Program (VCSQMP). Results were used for the two VCSQMP outfalls monitored in the Ventura River watershed (MO-MEI and MO-OJA). On this sampling event, the dry weather flow rate was reported as 0.5 cfs at both outfalls. Because flows at these outfalls represent a mixture of dry weather runoff from urban and non-urban land covers, Regional Board staff weighted the reported flows by the percent urban land use in each outfall catchment (61% for MO-MEI and 49% for MO-OJA), converted to cubic feet per *urban* acre per day, and averaged them to obtain an average area-weighted urban flow rate of 26.98 ft^3 $acre^{-1}$ day^{-1}. This baseline flow rate was applied to urban land covers throughout the watershed to derive the baseline N and P loads for both Caltrans and the Ventura County MS4 Permittees in the Algae TMDL. This value also serves as the baseline flow rate for the dry weather WLA attainment strategy. Using this baseline flow rate, the baseline dry weather urban daily fluxes (cubic feet/day) were calculated for the jurisdictional areas as shown in Table 5. The VCWPD has no planning, zoning, development, or permitting authority over land uses that generate urban runoff, and was therefore not assigned a baseline flow rate or targeted flow reductions.

Table 5. Baseline Urban Dry Weather Flow Rates Obtained Using TMDL Assumptions

Jurisdiction	Subwatershed	Baseline Flow Rate (2010) from Jurisdictional Area (cubic feet/day)
County of Ventura	Lower Watershed	15,211
	Cañada Larga	1,445
	Reach 3	7,244
	Reach 4	59,313
	San Antonio Creek	4,170
	Total	87,383
Caltrans	Lower Watershed	5,101
	Cañada Larga	383
	Reach 3	1,960
	Reach 4	3,256
	San Antonio Creek	2,460
	Total	13,160
City of Ventura	Lower Watershed	18,917
	Total	18,917
City of Ojai	Reach 4	2,385
	San Antonio Creek	45,139
	Total	47,525

Next, dry event monitoring data from the same two outfalls collected after 2010 (i.e., *post-baseline* data) was used to estimate a current, post-baseline urban runoff rate. The flow rates reported for outfalls during the dry events for four post-baseline years (2011-2014) is presented in Table 6, together with post-baseline averages for each outfall.

Table 6. Post Baseline Flow Monitoring Data for MO-MEI and MO-OJA

Event Date	Flow Rate (cfs)	
	MO-MEI	MO-OJA
4/18/2011	0.25	1.00
4/23/2012	0.05	0.50
4/30/2013	dry	0.00
4/16/2014	dry	N/A*
Post Baseline Average	**0.075**	**0.50**

*Value for this site reported in the 2013-2014 VCSQMP Annual Report was erroneous and no alternative estimate is available (D. Laak, personal communication February 17, 2015)

Following the approach used to determine area-weighted urban flow rates for the Algae TMDL (LARWQCB 2012), the post-baseline average flow rate for MO-MEI in Table 6 (0.075 cfs) was adjusted by the percent urban area in the outfall drainage (61%) and divided by the urban acreage in the outfall drainage as follows:

$$\left[\frac{(0.075\ ft^3 \cdot sec^{-1})(0.61)(86{,}400\ sec \cdot d^{-1})}{625\ urban\ acres}\right] = 6.3248\ ft^3 \cdot d^{-1}\, acre^{-1}$$

Because the 2011-2014 average flow rate for the MO-OJA outfall was not different from the value obtained from the baseline monitoring event (0.5 cfs on March 17, 2010), the TMDL baseline flow rate (26.98 ft^3 $acre^{-1}$ day^{-1}) was assumed to still apply to the drainage area for MO-OJA. Finally, in a manner consistent with the load calculation in the Algae TMDL, the post-baseline area-weighted flow rates from both outfalls were averaged to produce a post-baseline urban flow rate for the watershed as follows:

Post-Baseline Urban Dry Weather Flow Rate = (6.3248 + 26.98)/2 = 16.65 ft^3 $acre^{-1}$ day^{-1}

The post-baseline urban flow rate implies a 38% reduction in discharge from the baseline flow rate. If the current dry weather flow rates persist – and nutrient concentrations in urban runoff do not increase – urban dischargers would presumably only need to bring about an additional 12% reduction in urban flow rates (as percent of baseline) to meet the final dry weather WLAs in the Algae TMDL. The post-baseline urban flow rate represents a conservative estimate of current conditions because both outfalls demonstrated a pattern of decreasing flow rates between 2011-2014, but the post-baseline flow rate averages monitoring results from all four years.

Examination of the limited TN and TP data from dry weather outfall monitoring events since the TMDL was developed suggests that dry weather WLAs for MS4 permittees were met (for TP) or were close to being met (for TN) during the post-baseline period.[4]

[4] No monitoring data are available to evaluate post-baseline runoff from Caltrans jurisdiction in the Ventura River Watershed.

Post-baseline TN and TP concentration data for MO-MEI and MO-OJA are presented in Table 7. To derive nutrient loads for the dry events in Table 7, the post-baseline urban dry weather flow rate derived above (16.65 ft^3 $acre^{-1}$ day^{-1}) was used to convert outfall event mean concentrations (converted from mg/L to lb/ft^3) to area-weighted daily nutrient loads.

The estimated average nutrient loads for the three dry events are compared to the dry weather WLAs in Table 8. TP loads averaged across the two outfalls were below the phosphorus WLA during the post-baseline years. TN loads averaged across the two outfalls were below (during 2 of 3 years) or close to (within 20% of) the nitrogen WLA during the post baseline years. The analysis suggests that dry weather WLAs may be met going forward without achieving the full 50% target reduction in urban flows, and indicates that using flow rates as a proxy for nutrient loads for developing a BMP-based compliance strategy is a reasonable and conservative approach.

Table 7. Post-Baseline Nutrient Concentration Data from MO-OJA and MO-MEI for Dry Events

Dry Event Date[1]	TN[2] (mg/L)			TP (mg/L)		
	MO-OJA	MO-MEI	Event Average	MO-OJA	MO-MEI	Event Average
4/24/2012	2.093	2.041	2.07	0.022	0.074	0.048
4/30/2013	dry	dry	0	dry	dry	0
4/16/2014[3]	5.73	dry	2.87	0.12	dry	0.060

[1] Regional Board staff combined TN and TP values for dry events from 2010 and 2011 to derive the TMDL dry weather baseline urban loads. Consequently, dry events starting in 2012 were used to evaluate post-baseline conditions for MO-OJA and MO-MEI.

[2] TN was derived as TKN+nitrate+nitrite

[3] Dry outfalls were assigned concentrations of 0 mg/L for purposes of calculating the event average concentration for this event.

Table 8. Comparison of TMDL WLAs with Post-Baseline Dry Weather Nutrient Loads from the MS4

		Dry Weather Load (lb/acre/day)	
		TN	TP
TMDL WLA for MS4 Permittees		0.00250	2.3000×10^{-5}
Post-Baseline Dry Weather Monitoring Events	4/24/2012	0.00215	0.0179×10^{-5}
	4/30/2013	0	0
	4/16/2014	0.00298	0.0225×10^{-5}
	3-year average	0.00104	0.0135×10^{-5}

Estimated Target Reductions in Dry Weather Urban Flow

As explained above, the dry weather WLA attainment strategy relies in part on the assumption that a 50% decrease in urban flow rates will accomplish the required 50% reduction in N and P loads from dry weather urban runoff. Using flow as a conservative proxy for nutrient fluxes, the baseline (26.98 ft^3 $acre^{-1}$ day^{-1}) and post-baseline (16.65 ft^3 $acre^{-1}$ day^{-1}) dry weather urban flow rates were applied to the jurisdictional acreages in each subwatershed to derive the estimated reductions in urban flows that might be needed to meet the WLAs. The estimates are presented in Table 9. These estimates assume that the concentrations of TN and TP in urban flow do not change from the baseline. As suggested by the evaluation of outfall nutrient data above, BMPs or other changes in the watershed may cause decreases in N or P concentrations in urban runoff, with the result that flow reductions smaller than those in Table 9 may be sufficient to achieve compliance with the WLAs.

Table 9. Target Flow Reductions by Jurisdiction and Reach

Jurisdiction	Subwatershed	TMDL Baseline Flow Rate	Target Flow Rate (50% Reduction from Baseline)	Observed Post Baseline Flow Rate (2011-2014)	Remaining Post-2014 Targeted Flow Reduction
		(cubic feet/day)			
County of Ventura	Lower Watershed	15,211	7,606	9,387	1,782
	Cañada Larga	1,445	723	892	169
	Reach 3	7,244	3,622	4,471	848
	Reach 4	59,313	29,656	36,603	6,947
	San Antonio Creek	4,170	2,085	2,573	488
	Total	87,383	43,692	53,926	10,235
Caltrans[a]	Lower Watershed	5,101	2,550	3,148	597
	Cañada Larga	383	191	236	45
	Reach 3	1,960	980	1,210	230
	Reach 4	3,256	1,628	2,009	381
	San Antonio Creek	2,460	1,230	1,518	288
	Total	13,160	6,580	8,121	1,541
City of Ventura	Lower Watershed	18,917	9,458	11,674	2,216
	Total	18,917	9,458	11,674	2,216
City of Ojai	Reach 4	2,385	1,193	1,472	279
	San Antonio Creek	45,139	22,570	27,857	5,287
	Total	47,525	23,762	29,329	5,566

[a] During TMDL baseline load derivation, the estimated *urban* dry weather flow contribution of 26.98 ft^3 $acre^{-1}$ day^{-1} derived from an MS4 outfall monitoring event was applied to Caltrans' jurisdictional area. The flow rates presented in the table are consistent with the TMDL approach. However, potential dry weather flows from Caltrans roadways and rights of way are improbable outside of a small area at the junction of Highway 101 and Highway 33 in the Lower Watershed where shoulder vegetation is irrigated. Consequently, the baseline dry weather flows and target flow reductions for Caltrans are exaggerated. Dry weather outfall monitoring is expected to show compliance with dry weather WLAs assigned to Caltrans.

DRY WEATHER BMP STRATEGY

As discussed above, based on available monitoring data, dry weather WLAs may currently be being achieved in the watershed. The BMP strategy described below provides a structure for selecting BMPs through an iterative process to obtain additional load reductions if they are determined to be needed by future compliance monitoring. If needed, BMPs will be selected for implementation from a menu of potential BMPs to achieve the necessary load reductions.

The dry weather BMP strategy for the Ventura County MS4 Permittees involves four categories of BMPs, listed below. Although BMPs from several categories may be

implemented concurrently, dischargers will generally identify and evaluate opportunities using the following hierarchy:

1. Planned structural BMPs;
2. LID implemented under redevelopment requirements;
3. Non-structural BMPs, and;
4. Distributed structural BMPs if needed.

The dry weather BMP strategy for Caltrans involves three BMP categories (listed below) that may be implemented individually or concurrently. Caltrans is expected to identify and evaluate opportunities using the follow hierarchy:

1. Planned structural BMPs;
2. Non-structural BMPs, and;
3. Distributed structural BMPs if needed.

Ongoing monitoring will be used to determine if the BMPs implemented in the watershed are achieving the nitrogen and phosphorus WLAs. Each BMP category, and its expected contributions to the required load reductions, is discussed in the following sections. The analysis demonstrates that future BMPs (those implemented post 2014) can achieve cumulative flow reductions at least as significant as those in the fourth (final) column of Table 9.

Existing Structural BMPs

An inventory of existing structural stormwater BMPs in the IP planning area was developed using information provided by the Parties. Flow through BMPs that do not reduce volume or nutrient concentrations (e.g., gross solid removal devices) were removed from the inventory, yielding a list of BMPs relevant to the TMDL implementation planning process. The distribution of existing structural BMPs targeting nutrients and/or volume is presented in Figure 3. Each of these structural BMPs was assumed to be sized to treat wet weather discharge (and design storms, in cases subject to LID requirements) with peak flow rates that greatly exceed the dry weather urban discharges expected in the watershed. It is therefore reasonable to assume that each of these planned structures is a full capture structure for the purposes of dry weather treatment. The performance of existing structural BMPs was not used to quantify a post-baseline load reduction. As explained above, monitoring data (for flow from outfalls) was used as the basis for estimating dry weather load reductions that occurred between 2010-2014. Instead, the existing BMPs will provide a resource during future planning of distributed structural BMPs, if the need arises for them. The areas treated by existing structural BMPs would be excluded from the planning area for future additional structural BMPs.

Planned Structural BMPs

A total of 87 structural BMPs are currently planned for the Ventura River watershed that have an ability to reduce runoff volumes or nutrient loads. Planned structural BMPs include:

- Meiners Oaks bioswale (unincorporated County of Ventura)
- Topa Topa Winery siltation basin (City of Ojai)
- Bioswales (82) and infiltration devices (3) (Caltrans)[5]

Consistent with assumptions regarding existing BMPs, each of these planned structural BMPs is expected to yield full incidental treatment of dry weather flows tributary to the structure. A schematic of the Meiners Oaks bioswale is provided in Figure 4.

Planned structural BMPs were grouped by jurisdiction and subwatershed using information provided by the Parties. Tributary areas were delineated for the Meiners Oaks and Topa Topa Winery BMPs. Caltrans bioswale and infiltration devices were assumed to treat an average of two-thousand square feet of highway surface per device. The assumed current (post-baseline) dry weather flow rate from urban land uses was applied to these BMP drainage areas, and assumed to be fully captured. Aggregated expected volume reductions from planned structural BMPs are presented in Table 10.

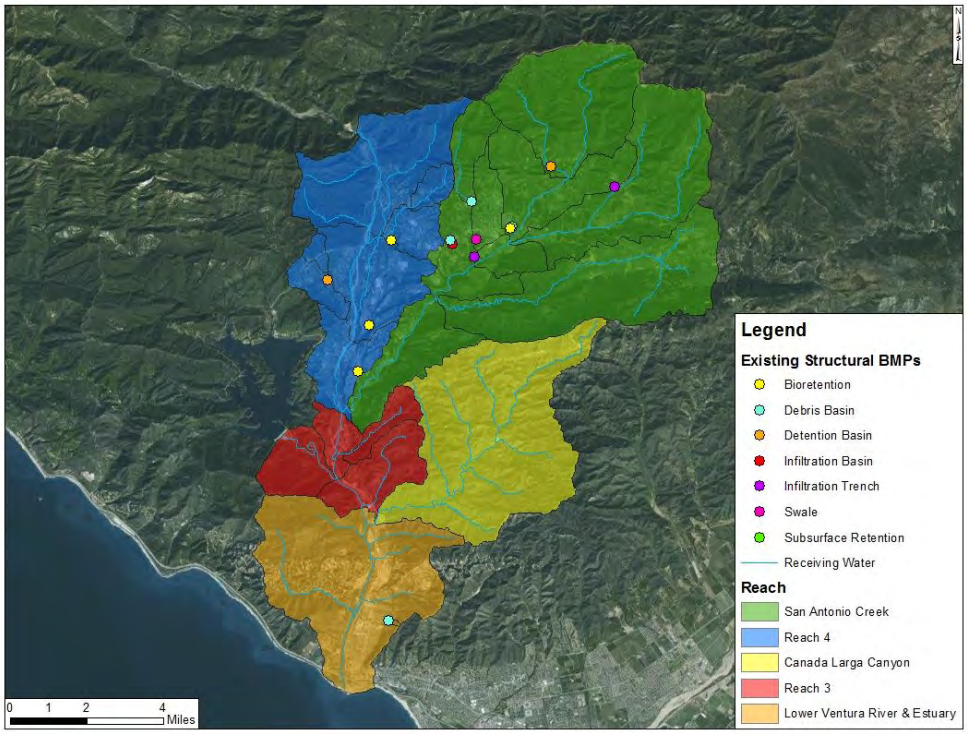

Figure 3. Existing Structural BMPs Targeting Nutrients and/or Runoff Volumes

[5] A complete list of planned structural BMPs for Caltrans is provided as Attachment 1.

Table 10. Flow Reductions from Planned Structural BMPs by Jurisdiction and Reach

Jurisdiction	Subwatershed	Flow Reduction from Planned Structural BMPs (cubic feet/day)	Percent of Target Post-2014 Reduction
County of Ventura	Lower Watershed	0	0.0%
	Cañada Larga	0	0.0%
	Reach 3	0	0.0%
	Reach 4	613	8.8%
	San Antonio Creek	0	0.0%
	Total	613	6.0%
Caltrans	Lower Watershed	14	2.4%
	Cañada Larga	0	0.0%
	Reach 3	4	1.8%
	Reach 4	6	1.5%
	San Antonio Creek	37	13.0%
	Total	62	4.0%
City of Ventura	Lower Watershed	0	0.0%
	Total	0	0.0%
City of Ojai	Reach 4	0	0.0%
	San Antonio Creek	29	0.6%
	Total	0	0.5%

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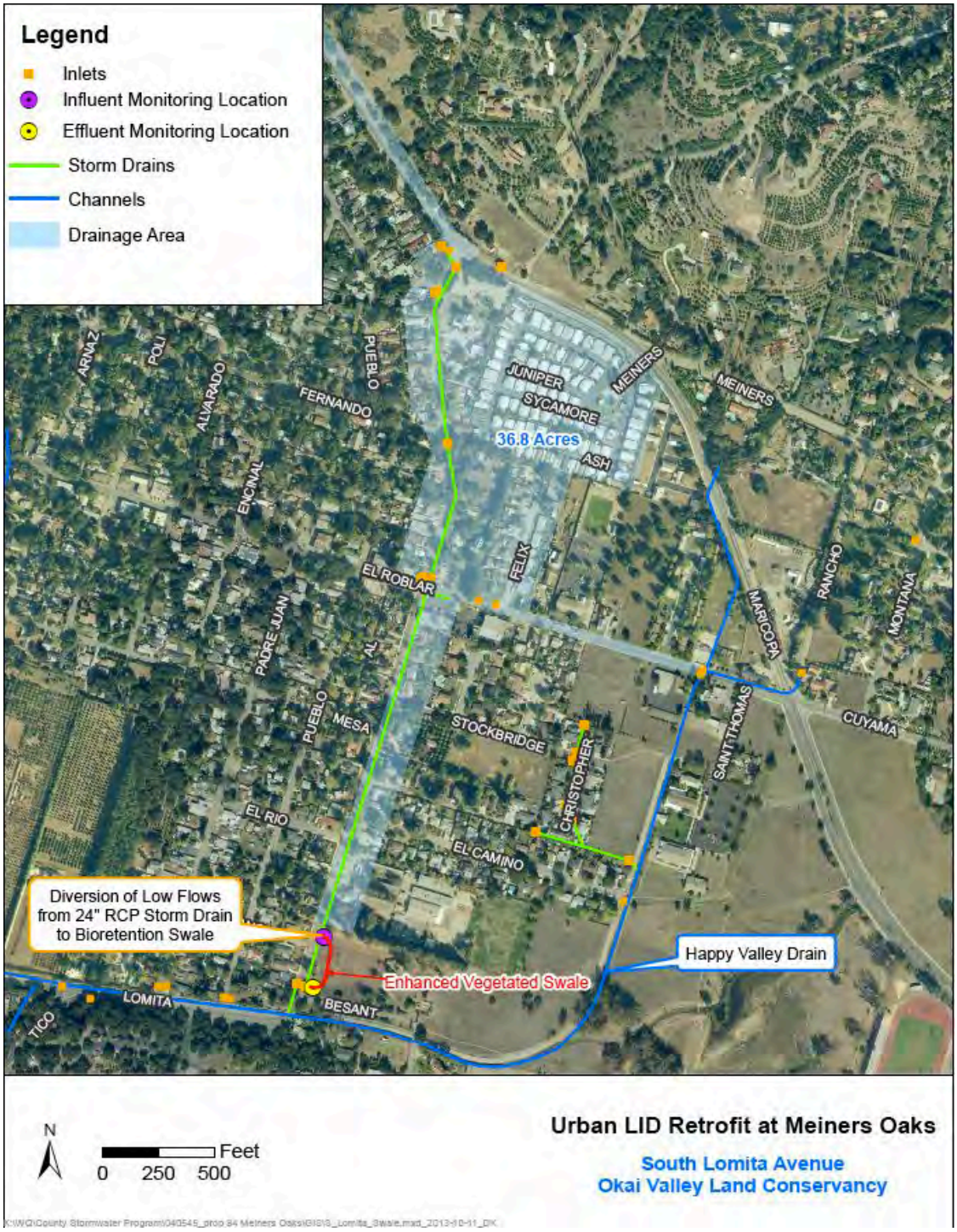

Figure 4. Illustration of the Planned Meiners Oaks LID Retrofit Project

Low Impact Development (LID) Redevelopment

The Ventura County Technical Guidance Manual (2011) outlines post construction treatment requirements for areas undergoing redevelopment. Rates of redevelopment within the Ventura River Watershed were assumed to be consistent with those utilized in the Lower Santa Clara River Bacteria TMDL Implementation Plan (2015) that were initially derived from the Ballona Creek TMDL Implementation Plan (Los Angeles Bureau of Sanitation, 2009). Assumed annual redevelopment rates are presented in Table 11. Post construction wet weather treatment requirements are assumed to fully treat dry weather contributions from redeveloped areas.

The cumulative effect of LID redevelopment is determined by the annual redevelopment rate and the duration of the program. A redevelopment rate for the five year implementation planning period (June 2014 through June 2019) was computed assuming that areas redeveloped once would not be subject to redevelopment again before 2019. Dry weather flow reductions expected from LID redevelopment are presented in Table 12.

Table 11. Low-Impact Development Redevelopment Rates by Land Use

Land Use	Annual Redevelopment Rate
Residential	0.18%
Commercial	0.15%
Industrial	0.34%
Education	0.16%
Transportation	2.70%

Table 12. Estimated Reductions in Urban Flow from LID Redevelopment through June 2019

Party	Subwatershed	LID Redevelopment Flow Reduction (cubic feet/day)	% of Target Post-2014 Reduction
County of Ventura	Lower Watershed	76	4.3%
	Cañada Larga	5	2.7%
	Reach 3	74	8.7%
	Reach 4	210	3.0%
	San Antonio Creek	16	3.2%
	Total	380	4.4%
City of Ventura	Lower Watershed	37	1.7%
	Total	37	1.7%
City of Ojai	Reach 4	4	1.4%
	San Antonio Creek	59	1.1%
	Total	63	1.3%

Non-structural BMPs

A broad suite of non-structural BMPs focused on reducing dry weather volumes and nutrient source control is expected to be a key component of the dry weather BMP strategy. Potential non-structural BMPs generally fall under one of four broad categories: (1) public education and outreach, (2) inspections and evaluations, (3) enforcement, and (4) incentives. Public education programs are intended to elicit voluntary responses regarding behaviors or operations that cause urban runoff or nutrient discharges. Inspections and evaluations involve agency staff or agency partners who identify sources that can be subsequently addressed through stakeholder engagement. Enforcement programs go beyond the inspection and evaluation process and involve punitive actions such as fines. Incentive programs are intended to elicit a voluntary public response by offering some form of benefit, often financial or in the form of public recognition, to participants (e.g., turf removal incentive programs).

Most of the future urban flow and nutrient load reductions in the Ventura River watershed will come from non-structural BMP implementation. The implementation of non-structural BMPs will be determined by each agency to target sources and activities that produce dry weather runoff and nutrient loading in their jurisdiction. A "menu" of BMPs is outlined below for the Ventura County MS4 Permittees.

Non-structural BMPs for MS4 Permittees

Public education and outreach

- Outdoor garden/lawn education program to reduce irrigation and fertilizer use[6]
- Water conservation outreach and education program
- Residential and/or commercial dry weather discharge education program which could address some or all of following sources of urban runoff:
  - Pool draining;
  - Car washing;
  - Sidewalk washing; and
  - Pet waste

Inspections and Evaluations

- Irrigation efficiency evaluations
- Increase in inspections and reporting of dry weather discharges. Potential options to consider include:
  - Community neighborhood watch
  - Improvement of existing public reporting framework to make them more accessible and responsive through smart phone applications, websites, or other easy to understand methods, especially those that directly link to appropriate enforcement agency to allow for rapid follow up
  - Third party observation program (police, bus drivers, mail drivers, gas/electric readers)
  - Increased municipal staff inspections either on a routine basis or in conjunction with other activities (e.g., inspections while driving through residential neighborhoods on way to industrial or commercial inspections)
- Private washing facility inspections
- Inspection of mobile businesses

Enforcement:

- Residential dry weather discharge enforcement
- Commercial dry weather discharge enforcement

[6] The City of Ventura sponsors an ongoing Ocean Friendly Gardens program. In addition, Ocean Friendly Garden workshops will be held by the County of Ventura as part of the Meiner's Oaks LID Retrofit project.

- Pet waste control enforcement

Incentives:

- Smart controller and turf replacement rebates[7]
- Dry-weather-focused LID incentives for areas not required to implement LID
- Nutrient trading framework between urban jurisdictions and agriculture[8]
- Incentives to re-route equipment wash areas to sanitary sewer
- Clean business program

Many potential non-structural BMPs are related to water conservation and programs that may be implemented by water agencies to meet other State mandates for water use reductions. On April 1, 2015, Governor Brown issued Executive Order B-29-15 requiring the State Water Resources Control Board (State Board) to impose restrictions to achieve a 25% reduction in potable urban water usage by February 28, 2016 (State of California, 2015). The order outlines a number of requirements that are expected to reduce outdoor water usage. The Department of Water Resources is required to partner with local agencies to replace 50 million square feet of lawns and ornamental turf with drought tolerant plants and provide funding for "underserved communities." Commercial, industrial, and institutional properties are now required to implement water efficiency measures to meet more stringent targets, newly constructed homes and buildings must employ drip irrigation, and irrigation of ornamental turf on street medians using potable water is now prohibited. Many of the proposed control measures could be implemented by MS4 agencies directly as well as through coordination with water agencies. Existing Urban Water Management Plans (UWMPs), developed by water agencies throughout the watershed in 2010, independently project a 20% per capita reduction by 2020 consistent with urban water conservations requirements outlined in Senate Bill SB X7-7 from 2009.

While many of the provisions outlined in the Governor's 2015 Executive Order directly target outdoor water uses that contribute to dry weather runoff, the 20-25% required reductions in water use under Senate Bill SB X7-7 and the State Board's actions apply to all potable water uses. Historical water uses reported in the UWMPs are currently grouped by predominant land uses and are not separated by indoor versus outdoor applications. However, outdoor water applications are assumed to account for half of all water used in the Ventura River Watershed consistent with values for other California regions from the literature (Hanak and Davis, 2006; De Oreo et al., 2011). The State Board mandated 25% reduction in all uses translates to an assumed 12.5% reduction in

[7] The City of Ventura has included a turf replacement program in its Drought Contingency Plan.

[8] A nutrient trading program would involve entities covered under the Ventura County Agricultural Irrigated Lands Group (VCAILG) permit waiver reducing nutrient loading on behalf of a responsible party based on an agreed upon fee. A nutrient trading framework would be attractive to responsible parties if a VCAILG participant is willing and capable of reducing loads using a program less costly than a similarly effective program implemented by the MS4 agencies or Caltrans.

outdoor uses potentially causing dry weather discharges in the MS4. Compliance with the State Board mandate could be sufficient to reach the target 50% urban flow reduction from the TMDL baseline if the current estimated post-baseline flow reduction of 38% for the Ventura River watershed is accurate (i.e., 38% post-baseline urban flow reduction observed by 2014 + 12.5% future reduction in outdoor water use $\approx$ 50%). If water agencies discontinue their conservation programs in the future, the MS4 agencies may elect to commit to similarly effective programs to prevent dry weather flows and nutrient loading if needed to achieve TMDL WLAs.

A broad array of water conservation practices are expected to be widely applied in response to the State's current drought conditions. Although the references above suggest that water conservation activities could result in the required dry weather load reductions in the TMDL, an additional evaluation of non-structural BMP effectiveness was carried out for the IP. The evaluation uses literature values to demonstrate that a program of non-structural BMPs can result in the needed reductions in absence of water conservation measures required from water purveyors under the State mandate. The effectiveness of nonstructural BMPs targeted to address dry weather flows or nutrient loading are typically not measured directly. As a result, other methods are employed to estimate effectiveness.

Literature was reviewed to develop an "effectiveness rating" for each non-structural BMP. Assumed "high", "low", and "average" effectiveness ratings for the each non-structural BMP class are presented in Table 13. An additional discussion of the methods used to develop effectiveness assumptions is presented in Attachment 2. The assumed effectiveness rating is equal to the product of a participation factor and a loading factor for nonstructural BMP (Water Environment Research Foundation, 2000). Participation and loading factors are further described below.

- The participation factor is the amount of the target audience who would implement or participate in the non-structural program, representing the overall behavior change resulting from implementation. For example, outreach to residents might result in 5 to 10% of residents changing their behavior (5-10% participation factor). For programs over which the agencies have complete control (e.g., changing washing practices at a municipal facility) the participation factor would be closer to 100%.

- The loading factor is how much of the pollutant load would be reduced if 100% of the target audience changed their behavior. For example, if half of the residents responded to a sidewalk washing education program, dry weather flows may be reduced by 50% (loading factor 50%). If residents stopped washing sidewalks all together, then the loading factor would be 100%.

The overall average of low and high effectiveness ratings presented in Table 13 (20%) was multiplied by estimated current dry weather flows from the MS4 discharge areas within the IP area (post-baseline 2011-2014 average flows) to establish volume reduction estimates for the jurisdictional areas. A range of estimated non-structural load reductions from MS4 permittee jurisdictions are presented by reach in Table 14. Low range estimates correspond to approximately 21.1% of the required dry weather flow reductions

while the high range reflects 189.7% of same target metric. Assumed average effectiveness is 105.4% of target volumes.

Table 13. Assumed Non-Structural BMP Effectiveness by Category

Class	Low	High	Average
Public Education and Outreach	2%	20%	11%
Inspection and Evaluations	8%	30%	19%
Enforcement	2%	72%	37%
Incentives	2%	20%	11%
Average	**4%**	**36%**	**20%**

Table 14. Estimated Load Reductions from Non-Structural BMPs for MS4 Permittees

Jurisdiction	Subwatershed	Flow Reduction from Non-Structural BMPs (cubic feet/day)		
		Low	High	Average
County of Ventura	Lower Watershed	467	3,379	1,877
	Cañada Larga	36	321	178
	Reach 3	179	1,609	894
	Reach 4	1,464	13,177	7,321
	San Antonio Creek	103	926	515
	Total	2,249	19,413	10,785
City of Ventura	Lower Watershed	467	4203	2,335
	Total	467	4203	2,335
City of Ojai	Reach 4	59	530	294
	San Antonio Creek	1,114	10,028	5,571
	Total	1,173	10,558	5,866

Non-structural BMPs for Caltrans

The Caltrans Statewide Storm Water Management Plan (SWMP) identifies non-structural BMPs that have been approved to target post-construction non-stormwater discharges (Caltrans, 2012). These BMPs address practices such as:

1. Water conservation practices;

2. Potable Water/Irrigation; and

3. Dewatering operations.

A comprehensive discussion of these non-structural BMPs can be found in Appendix B of the SWMP (Caltrans, 2012).

Target dry weather flow reductions from the Caltrans jurisdictional area (related to irrigation of median and right of way vegetation and operations in two maintenance yards), are expected to be fully accomplished by the implementation of non-structural BMPs consistent with the prohibitions outlined in the Governor's 2015 Executive Order.

Non-structural BMPs for the VCWPD

The VCWPD currently implements a suite of BMPs that are expected to reduce the mobilization of nutrients if dry weather flows are conveyed through facilities or rights-of-way in their jurisdiction. Relevant environmental BMPs identified in the Ventura County Watershed Protection District Routine Operations & Maintenance Program guidance (dated October 1, 2013) include:

1. Preventing the discharge of silt-laden water during concrete channel cleaning;

2. Locating temporary stockpiles where they will not be exposed to flowing water;

3. Leaving vegetation on upper basin slopes;

4. Avoiding road base discharges when working adjacent to channels;

5. Mitigating/replacing temporary impacts to habitat;

6. Minimizing erosion from stream gauge maintenance; and

7. Avoiding spills and leaks.

A comprehensive discussion of each of these environmental BMPs can be found in guidance document referenced above.

Future Distributed Structural BMPs for Ventura County MS4 Permittees

As noted above, it is anticipated that all needed load reductions can be achieved through planned structural BMPs, LID from redevelopment, and non-structural BMPs. However, if monitoring results demonstrate that the suite of planned structural and non-structural BMPs have not attained the target volume and/or nutrient load reductions required to achieve dry weather compliance based on the procedures outlined in the adaptive management process, additional structural distributed BMPs will be considered. Structural BMPs are rarely, if ever, implemented to treat dry weather flows only. However, because they are sized to treat relevant wet weather design storms, they yield both wet and dry condition treatment benefits.

Potential distributed structural BMPs would be implemented in a manner consistent with the Ventura County Technical Guidance Manual (2011) (TGM). Retention BMPs are prioritized in areas where infiltration is feasible and advisable. Vegetated treat-and-

release BMPs would be implemented in areas where infiltration is not feasible or other physical constraints exist (e.g., shallow groundwater). Specific BMPs that would be considered for implementation are listed below.

- Infiltration BMPs
    - Infiltration basin
    - Infiltration trench
    - Bioretention
    - Dry well
    - Permeable pavement
- Vegetated treat-and-release BMPs
    - Bioretention with an underdrain
    - Vegetated swale

An extensive discussion regarding the configuration, operation, and sizing of these structures can be found in the TGM.

The TGM establishes that infiltration is feasible (unless site-specific testing shows otherwise) in areas assigned a soil number between four and seven in the Ventura County Soil Number spatial dataset (County of Ventura Hydrology Manual, 2005). Soil numbers between four and seven represent areas where natural undisturbed soils are typically sands, loamy sands, sandy loams, silt loams, or loams, soil that have saturated hydraulic conductivities (K_{sat}) greater than or equal to 0.5 inches/hour. Areas with mapped soil numbers of one through three are typically sandy clay loams, clay loams, silty clay loams, sandy clays, silty clays, or clays and are typically associated with a K_{sat} less than 0.5 inches/hour. The spatial distribution of areas where infiltration BMPs should and should not be considered is presented in Figure 5. Areas where infiltration is not feasible may be more effectively addressed through treat-and-release BMPs.

The limited resources of the Parties will first be focused on implementing structural retention BMPs in areas where infiltration is feasible and, ideally, where soil numbers are highest to treat areas generating dry weather volumes. Siting structural BMPs in areas with higher soil numbers, and therefore higher natural undisturbed infiltration rates, will require smaller footprints to effectively treat the expected runoff. Smaller BMP footprints may be easier to identify and capital costs would remain lower. Areas identified as sources of dry weather volumes where infiltration is not feasible will be addressed with treat-and-release BMPs such as swales.

Future Distributed Structural BMPs for Caltrans

Target volume and nutrient reductions for the Caltrans jurisdictional area are expected to be addressed through a combination of planned structural BMPs and non-structural BMPs. If monitoring data demonstrates that target reductions have not been met, additional structural distributed BMPs may be required. Caltrans District 7 is expected to continue to implement the Department's stormwater program in a manner consistent with the Caltrans Statewide Storm Water Permit, Order 2012-0011-DWQ as amended by

Order WQ 2014-0077-DWQ, and the existing Caltrans Storm Water Management Plan (SWMP) to achieve final WLAs (Caltrans, 2012).

Section 4.4 of the SWMP presents a list of approved treatment control BMPs for use in Department projects (Caltrans, 2012). Approved treatment control BMPs targeting volume and/or nutrients include:[9]

1. Biofiltration: strips/swales;
2. Infiltration basins;
3. Infiltration trenches; and
4. Detention devices.

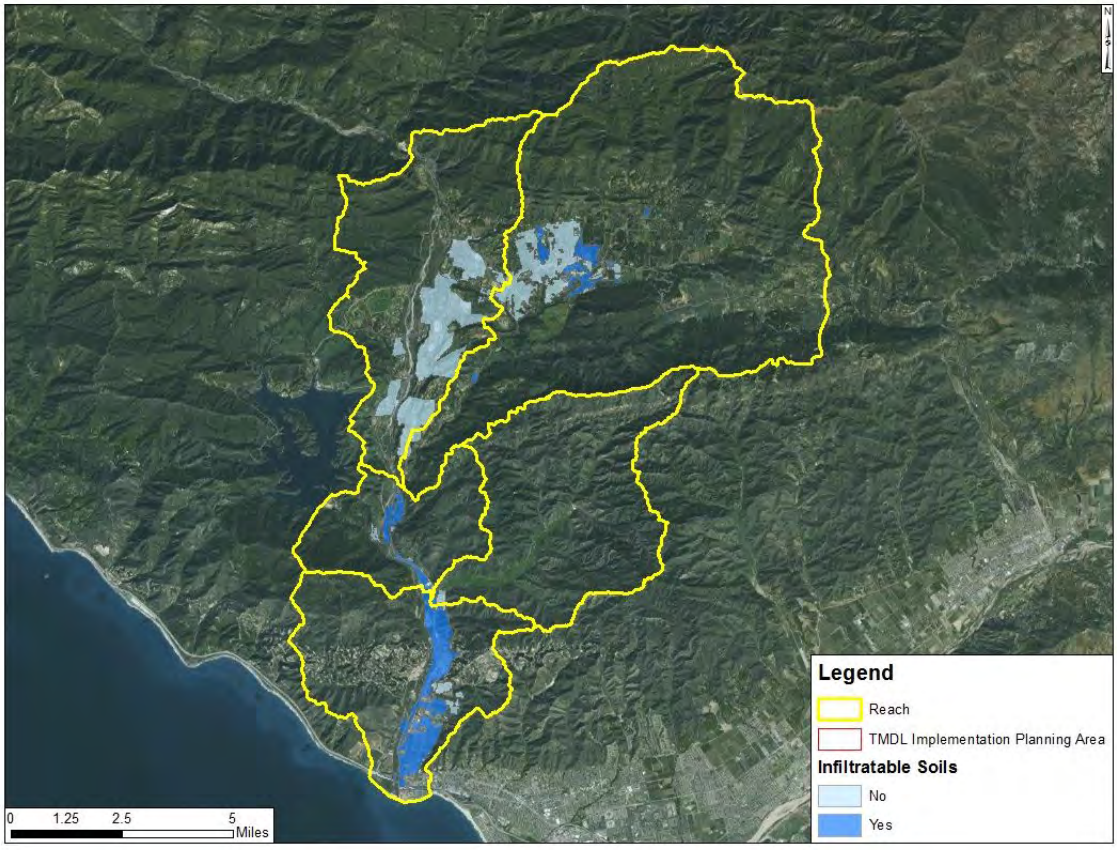

Figure 5. Infiltratable Soils within the TMDL IP Jurisdictional Area

[9] Traction sand traps are also identified as an approved treatment control BMP within Section 4.4 of the SWMP. These BMPs do not target dry weather volumes or nutrients.

Factors Contributing to Decisions about Future BMPs

During the implementation period, the Parties will continue efforts to implement planned structural BMPs, and evaluate potential non-structural BMPs, before considering future structural BMPs. Factors are described below that may be considered when evaluating or comparing additional dry weather BMPs if and when they are needed to achieve compliance.

Factors Driving Non-structural BMP Costs

Given the nature of many of the potential programs, costs associated with non-structural BMP implementation are typically realized in the form of employee time. Public education and outreach, inspections and evaluations, enforcement, and incentive programs are expected to require stakeholder engagement and interaction that in most cases can only be achieved through a frequent public presence in the watershed. A number of programs may also involve direct materials costs through the development and distribution of informational materials and indirect materials costs associated with incentive program payments.

Factors Driving Structural BMP Costs

Life cycle costs associated with structural BMPs are typically grouped into three broad categories or steps: planning and survey, construction, and ongoing operations and maintenance. If a specific dry weather source area cannot be effectively addressed through non-structural BMP implementation and structural treatment is required, responsible party staff will attempt to develop a viable BMP conceptual design to address the area of concern. Planning and survey costs are associated with taking a viable conceptual BMP design to a full detailed design and are almost exclusively reflected in staff time. Viable structural BMP designs may not be possible for every location due to physical, economic, or political constraints.

Construction costs are expected to vary based on BMP type, configuration, and natural soil conditions. Retention BMPs implemented in areas with more infiltrative soils will require a smaller BMP footprint and have lower construction costs than a similarly sized structure in less infiltrative soils. Structures requiring more intensive construction methods (e.g., dry wells) are expected to cost more than more straightforward BMPs (e.g. swales). Specific unit cost estimates for construction are presented in Table 3-6 of the TGM.

Operations and maintenance is critical to preserve long term BMP function and will vary by BMP type. For example, the soil matrix of a retention BMP may need to be replaced or amended periodically to maintain design porosity and vegetated BMPs may need to be weeded, trimmed, or mowed. A more extensive discussion regarding maintenance requirements and associated costs can be found in the TGM.

Summary of Dry Weather BMP Evaluation

Expected volume reductions derived from planned structural BMPs, LID redevelopment, and non-structural BMPs were summed for each subwatershed and jurisdiction and are presented in Table 15. Together, planned structural BMPs, LID redevelopment, and non-

structural BMPs have a reasonable assurance of achieving the target post-2014 12% reduction in dry weather flows/nutrient loads that should result in attainment of the dry weather WLAs. The analysis is conservative owing to the observation that dry weather WLAs may have already been met by conditions and practices in effect between 2011-2014.

Table 15. Summary of Projected Reductions in Dry Weather Runoff from WLA Attainment Strategy

Party	Subwatershed	Flow Reduction (cubic feet/day)				
		Post 2014 Target Volume Reduction	BMP Categories			
			Planned Structural BMPs	LID Redevelop-ment	Non-Structural BMPs (based on average effectiveness)	Total Reduction from BMPs
County of Ventura	Lower Watershed	1,782	0	76	1,877	1,953
	Cañada Larga	169	0	5	178	183
	Reach 3	848	0	74	894	968
	Reach 4	6,947	613	210	7,321	8,143
	San Antonio Creek	488	0	16	515	530
	Total	10,235	613	380	10,785	11,778
Caltrans	Lower Watershed	597	14	0	597	612
	Reach 3	230	0	0	230	230
	Reach 4	230	4	0	230	234
	San Antonio Creek	381	6	0	381	387
	Total	288	37	0	288	326
City of Ventura	Lower Watershed	1,726	62	0	1,726	1,788
	Total	2,216	0	37	2,335	2,371
City of Ojai	Reach 4	2,216	0	37	2,335	2,371
	San Antonio Creek	279	0	4	294	298
	Total	5,287	29	59	5,571	5,660

Wet Weather WLA Attainment Strategy

Wet weather WLAs in the Algae TMDL for the Parties are effluent concentrations assigned to reaches, as shown in Table 16.

Table 16. Wet Weather WLAs for Ventura County MS4 Permittees and Caltrans

Reaches	WLA
Estuary Reach 1	7.4 mg/L Total Nitrogen
Reach 2 Cañada Larga	10 mg/L (Nitrate+Nitrite)-N
Reach 3 San Antonio Creek Reach 4 Reach 5	5 mg/L (Nitrate+Nitrite)-N

Based on a review of available wet event monitoring data from the VCSQMP (through February 2014), the pertinent wet weather allocation (5 mg/L nitrate+nitrite-N) is met at the currently monitored outfalls discharging to Reach 4 (MO-MEI) and San Antonio Creek (MO-OJA). Data is not available for outfalls discharging to other reaches. However nitrogen concentrations in receiving water during wet weather (measured at the VCSQMP mass emission site ME-VR2 near the base of the watershed) are almost always below all of the nitrogen WLAs that apply to urban discharges (expressed as concentrations of TN or nitrate+nitrite-N, depending on the reach). Data from 2009-2014 are presented in Table 17. A longer time series of TN concentrations for ME-VR2 (2001-2014) is provided in Attachment 3.

WET WEATHER BMP STRATEGY

Because wet-weather limits are not an anticipated compliance issue, the wet weather WLA attainment strategy does not rely on quantification of the nutrient reduction benefits associated with a suite of future wet weather BMPs. If monitoring results demonstrate that wet weather compliance is no longer being achieved in the future, the implementation of additional wet weather BMPs will be evaluated and considered in accordance with the adaptive management process outlined below. If wet weather BMPs are needed, they will be selected from the list of BMPs identified in this section. The list of potential BMPs includes LID incentive programs and distributed structural BMPs. Additionally, many of the BMPs that could implemented to address dry weather discharges (if needed) will also reduce wet weather loads, particularly the planned distributed structural BMPs.

Table 17. Wet Weather Concentrations of Total Nitrogen[1] and Nitrate+Nitrite (as mg N/L) in the Ventura River (ME-VR2) and MS4 Outfalls MO-MEI and MO-OJA

Wet Event Date	Ventura River		MS4 Outfalls			
	ME-VR2		MO-MEI		MO-OJA	
	TN	NO3 + NO2	TN	NO3 + NO2	TN	NO3-N + NO2-N
2/7/09	0.42					
3/5/09	0.29					
10/14/09	1.48		3.30		1.51	
12/8/09	1.67		2.40		1.34	
2/6/10	2.7		3.70		1.65	
10/06/10			6.55		4.20	0.58
10/7/10	1.03					
10/30/10	0.76					
11/21/10			2.41		1.85	
2/17/11	1.65		4.00		2.88	
10/6/11			7.38	0.98	2.88	
1/21/12			3.32	0.92	1.96	0.66
3/18/12			2.95	0.25	2.08	0.28
10/12/12					10.01	0.01
11/18/12	0.81	0.46	9.30	1.30	3.20	0.60
3/8/13	0.52	0.25	2.78	0.48	3.65	0.45
12/8/13	0.69	0.46	2.42	0.92	2.29	0.69
2/7/14	0.66	0.42	4.70	1.40	4.40	1.50
2/28/14	0.86	0.46	3.70	0.60	3.15	0.45

[1] TN was derived as the sum of TKN + Nitrate + Nitrite

LID Incentives

Wet-weather-specific LID incentives could be implemented to retain wet weather volumes and prevent associated nutrients from moving into receiving waters. LID incentives are designed to encourage private sector parties to implement lot-scale measures to improve water quality. LID incentives may include, but are not limited to:

- Rain barrel or cistern programs;
- Rain garden or bioretention programs;
- Downspout disconnection programs to break up directly connected impervious areas (DCIAs).

Water quality benefits would be largely determined by participation rates and the cumulative area treated by each program.

Future Distributed Structural BMPs for Ventura County MS4 Permittees

A preliminary wet weather structural distributed BMP program would be implemented in a manner consistent with the dry weather BMP strategy. Structural distributed BMPs would be sized to treat the relevant 24 hour, 85th percentile design storm to address wet and dry weather loading of a broad array of pollutants. Potential structural distributed BMPs would be implemented in a manner that complies with the Ventura County Technical Guidance Manual (2011) (TGM). The TGM indicates that retention BMPs should be prioritized in areas where infiltration is feasible and advisable. The areas with soils suitable for infiltration within the implementation area are shown in Figure 5. Vegetated treat-and-release BMPs would be implemented in areas where infiltration is not feasible or other physical constraints exist (e.g., shallow groundwater).

Specific wet weather BMP types that would be considered for implementation are as follows:

- Infiltration BMPs
    - Infiltration basin
    - Infiltration trench
    - Bioretention
    - Dry well
    - Permeable pavement
- Vegetated treat and release BMPs
    - Bioretention with an underdrain
    - Vegetated swale.

An extensive discussion regarding the configuration, operation, and sizing of these structures can be found in the TGM.

Future Distributed Structural BMPs for Caltrans

Caltrans District 7 is expected to continue implementing the Department's stormwater program in a manner consistent with the Caltrans Statewide Storm Water Permit (Order 2012-0011-DWQ as amended by Order WQ 2014-0077-DWQ) and the existing Caltrans Statewide Storm Water Management Plan (SWMP; Caltrans, 2012) to achieve final WLAs.

Section 4.4 of the SWMP presents a list of approved treatment control BMPs for use in Department projects (Caltrans, 2012). Approved treatment control BMPs targeting volume or nutrients include:[10]

1. Biofiltration: strips/swales;
2. Infiltration basins; and

[10] Traction sand traps and dry weather flow diversions are also identified as approved treatment control BMPs within Section 4.4 of the SWMP. These BMPs do not target wet weather volumes or nutrients.

3. Detention devices.

Compliance Points

The Algae TMDL does not specify the number or locations of monitoring sites required for the Parties to evaluate compliance with the dry- and wet-weather WLAs. Four outfalls are proposed as effluent compliance points as shown in Table 18. One of the MS4 outfall sites (MO-OJA) is an existing monitoring site for the VCSQMP. The locations of the monitoring outfalls are shown in Figure 6 together with the existing Algae TMDL receiving water monitoring sites. Outfalls were selected based on several criteria:

- The drainage area is representative of urban land covers in the party's overall jurisdictional area subject to the Algae TMDL.
- Property owners are responsible parties in the Algae TMDL and will allow access.
- The required sampling can be conducted safely during dry and wet weather.
- Outfall characteristics will enable quantitative measurements of flow during dry weather, so that loads can be computed.

Table 18. Proposed WLA Compliance Points

Jurisdiction	Site	Reach
City of Ojai	MO-OJA	San Antonio Creek
County of Ventura	MO-MMC	Reach 4
Caltrans	MO-150	Reach 4
City of Ventura	MO-STA	Lower Watershed

The minimum sampling strategy needed to assess compliance with the WLAs, as specified in the TMDL, is summarized in Table 19. The Parties may elect to monitor additional parameters at the outfalls, however, additional parameters are not required to evaluate compliance with the WLAs.

Consistent with the method by which the loads and allocations were developed for MS4 permittees in the Algae TMDL, compliance with the dry weather WLAs will not be assessed using the raw loads exiting the MS4 outfalls. Instead, the loads measured at the MS4 outfalls will be adjusted by the proportions of their drainage areas that consist of urban land covers. More detail is provided about the proposed compliance points below.

Table 19. Sampling Strategy for Wet and Dry Weather at Monitored Outfalls

	Dry Weather Events	Wet Weather Events
Frequency	Quarterly	Twice per year
Minimum Parameters	Nitrate + Nitrite[a] TKN[a] Total Phosphorus Discharge (cfs)	Nitrate + Nitrite[a] TKN[a]
Expression	lb/urban acre/day	event mean concentrations[b]

[a] [Nitrate + Nitrite] and TKN are required to derive values for TN
[b] Autosamplers may be required to derive an event mean concentration.

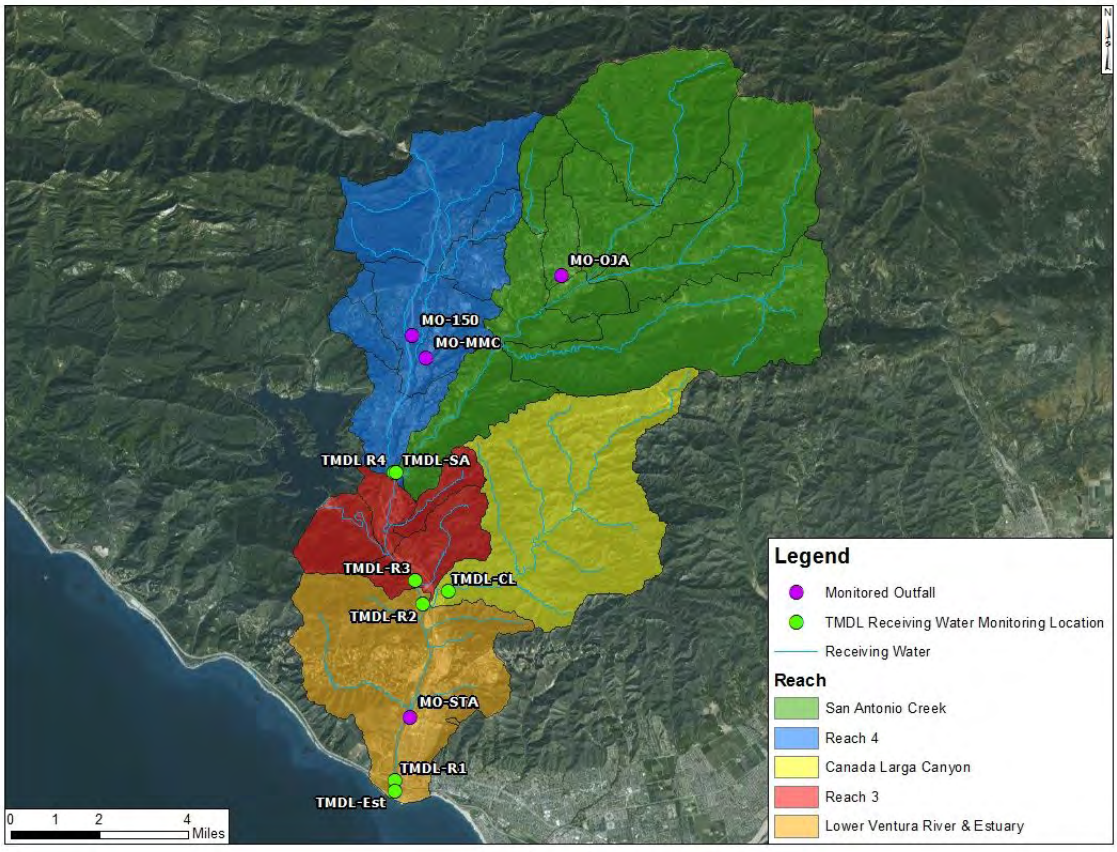

Figure 6. Monitoring Outfalls for the Implementation Plan and Existing Algae TMDL Receiving Water Monitoring Sites

MO-MMC

The MO-MMC outfall monitoring site is located in the Mira Monte Community between Oakcrest Avenue and Arcata Road in unincorporated Ventura County. A 54-inch-diameter pipe discharges into a box channel that flows directly to the Ventura River main stem (34°25'5.4582"N, 119°17'45.0414"W). The location of the outfall is shown in Figure 7. A photo of the outfall is provided in Figure 8. The land uses in the MO-MMC

drainage area are compared to those in the Mira Monte Community in Table 20. A diagram of land uses draining to the outfall is presented in Figure 9.

Figure 7. Location of MO-MMC.

Figure 8. Photo of MO-MMC

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Table 20. MO-MMC Drainage Area Representativeness Comparison

Grouped SCAG Land Use Class	MO-MMC Drainage Area		Mira Monte Community (Unincorporated Ventura County)	
	Area (acres)	% of Total	Area (acres)	% of City Area
Agriculture	0.0	0.0%	35.0	2.2%
Commercial	24.0	13.2%	57.0	3.6%
Education	0.0	0.0%	29.5	1.9%
Multi-Family Residential	7.8	4.3%	7.8	0.5%
Single-Family Residential	120.8	66.8%	1319.8	83.7%
Vacant	28.3	15.6%	126.8	8.0%
Total	**180.8**	**100.0%**	**1576.0**	**100.0%**

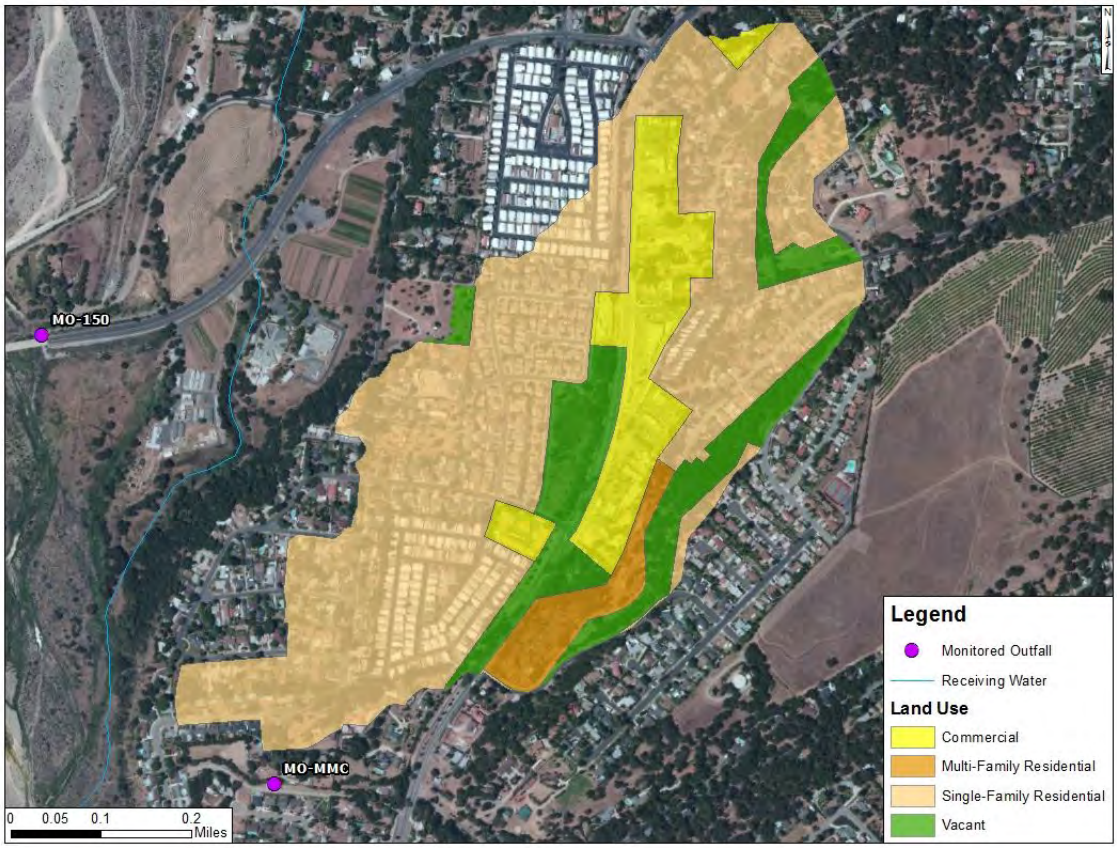

Figure 9. Land Uses in the MO-MMC Drainage Area

MO-OJA

The MO-OJA outfall monitoring site is located on Fox Canyon Barranca, a tributary to San Antonio Creek within the City of Ojai. Samples are collected from a concrete box channel upstream of the Ojai Valley Athletic Club and downstream of a pedestrian

walkway (34°26'41.25"N, 119°14'28.43"W). The location of the outfall is shown in Figure 10. A photo of the outfall is provided in Figure 11. The land uses in the MO-OJA drainage area are compared with those in the City of Ojai in Table 21. A diagram of land uses draining to the outfall is presented in Figure 12.

Figure 10. Location of MO-OJA

Figure 11. Photo of MO-OJA

Table 21. MO-OJA Drainage Area Representativeness Comparison

Grouped SCAG Land Use Class	MO-OJA Drainage Area		City of Ojai	
	Area (acres)	% of Total	Area (acres)	% of City Area
Agriculture	35.6	4.8%	76.6	2.7%
Commercial	27.9	3.7%	198.4	7.1%
Education	20.2	2.7%	100.7	3.6%
Industrial	12.4	1.7%	29.4	1.1%
Multi-Family Residential	8.0	1.1%	64.1	2.3%
Single-Family Residential	295.3	39.4%	1156.5	41.4%
Vacant	349.4	46.7%	1170.0	41.8%
Total	**748.9**	**100.0%**	**2795.7**	**100.0%**

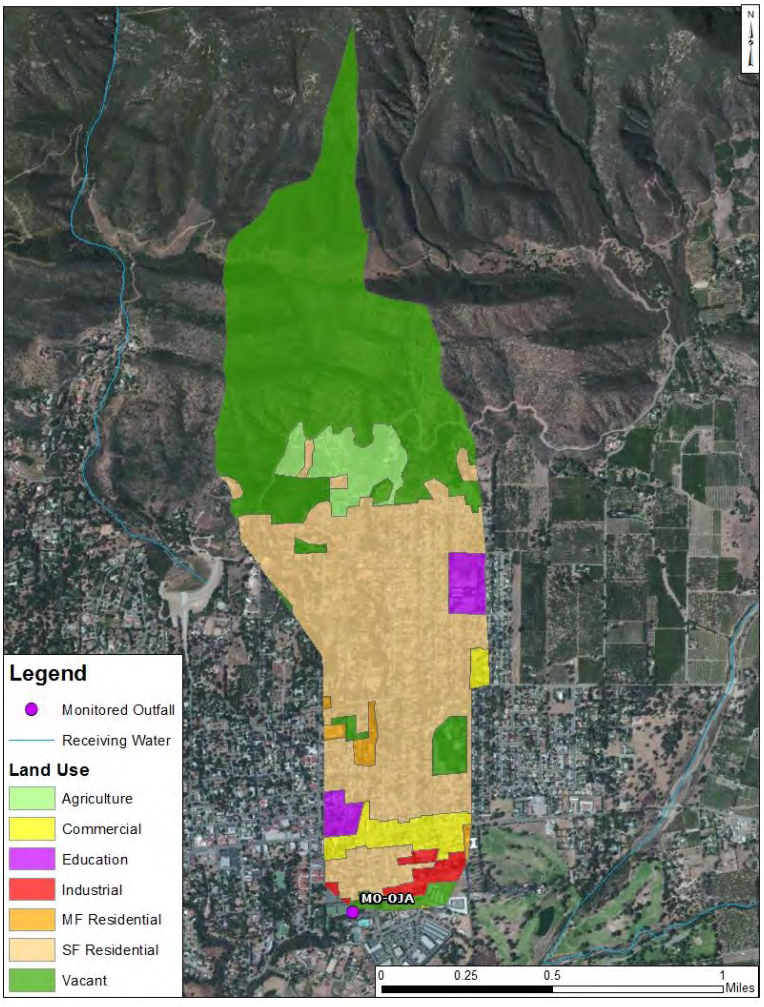

Figure 12. Land Uses in the MO-OJA Drainage Area

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MO-STA

The MO-STA outfall monitoring site is located at the west end of Stanley Avenue within the City of Ventura. A 48-inch-diameter pipe discharges from the east to the Ventura River's left bank (34°18'03.04"N, 119°18'08.22W). The location of the outfall is shown in Figure 13. A photo of the outfall is provided in Figure 14. The land uses in the MO-STA drainage area are compared with those in the portion of the City of Ventura draining to the Ventura River in Table 22. A diagram of land uses draining to the outfall is presented in Figure 15.

Figure 13. Location of MO-STA

Figure 14. Photo of MO-STA

Table 22. MO-STA Drainage Area Representativeness Comparison

Grouped SCAG Land Use Class	MO-STA Drainage Area		Portion of the City of Ventura draining to the Ventura River	
	Area (acres)	% of Total	Area (acres)	% of City Area
Agriculture	5.1	2.0%	72.1	4.1%
Commercial	15.4	6.0%	230.6	13.2%
Education	22.9	9.0%	41.9	2.4%
Industrial	90.2	35.3%	190.2	10.9%
Multi-Family Residential	10.0	3.9%	159.0	9.1%
Single-Family Residential	18.5	7.2%	353.8	20.2%
Transportation	13.9	5.4%	117.0	6.7%
Vacant	79.4	31.1%	583.0	33.4%
Total	**255.5**	**100.0%**	**1747.5**	**100%**

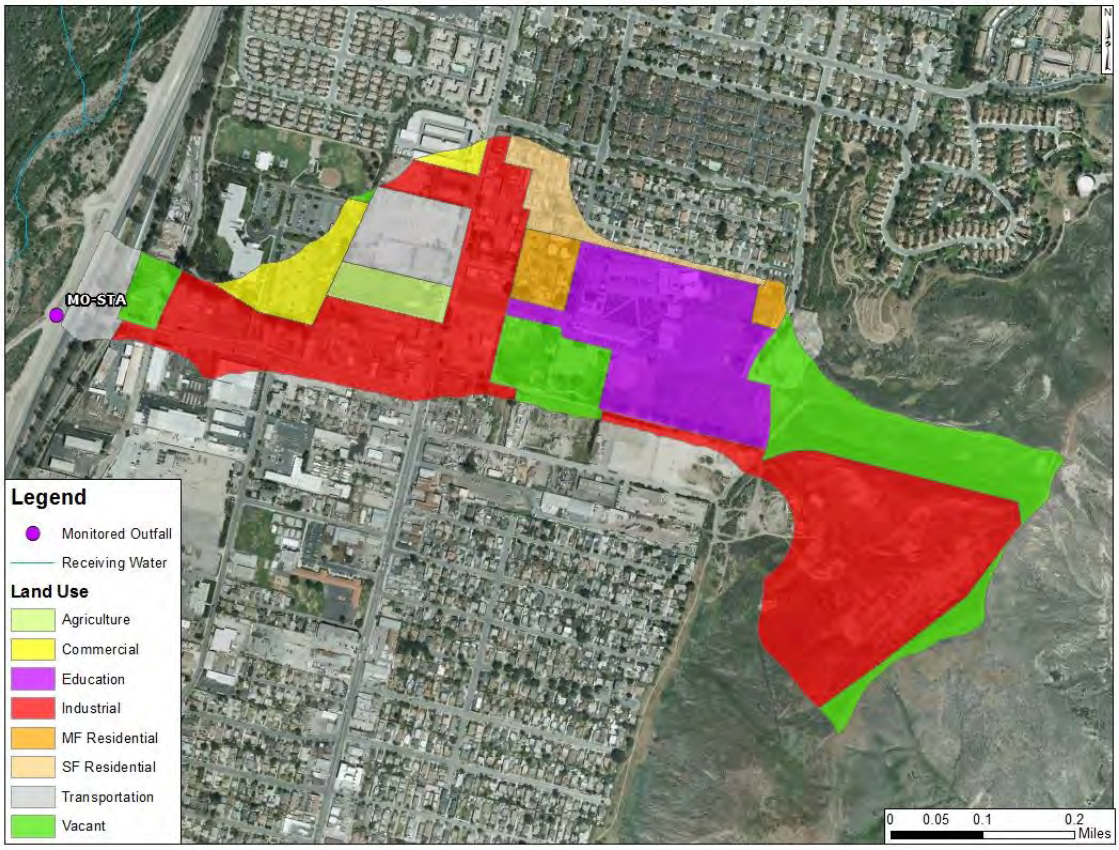

Figure 15. Land Use within the MO-STA Drainage Area

MO-150

MO-150 is located on the northeast shoulder of the Highway 150 bridge crossing the Ventura River. The outfall is a 24-inch diameter corrugated metal pipe situated about mid-slope draining a highway land use. The location of the outfall is shown in Figure 16. A photo of the outfall is provided in Figure 17. The estimated drainage area for the outfall is 0.39 acre and is illustrated in Figure 18.

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Figure 16. Location of MO-150

Figure 17. Photo of MO-150

Figure 18. Estimated MO-150 Drainage Area

Interim Milestones and Implementation Schedule

Wet weather WLAs in the Algae TMDL apply immediately upon their incorporation in pertinent permits. The Ventura County MS4 Permit is expected to be renewed in late 2015. In all likelihood, the wet weather WLAs will be in effect for MS4 permittees by the time the IP is approved by the Regional Board. The Algae TMDL was incorporated into the Caltrans general permit (State Board Order 2012-0011-DWQ) in the July 1, 2014 amendment. Consequently, interim milestones are not proposed for the attainment of wet weather WLAs.

Interim limits were not assigned for dry weather in the TMDL; the dry weather WLAs are final limits that apply six years after the TMDL effective date (by June 27, 2019). However, post baseline monitoring data described above implies that significant progress toward meeting the dry weather WLAs has already occurred. Multi-faceted interim milestones for attainment of the dry weather WLAs are proposed that (1) focus on reductions in dry weather flow rates, (2) provide opportunity for confirmation of existing post-baseline monitoring results, and (3) allow for prioritization of non-structural BMPs over structural BMPs. The interim milestones are described in Table 23. The interim milestones incorporate triggers based on monitoring data and use flow as a proxy for

nutrient discharges; additional BMPs are triggered only if monitoring data indicates that incremental progress toward meeting the target reductions in runoff volumes is not occurring. The triggers account for the observation that conditions and actions between 2011-2014 appear to have already resulted in significant progress toward attainment of the final dry weather WLAs.

The implementation schedule includes an optional dry weather outfall screening. The purpose of the outfall screening would be to identify neighborhoods, sources, or land uses to focus on with BMP implementation. The outfall screening would occur at the discretion of individual dischargers, and the goals and methods would be determined by individual dischargers. Jurisdictions that elect to perform the outfall screening would be considered in compliance with the dry weather WLAs at that point in the implementation plan.

Table 23. Implementation Schedule and Interim Milestones for Dry Weather WLAs

Date	Milestones
June 2015	Implementation Plan is Submitted June 27, 2015
June 2016	• Monitoring confirms ≥38% flow reduction compared to baseline; OR • Optional outfall screening has commenced; OR • Planning for new non-structural BMPs has commenced. Enhanced outdoor water conservation measures by other agencies satisfy this interim milestone.
June 2017	• Results of outfall screening (if performed) have been used to prioritize neighborhoods for BMP implementation and targeted BMP planning has commenced; OR • Dry weather runoff volumes have been reduced by ≥40% compared to baseline; OR • Implementation of new non-structural BMPs has commenced in pertinent jurisdictions.
June 2018	• Dry weather runoff volumes have been reduced by ≥45% compared to baseline; OR • Additional BMPs are being implemented
June 27, 2019	• Dry weather WLAs have been attained. (Dry weather TN and TP loads have been reduced 50% compared to the baseline)

Adaptive Management Process

The WLA attainment strategies will be implemented using an adaptive management process that bases decisions for action on the evolving quality of receiving waters and urban discharge. On an annual basis, data will be evaluated from the receiving water monitoring program conducted by the TMDL responsible parties (VCWPD 2014) and the outfall monitoring described herein. During the implementation period for the dry weather WLAs (through June 27, 2019), the adaptive management process incorporates

interim milestones presented above in Table 23. During this period, compliance during dry weather can be achieved in three ways: (1) attainment of water quality objectives in receiving water, (2) attainment of dry weather WLAs, or (3) achievement of interim milestones.

Wet weather WLAs will already apply during the implementation period for the dry weather WLAs. Based on long term monitoring data, wet weather WLA exceedances are not expected. Accordingly, decisions regarding wet weather BMPs will not be based on single, occasional wet weather exceedances of outfall WLAs that could represent anomalies rather than a watershed issue. Instead, a wet weather WLA will need be exceeded more than once in a monitoring year to trigger wet weather BMP planning in the jurisdiction where the exceedance occurred. In addition, if exceedances of a wet weather WLA are observed at one or more outfalls but receiving water concentrations of TN or nitrate+nitrite-N are below the WLA concentrations that apply to outfalls in all downstream reaches, the monitoring event data will not trigger planning or implementation of wet weather BMPs. After the dry weather WLAs are in effect (after June 27, 2019), a similar principal will apply to dry event outfall monitoring data; the dry weather WLAs must be exceeded during more than one of the quarterly dry events during a monitoring year to trigger evaluation of additional dry weather BMPs in the pertinent jurisdiction.

The adaptive management processes for dry weather and wet weather are illustrated in Figure 19 and Figure 20, respectively. If the adaptive management process triggers implementation of new BMPs, non-structural BMPs will be prioritized by addressing sources through public education and outreach, inspections and evaluations, enforcement, or some form of incentive. If non-structural approaches do not effectively address likely sources identified by inspection and evaluation or enforcement programs, additional structural BMPs will be planned. If the dry weather WLAs and receiving water targets are not being met by June 27, 2019, more time might be needed to implement structural BMPs. In this case, a Time Schedule Order or TMDL modification might be needed to allow for implementation of structural BMPs.

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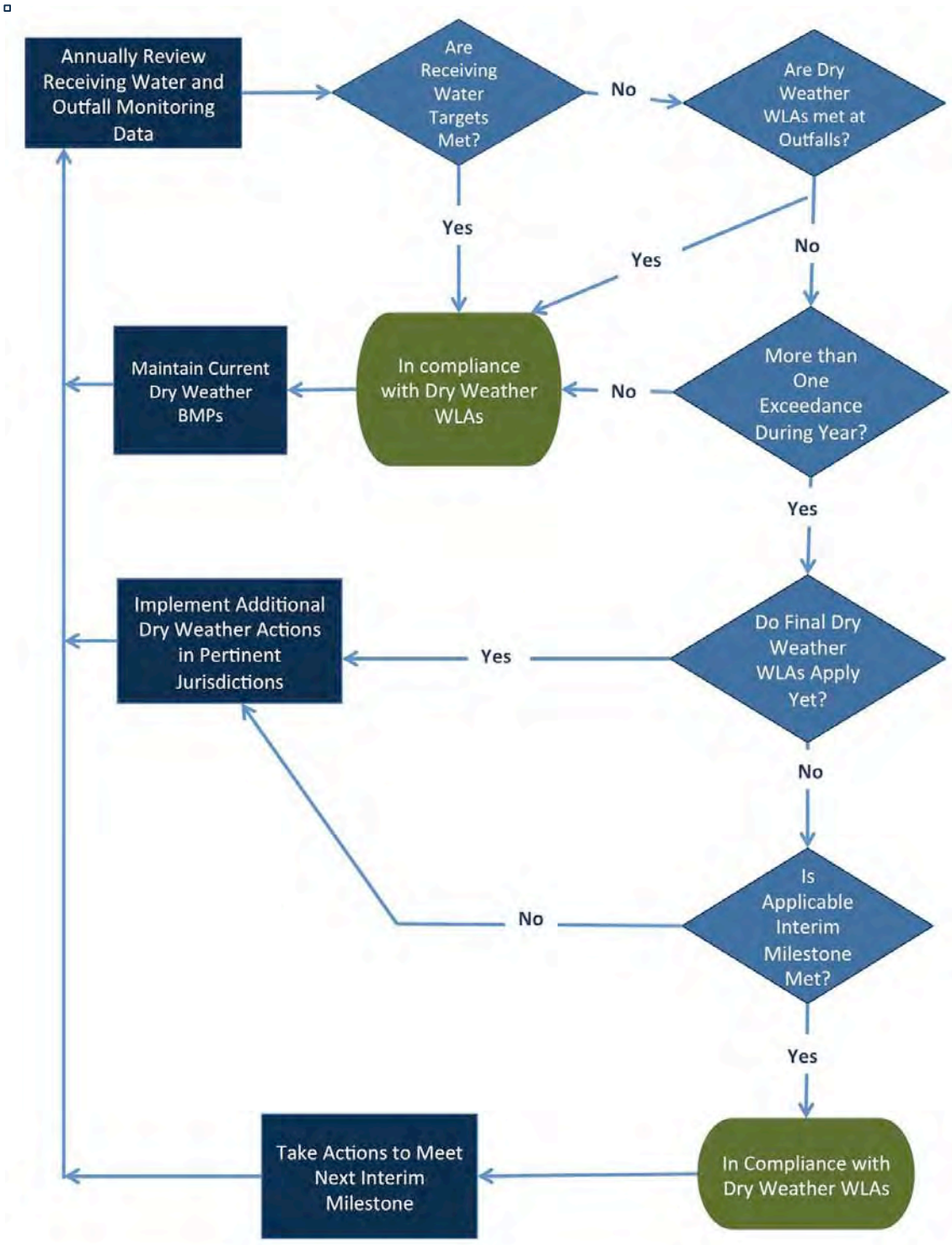

Figure 19. Adaptive Management Process for Attainment of Dry Weather WLAs

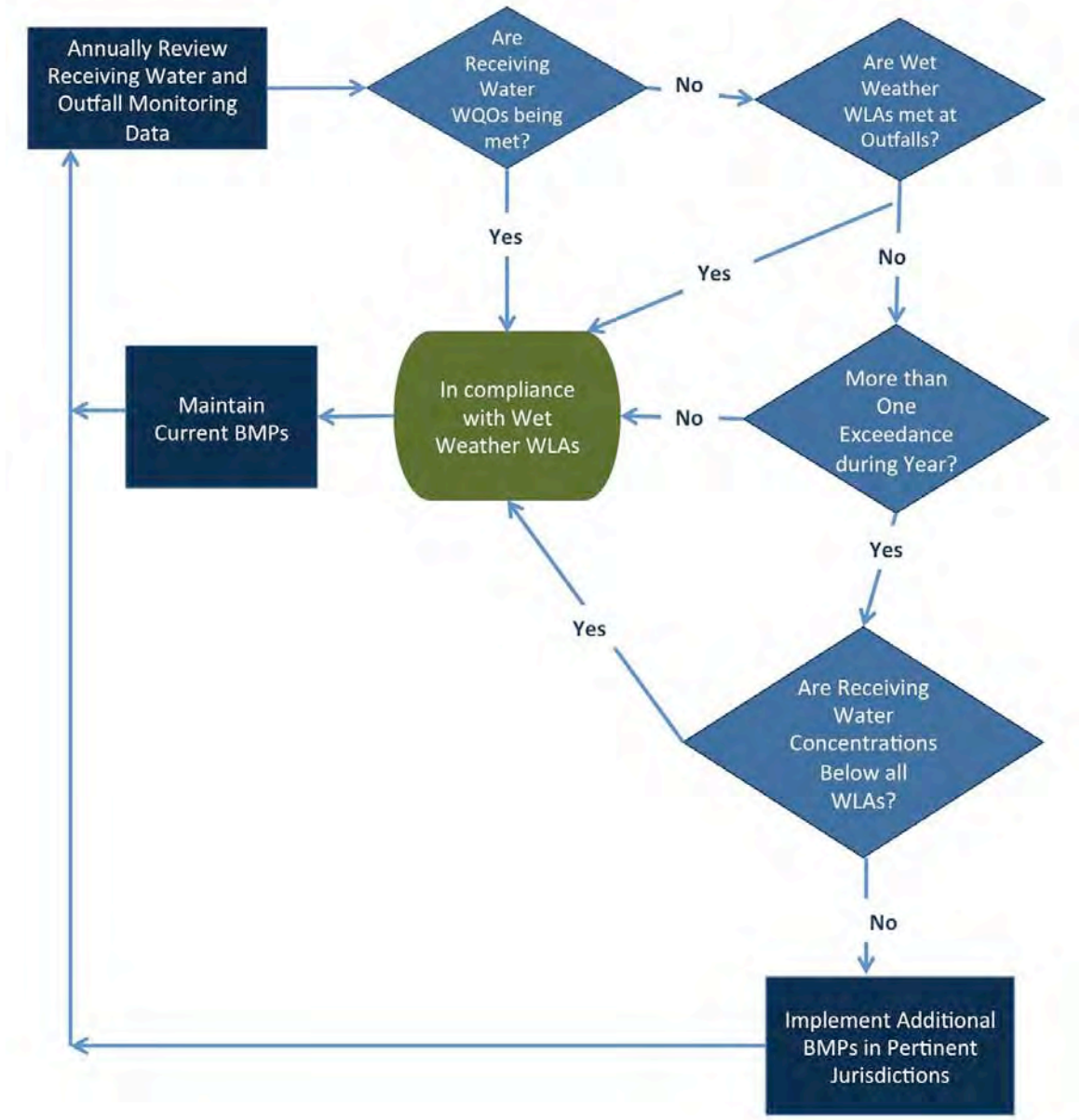

Figure 20. Adaptive Management Process for Attainment of Wet Weather WLAs

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Attachment 1. Total Nitrogen Concentrations at ME-VR2 between 2001-2014

Date	TN (mg N/L)
2/13/01	8.42
2/26/01	3.82
3/5/01	7.79
11/13/01	1.4
3/8/02	1.09
11/10/02	3.8
12/18/02	2
2/12/03	2.2
2/3/04	0.99
2/19/04	0.47
2/27/04	1.62
10/19/04	4.1
10/28/04	1.76
12/6/04	0.59
1/11/05	4
10/19/05	1.2
11/10/05	6.85
2/21/06	2.18
3/1/06	2.1
12/11/06	4.25
1/29/07	0.64
2/23/07	0.25
4/21/07	0.37
9/24/07	0.23
1/24/08	5.04

Date	TN (mg N/L)
11/26/08	0.23
12/16/08	0.9
2/7/09	0.42
3/5/09	0.29
10/14/09	1.48
12/8/09	1.67
2/6/10	2.7
10/06/10	
10/7/10	1.03
10/30/10	0.76
11/21/10	
2/17/11	1.65
10/6/11	
1/21/12	
3/18/12	
10/12/12	
11/18/12	0.81
3/8/13	0.52
12/8/13	0.69
2/7/14	0.66
2/28/14	0.86

Attachment 2. Non-Structural BMP Effectiveness

Available literature was reviewed to develop an effectiveness rating for public education and outreach, inspection and evaluation, progressive enforcement, and incentive non-structural BMP classes. The assumed effectiveness ratings for each non-structural BMP class are presented in Table 13 within the main body text. Each BMP is assigned an assumed effectiveness rating that is equal to the product of a participation factor and a loading factor (Water Environment Research Foundation, 2000), described below.

- The participation factor is the amount of the target audience who would implement or participate in the non-structural program, representing the overall behavior change resulting from implementation. For example, outreach to residents might result in 5 to 10% of residents changing their behavior (5-10% participation factor). For programs that the agencies have complete control over (e.g., changing washing practices at a municipal facility) the participation factor would be closer to 100%.

- The loading factor is how much of the pollutant load would be reduced if 100% of the target audience changed their behavior. For example, if half of the residents responded to a sidewalk washing education program, dry weather flows may be reduced by 50% (loading factor 50%). If residents stopped washing sidewalks all together, then the loading factor would be 100%.

The following section describes the assumptions used to identify participation and load factor ranges for each non-structural BMP class.

PUBLIC EDUCATION AND OUTREACH

Public education and outreach programs can be crafted to address specific pollutants of concern including salts, trash, nutrients, metals, pesticides, and bacteria. The public education and outreach program implemented as part of this TMDL implementation planning effort will directly target dry weather volume and nutrient loading, although the program may be broadened or combined with existing programs to address other pollutants of concern. Program effectiveness has been shown to increase as more focused outreach is performed, whether targeted to specific audiences (which would increase the participation factor), or targeted to specific pollutants and sources (which would increase the loading factor). In general, broad outreach programs to the general public have been found to be less effective, even though the audience may be larger (Larry Walker Associates, 1998; Caraco, 2013).

Consistent with literature values, low participation factors were used for broad-based residential outreach programs. Participation factors were increased for more targeted outreach programs, such as those with specific audiences (e.g. points of purchase such as home improvement centers). Targeted outreach programs were assigned overall effectiveness ratings of 2-20%. Organized events, such as river or ocean friendly gardening seminars, were assigned a 5% participation factor and a mid-range loading factor resulting in a relatively low effectiveness rating (2-4%).

INSPECTIONS AND EVALUATIONS

The proposed inspection and evaluation program will be implemented to address key sources contributing to nutrient loading and dry weather flows from the TMDL IP area. Based on literature values, a higher level of participation in voluntary evaluations or inspections is expected in business outreach programs when combined with a business assistance program (Brosseau, 1997). Assuming not all potential sources would be targeted every year, the analysis utilized participation factors ranging from 10-30%, more conservative than literature values (which ranged from 30-80%). Corresponding loading factors are generally high for targeted evaluation programs because subsequent implementation of recommended or required BMPs will often eliminate the source of the pollutant. Loading factors of 80-100% were used, consistent with literature values.

Inspection and evaluation programs will track potential sources and increase the total number of inspections. When paired with a progressive enforcement program, annual participation factors were assumed to be 40%. Loading factors were assumed to be 80-90% due to the targeted nature of the inspection and evaluations, consistent with literature values for programs in Palo Alto and Sacramento, CA. An overall effectiveness range of 8-30% with an average of 19% was assumed for inspection and evaluation programs.

ENFORCEMENT

Under the 2009 MS4 permit (Order 09-0057), permittees are required to develop and implement a progressive enforcement policy. The use of progressive enforcement tends to increase participation rates, improving the overall effectiveness rating of enforcement programs. In some cases, participation factors as high as 80% have been used where regulatory requirements are enforced (Brosseau, 1997). While progressive enforcement programs increase participation, they are not generally expected to have an effect on the loading factors. An increase in progressive enforcement effectiveness is typically driven by an increase in participation rather than a higher loading factor. A broad effectiveness range between 2-72% was assumed for enforcement activities.

INCENTIVES

Where opportunities arise, responsible parties will cooperate with private land owners to encourage behavioral change or the adoption of specific measures to target dry weather volume and/or nutrient loading. Because of the targeted nature of an incentive program, it is expected that the loading factors would be high, consistent with other focused programs. Loading factors ranging from 50-80% were assumed. However, with limited opportunities and low participation assumed in the early stages, the participation factors were assumed to range from 5-25%, resulting in effectiveness ratings in the range of 2-20%. Although incentive programs were not specifically addressed in the literature, these assumptions are consistent with other programs in the literature.

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June 27, 2015

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Attachment 3. Caltrans Planned Structural BMPs Targeting Nutrients and/or Runoff Volume

Note: Preliminary studies have been conducted for the BMPs in the list. However, BMPs would be subject to independent verification prior to final design and construction.

Route	PostMile	General Location	BMP Type
33	0.1	Gore Area between NB SR33 Connector- Ramp from NB SR 101 and SB SR33 Connector- Ramp to SB SR101	Bioswale
33	0.34	Gore Area between the SB SR33 Off-Ramp and NB SR33	Bioswale
33	0.9	Outside Shoulder NB SR33 North of SR33 NB On- Ramp from N Olive St	Bioswale
33	1.57	Outside Shoulder NB SR33 Off- Ramp to Stanley Ave	Bioswale
33	1.8	Outside Shoulder of NB SR33 On- Ramp from Stanley Ave	Bioswale
33	2.65	Interior Area between NB SR33 Off-Ramp and Shell Rd	Bioswale
33	2.9	Outside Shoulder SB SR33 South of Crooked Palm Rd	Bioswale
33	2.95	Outside Shoulder NB SR33 South of Crooked Palm Rd	Bioswale
33	3.23	Outside Shoulder NB SR33 North of Crooked Palm Rd	Bioswale
33	3.85	Gore Area between NB SR 33 and N Ventura Blvd	Bioswale
33	3.99	Outside Shoulder SB SR33 South of Crooked Palm Rd	Bioswale
33	3.99	Outside Shoulder NB SR33 North of N Ventura Rd	Bioswale
33	4.16	Outside Shoulder of SB SR33 North of N Ventura Drive	Bioswale
33	4.34	Outside Shoulder NB SR33 Off- Ramp to Cañada Larga Rd	Bioswale
33	4.82	Outside Shoulder of SB SR33 North of Cañada Large Rd	Bioswale
33	4.88	Outside Shoulder SB SR33 South of N Ventura Ave	Bioswale
33	5.42	Gore Area between NB SR33 and N Ventura Ave South of Casitas Vista Rd	Bioswale
33	5.75	Gore Area between SR33 and the Off- Ramp to Casitas Vista Rd and On- Ramp from Casitas Vista Rd	Bioswale
33	10	Outside shoulder SB SR 33 0.07-mile north of Encino Drive	Bioswale
33	10.6	Outside shoulder SB SR 33 0.09-mile south of Woodland Avenue	Bioswale
33	12	Outside shoulder SB SR 33 at SW corner of Rancho Drive	Bioswale
33	12.8	Outside shoulder SB SR 33 0.03-mile north of Fairview Road	Bioswale
33	14.2	Outside shoulder NB SR 33 0.5-mile north of McDonald Creek Bridge	Bioswale
33	15.2	Outside shoulder SB SR 33 at NW corner of Camino Cielo	Bioswale
33	16.2	Outside shoulder NB SR 33 at Matilija Canyon Road	Bioswale

Route	PostMile	General Location	BMP Type
33	16.7	Outside shoulder NB SR 33 0.48-mile north of Matilija Canyon Road	Bioswale
33	16.9	Outside shoulder NB SR 33 0.68-mile north of Matilija Canyon Road	Bioswale
33	19.4	Outside shoulder SB SR 33 north end of Bear Creek Bridge	Bioswale
33	19.5	Outside shoulder NB SR 33 0.17-mile north of Bear Creek Bridge	Bioswale
33	20.8	Outside shoulder NB SR 33 1.11 miles north of North Fork Bridge	Bioswale
33	21.1	Outside shoulder NB SR 33 1.40 miles north of North Fork Bridge	Bioswale
33	21.3	Outside shoulder SB SR 33 1.56 miles north of North Fork Bridge	Bioswale
33	21.9	Outside shoulder SB SR 33 2.17 miles north of North Fork Bridge	Bioswale
33	22.9	Outside shoulder SB SR 33 2.90 miles south of Rose Valley Road	Bioswale
33	24	Outside shoulder NB SR 33 1.76 miles south of Rose Valley Road	Bioswale
33	24.4	Outside shoulder NB SR 33 1.34 miles south of Rose Valley Road	Bioswale
101	30.9	WB SR 101 Shoulder between SR 33 On- and Off-Ramps	Bioswale
101	30.9	EB SR 101 Shoulder West of SR 33 Jct	Bioswale
101	31.4	WB SR 101 Shoulder East of Main Street UC	Bioswale
101	31.5	WB SR 101 Shoulder between Main Street On-/Off- Ramps	Bioswale
150	6.8	Outside shoulder WB SR-150 1.0-mile south of Laguna Ridge Fire Road	Bioswale
150	7.7	Outside shoulder EB SR-150 475 feet south of Laguna Ridge Fire Road	Bioswale
150	8.3	Outside shoulder WB SR-150 0.5-mile north of Laguna Ridge Fire Road	Bioswale
150	9.3	Outside shoulder EB SR-150 0.1-mile east of Forest Route 4N10	Bioswale
150	9.3	Outside shoulder WB SR-150 0.1-mile east of Forest Route 4N10	Bioswale
150	9.5	Outside shoulder WB SR-150 0.3-mile east of Forest Route 4N10	Bioswale
150	9.7	Outside shoulder EB SR-150 0.5-mile east of Forest Route 4N10	Bioswale
150	10.6	Outside shoulder EB SR-150 0.7-mile west of Santa Ana Road	Bioswale

Route	PostMile	General Location	BMP Type
150	10.6	Outside shoulder WB SR-150 0.7-mile west of Santa Ana Road	Bioswale
150	10.9	Outside shoulder EB SR-150 0.5-mile west of Santa Ana Road	Bioswale
150	10.9	Outside shoulder WB SR-150 0.5-mile west of Santa Ana Road	Bioswale
150	11.4	Outside shoulder EB SR-150 0.1-mile east of Santa Ana Road	Bioswale
150	11.5	Outside shoulder WB SR-150 0.2-mile east of Santa Ana Road	Bioswale
150	11.7	Outside shoulder EB SR-150 0.4-mile west of De La Garrigue Road	Bioswale
150	11.7	Outside shoulder WB SR-150 0.3-mile west of De La Garrigue Road	Bioswale
150	12.2	Outside shoulder EB SR-150 0.1-mile east of De La Garrigue Road	Bioswale
150	12.5	Outside shoulder EB SR-150 0.2-mile west of Ranch Road	Bioswale
150	12.5	Outside shoulder WB SR-150 0.2-mile west of Ranch Road	Bioswale
150	13.1	Outside shoulder WB SR-150 0.2-mile east of Burnham Road	Bioswale
150	13.4	Outside shoulder EB SR-150 0.1-mile east of Burnham Road	Bioswale
150	13.6	Outside shoulder EB SR-150 0.3-mile west of Burnham Road	Bioswale
150	14.9	Outside shoulder WB SR-150 0.2-mile east of Tico Road	Bioswale
150	14.9	Outside shoulder WB SR-150 0.2-mile east of Tico Road	Bioswale
150	15.4	Outside shoulder WB SR-150 0.7-mile east of Tico Road	Bioswale
150	15.4	Outside shoulder WB SR-150 0.7-mile east of Tico Road	Bioswale
150	15.6	Outside shoulder WB SR-150 0.9-mile east of Tico Road	Bioswale
150	18.2	Outside shoulder WB SR-150 380 feet east of Shady Lane	Bioswale
150	18.8	Outside shoulder EB SR-150 290 feet west of Boardman Road	Bioswale
150	18.8	Outside shoulder WB SR-150 90 feet east of Boardman Road	Bioswale
150	19.6	Outside shoulder EB SR-150 0.2-mile west of Carne Road	Bioswale
150	19.8	Outside shoulder WB SR-150 110 feet east of Carne Road	Bioswale
150	20.6	Outside shoulder EB SR-150 0.8-mile east of Carne Road	Bioswale
150	21.6	Outside shoulder WB SR-150 0.8-mile west of Happy Valley School Road	Bioswale
150	22.3	Outside shoulder WB SR-150 400 feet west of Happy Valley School Road	Bioswale
150	22.9	Outside shoulder EB SR-150 0.2-mile west of Old Walnut Road	Bioswale

Route	PostMile	General Location	BMP Type
150	22.9	Outside shoulder WB SR-150 0.2-mile west of Old Walnut Road	Bioswale
150	23	Outside shoulder WB SR-150 0.1-mile west of Old Walnut Road	Bioswale
150	23.6	Outside shoulder WB SR-150 0.3-mile east of Mountain Lion Road	Bioswale
150	24.6	Outside shoulder WB SR-150 0.3-mile west of Awhai Ranch Road	Bioswale
150	24.9	Outside shoulder EB SR-150 310 feet east of Awhai Ranch Road	Bioswale
150	24.9	Outside shoulder WB SR-150 370 feet east of Awhai Ranch Road	Bioswale
150	25.1	Outside shoulder WB SR-150 230 feet west of Chumash Road	Bioswale
150	9.3	Outside shoulder EB SR-150 0.1-mile east of Forest Route 4N10	Infiltration Device
150	15.6	Outside shoulder WB SR-150 0.9-mile east of Tico Road	Infiltration Device
150	18.8	Outside shoulder WB SR-150 90 feet east of Boardman Road	Infiltration Device