PROGRAM EFFECTIVENESS ASSESSMENT & IMPROVEMENT PLAN

City of Pismo Beach

Pismo Beach's stormwater programs address many pollutants of concern and implement a wide range of BMPs. The PEAIP presents a plan for assessing the effectiveness of a subset of prioritized BMPs that are focused on high priority pollutants of concern. This approach provides a manageable assessment program that can be improved, targeted, and refined.

Contents

Tables of Tables

Table of Figures

I Background

Section E.14 of the General Permit requires the City to develop a Program Effectiveness Assessment and Improvement Plan (PEAIP), which tracks and assesses the long-term effectiveness and success of the City's stormwater program

1.1 Program Effectiveness Assessment and Improvement Plan Requirements

Program Element E.14.a of the National Pollutant Discharge Elimination System (NPDES) General Permit for Waste Discharge Requirements for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems (MS4s) Order No. 2013-0001-DWQ NPDES No. CAS000004 (herein referred to as the 'MS4 General Permit') requires the development of a Program Effectiveness Assessment and Improvement Plan (PEAIP).

The PEAIP is required to:

(a) Be modeled after the most recent version of the California Stormwater Quality Association (CASQA) Municipal Storm Water Program Effectiveness Assessment Guidance document or equivalent and must include the following elements:

1. Identification of overall program goals including pollutants of concern and prioritized BMPs.
2. Documentation of the level of implementation of storm water program elements.
3. Identification and targeting of target audience(s)
4. Assessment of BMP performance at achieving outcome levels
5. Assessment of pollutant source reductions achieved by individual BMPs.
6. Quantification of pollutant loads and pollutant load reductions achieved by the program as a whole.
7. MS4 discharge quality, where available, including analysis of the data.
8. Receiving water quality data, including analysis of the data.
9. Identification of long-term effectiveness assessment, to be implemented beyond the permit term.

(b) Assess BMP and program effectiveness in terms of the following Outcome Levels:

1. Storm water program activities
2. Awareness
3. Behavior
4. Pollutant load reductions
5. MS4 discharge quality (where assessment is supported by MS4 discharge quality data)
6. Receiving water conditions

(c) Identify assessment methods for privately owned BMPs.

(d) Identify assessment methods the Permittee will use to quantitatively assess BMP performance at reducing pollutant loads wherever feasible, using the following or equivalent methods:

1. Direct quantitative measurement of pollutant load removal for BMPs that lend themselves to such measurement (e.g., measuring sediment collected through street-sweeping activities);

2. Science-based estimates of pollutant load removal for BMPs where direct measurement of pollutant removal is overly challenging (e.g., removal of heavy metals through a bioswale);
3. Direct quantitative measurement of behaviors that serve as proxies of pollutant removal or reduction (e.g., the percentage of construction sites demonstrated by inspection to be in compliance with permit conditions); or
4. Visual comparison (e.g., using photographs to compare the amount of trash in a creek between one year and the next).

(e) Ask and answer the following Management Questions for prioritized BMPs for which answers to management questions can be based on quantitative data appropriate to the question being answered.

1. Were prioritized BMPs or group of BMPs implemented in accordance with the permit requirements?
   The City is required to develop quantitative data using the following or equivalent methods:
   a. Confirmation – Documenting whether an activity or task has been completed, expressed as positive or negative outcome (i.e., yes or no)
   b. Tabulation – Simple accounting expressed in absolute (e.g., number of people participating), or relative terms (e.g. percent increase in recycled household hazardous waste)
2. To what extent did prioritized BMPs or group of BMPs change the target audience's behavior?
   The City is required to develop quantitative data using the following or equivalent methods:
   a. Surveys or interviews to discern knowledge, attitudes, awareness, behavior of specific population, etc.
   b. Interviews of site personnel to discern awareness and behavior
   c. Inspections or site visits to directly observe or assess a practice.
3. To what extent did prioritized BMPs or group of BMPs reduce pollutant loads from their sources to the storm drain system?

(f) Include water quality monitoring data, where available, to answer the following long-term management questions, effectiveness of BMPs and the overall storm water program will be assessed in future permit terms.

1. To what extent did implementation of the BMP, group of BMPs, or storm water program enhance or change the urban runoff and discharge quality?
2. To what extent did implementation of the BMP, group of BMPs, or storm water program enhance or change receiving water quality?
3. Did exceedance(s) of water quality objectives or water quality standards persist notwithstanding implementation of the storm water program?

The PEAIP is required to include documentation of the effectiveness of BMPs implemented to reduce the discharge of pollutants to the MS4 to the MEP and protect water quality.

This PEAIP was modeled after the City of Paso Robles PEAIP approach, which reportedly has been determined to meet the requirements of the content, approach and reporting aspects of Program Element E.14.a "Program Effectiveness Assessment and Improvement Plan (PEAIP)."

1.2 PEAIP Goals and Objectives

The overall goals of the City's stormwater program are to:

a. Comply with General Permit provisions.
b. Improve and protect water quality in local receiving waters through targeted implementation of stormwater program activities.
c. Establish a good understanding of urban pollutants sources and associated contribution to pollutant loading to local receiving waters.
d. Focus stormwater program activities in areas (or target audiences) established to have a greater contribution of pollutant loading.
e. Establish a long-term method to assess program effectiveness with a nexus to water quality improvement.

The core objectives of the integrated stormwater program are to:

a. Create GIS maps identifying individual drainage catchments throughout the Pismo Beach jurisdiction.
b. Develop a pollutant loading and relative risk estimation tool/model (or Tool to Evaluate Load Reduction [TELR]) that will provide relative pollutant loading risk per drainage catchment.
c. Identify specific target audiences and targeting methods to focus stormwater implementation in high risk catchments.
d. Develop a Rapid Assessment Methodology and tool to inventory and evaluate BMP performance and maintenance needs.
e. Develop a method to reassess pollutant loading risk and program improvements.

1.4 Outcome Levels (E.14aiia2)

The MS4 General Permit required that the City evaluate BMP and program effectiveness in terms of specific outcome levels. The six outcome level categories that will be used to identify and differentiate the components of the program focus on three categories: source generators, people behaviors and receiving water characteristics.

The outcome levels represent a general progression of conditions that are assumed to be related in a sequence of causal relationships and establish a logical and consistent organizational scheme for assessing and relating individual outcomes.

Outcome Level 1 (Stormwater Program Activities): Level 1 Outcomes, which are often defined by specific stormwater permit requirements, address a variety of stormwater program activities. This outcome level measures the implementation of the program, not the impact that the stormwater program is having.

Outcome Level 2 (Awareness / Barriers and Bridges to Action): Level 2 Outcomes provide a means of gauging whether activities are producing changes in the awareness, knowledge, or attitudes of target audiences. Level 2 Outcomes are often used to gauge progress in, or to refine approaches for, achieving Level 3 Outcomes.

Outcome Level 3 (Behavior / Target Audience Actions): Level 3 Outcomes address the actions of target audiences, and whether or not changes are occurring over time. The major categories of target audience actions are pollutant-generating activities (PGAs); best management practices (BMPs) and supporting behaviors.

Outcome Level 4 (Pollutant Load Reductions / Source Contributions): Level 4 Outcomes reductions in the discharge of pollutants from sources.

Outcome Level 5 (MS4 Discharge Quality / MS4 Contributions): Level 5 Outcomes may be measured within the MS4, or as discharges from it. Evaluation typically focuses on pollutant concentrations and/or loads. Level 5 Outcomes provide a direct linkage between upstream sources and receiving waters and are a critical expression of program success. Assessment data for level 5 outcomes must be supported by discharge quality data.

Outcome Level 6 (Receiving Water Conditions): Level 6 Outcomes describe receiving water conditions. They can apply either to existing conditions or to improvements that will be sought over time through program implementation.

Figure 1 provides a pictorial representation of the three category types, and the general outcome types associated with each of the six outcome levels.

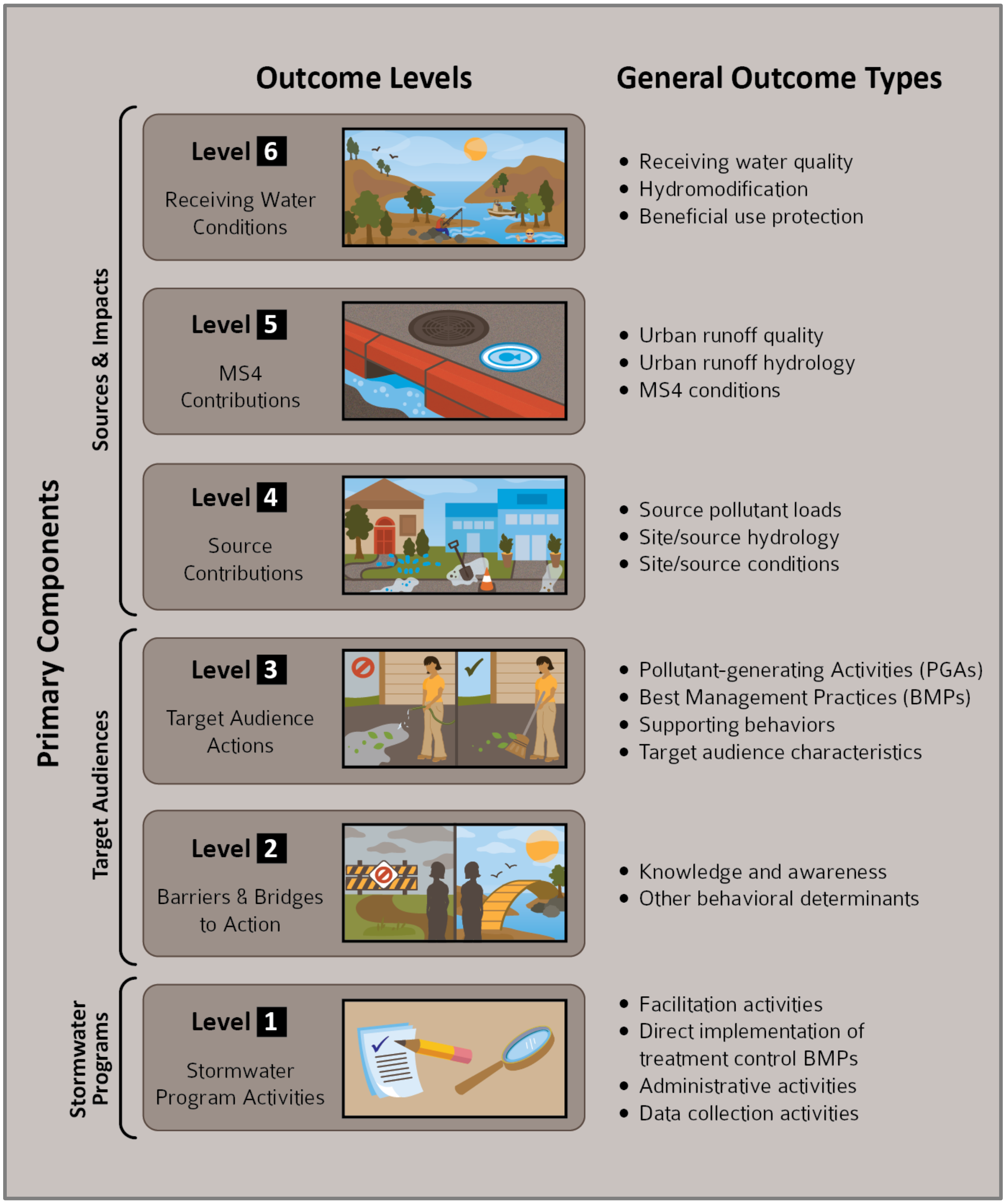

Figure 1 General Stormwater Management Model (CASQA, 2015)

II Program Effectiveness Assessment Approach and Development

2.1 Strategy

In accordance with Section E.14.a. of the General Permit, the City's PEAIP is to include, at a minimum, the following elements:

- Program goals including pollutants of concern and prioritized BMPs,
- Level of implementation for stormwater program elements,
- Target audience identification and targeting methods,
- BMP performance assessment achieving outcome levels,
- Pollutant source reduction assessment achieved by individual BMPs,
- Quantification of pollutant loading and load reductions achieved by program,
- MS4 discharge quality and water quality analysis (where available),
- Receiving water quality data and analysis,
- Long-term program effective assessment implementation.

The City's PEAIP addresses the aforementioned elements in various parts of the plan. Some of these elements are not yet defined as it may take longer that the five year permit cycle to determine data analysis and information gaps.

Because the City has limited and inconsistent water quality data, it is problematic to establish a baseline for assessing water quality improvements. Collecting water quality data has limitations mainly due to the seasonal/annual variations, the financial burden of long-term water quality monitoring, and the necessity to collect multiple years' worth of water quality samples to establish statistically significant data. That being the case, the City plans to assess overall water quality and pollutant loading (and improvements) through the use of pollutant load modeling, which will be further explained in Section III.

The City recognizes that the PEAIP is a dynamic document and should change depending on new information, financial limitations, stormwater program changes based on staffing resources and funding, as well as external regulatory drivers. Pursuant to Section E.14.a (iii) or the General Permit, the City shall annually submit, in subsequent annual reports, a description of implementation, a data/information summary, the short and long-term progress of the program, and data analysis to document program effectiveness and compliance with the General Permit. In addition, the City shall submit an analysis of BMP and/or program effectiveness improvements and the associated modifications every five years.

2.2 Information Inventory/Documents

2.2.1 Drainage Master Plan.

The City updated its Drainage Master Plan in October 2005. The Drainage Master Plan provided a thorough review of self-identified drainage deficiencies within the Pismo Heights and downtown Commercial areas of the City. The goal of the drainage master plan is to prioritize necessary capital improvements to reduce flooding and improve water quality.

2.2.2 Sewer System Management Plan

The purpose of the Plan is to provide a guide to properly manage, operate, and maintain all parts of the wastewater collection system to reduce and prevent sanitary sewer overflows to the extent practicable, as well as mitigate the issues of any spills that do occur.

2.2.3 GIS

The City maintains a dedicated GIS database. The GIS "storm drain atlas" and "sewer atlas" was updated July 2015. The GIS database is the main component in delineating drainage catchments, tracking treatment BMPs, and tracking priority catchments to focus stormwater BMPs and any associated improvements. They also identify sewer collection infrastructure and the tributary area to each of the City's lift stations. The City is currently in the process of creating a GIS to identify locations of sanitary sewer line overflows.

2.2.4 Water Quality Data

There is one Central Coast Ambient Monitoring Program (CCAMP) monitoring location within the City Limits for Pismo Creek, Station 310PIS. Monitoring at this location has only occurs intermittently:

A variety of water quality parameters were sampled roughly monthly between April 2001 and February 2003 and March 2014 and February 2015, with some 24-hour readings in the Augusts of 2002, 2004, 2005 and 2006.

The water quality data that are available through CCAMP provides a good snapshot of key parameter at various times, includes some value with regards to trends, but it limited and inconsistent to develop defendable conclusions.

The County conducts enterococcus, fecal coliforms and total coliforms monitoring on a weekly basis, and during rain events, at three locations:

- PB3: 302 yards south of the Pier at below Ocean view Avenue
- PB4: 40 ft south of the Pismo Beach Pier
- PB5: 338 yards north of pier below Wadsworth Avenue

2.2.5 Recycled Water Facilities Planning Study.

The City initiated the Recycled Water Facilities Planning Study (RWFPS) to investigate alternatives for constructing a recycled water (RW) system that will enable the City to produce and beneficially use RW. The study included a hydrogeologic analysis to evaluate the feasibility of recharge basins and/or injection wells for groundwater recharge and to identify conceptual design criteria for groundwater recharge facilities as well as necessary treatment plant upgrades to support beneficial reuse.

2.2.6 TMDL and 303d Listings

According to the Clean Water Act, Section 303(d), states are required to submit to U.S. EPA a list identifying waters within its boundaries not meeting water quality standards (impaired waters) and the water quality parameter (i.e., pollutant) not being met (referred to as the 303(d) List).

The 303(d) List identifies water quality impairments for the Pismo Creek and the Pacific Ocean at Pismo State Beach. Water quality impairments within Pismo Creek attributable to urban sources include chlorides, E. col, fecal coliforms, low dissolved oxygen, and sodium. The potential urban source are all tied to a single urban issue, transient encampments. The Pacific Ocean at Pismo State Beach, south of Pismo Pier is included on the 303(d) list for fecal coliforms with unknown sources.

The Central Coast Regional Water Quality Control Board has not established a total maximum daily load for Pismo Creek or the Pacific Ocean within the City limits.

Meadow creek and Pismo Lake are currently not included on any 303(d) list.

2.2.7 Pismo Creek/Edna Ware Watershed Management Plan

This plan was develop for the California Department of Fish and Game in March 2009 and is intended to be a working documentation of history, information, and projects along Pismo creek and its tributaries, and throughout the watershed. The plan describes the condition of creek water quality, identifies critical issues facing the watershed, and poses a set of recommendations to address the issues.

2.2.8 Pismo Creek Estuary Enhancement Project

This plan was develop in June 2011 to o investigate the critical issues affecting the Estuary and to consider alternatives for improvement that would be supported by stakeholders

2.3 City Drainage Description

There are major and regional tributary watersheds that contribute drainage to the City's creeks and drainage ways. The four watershed areas contained within the City of Pismo Beach are:

- Pismo Creek Watershed
- Pismo Lake Watershed
- Chumash Park Watershed
- Freeway Foothills Watershed

2.3.1 Pismo Creek Watershed

The Pismo Creek Watershed occupies approximately 47 square miles within southern San Luis Obispo County. The drainage attains a maximum elevation of almost 2,865 feet above mean sea level. It consists of approximately 54 percent mountainous and foothill area and 46 percent valley area.

Pismo Creek's tributaries, West Corral de Piedra, East Corral de Piedra, Canada Verde Creek, and Cuevitas Creek cumulatively measure about 53 miles in length from their headwaters in the Santa Lucia Mountains to where they join, forming the main stem Pismo Creek, upstream of the Union Pacific Railroad crossing (DWR, 2002). The main stem originates at the confluence of East Corral de Piedra and West Corral de Piedra Creeks and flows south-southwest for approximately 5.5 miles to the Pacific Ocean within the City limits of Pismo Beach.

2.3.2 Pismo Lake Watershed

Pismo Lake is nestled between Grover Beach and Pismo Beach in the Pismo Beach Ecological Reserve. Land within the reserve supports a riparian-woodland habitat, dominated by willows and other plants native to the Central Coast of California. The lake is unique because it has both salt and fresh water. Two hundred and fifty bird species, mammals, reptiles, and amphibians inhabit this protected environment.

Pismo Lake Ecological Reserve was a healthy wetland when the Wildlife Conservation Board purchased it in 1976. However, in less that a decade, excessive sediment loads from development along Meadow Creek had reduced the 30 acres of open water to just 2 .5 acres. In 1986 the lake was dredged and deepened along its length at a cost of $100,000. A spillway was installed at the western end to maintain a water depth of about five feet. Dredged material was used to build four islands, ranging in size from one half an acre to 2 acres.

2.3.3 Chumash Park Watershed

The Chumash Park Watershed area consists of a portion of Pismo Beach and a portion of land outside the City limits. Chumash Park consists of 41.15 acres of land, and has tributary runoff from residential subdivisions to the north and south. The Mankins Ranch, located outside the city limits, also contributes to the Chumash Park watershed and occasionally cattle have grazed on their land.

Although there is little data on this watershed, this area is a sub-region of the Meadow Creek Area and exhibits many of the same characteristics.

2.3.4 Freeway Foothills Watershed

The Freeway Foothills area consists of the foothills lying adjacent to and east of U.S. Highway 101. The area consists of developed planned residential developments, a restaurant, a small shopping complex, a few scattered single family dwellings, and the 116-acre Mattie Road annexation area, (currently outside the city limits but within LAFCO adopted Sphere of Influence Area).

This area is highly visible from U.S. Highway 101 above Shell Beach and Sunset Palisades. The foothills provide an important visual and open space backdrop for the entire northern half of the City. The planning area itself has spectacular ocean views. The Freeway Foothills area is physically separated from the other City areas by U.S. Highway 101.

The Freeway Foothills watershed consists of tributary areas within the City as well as outside the City limits.

2.3.5 High Priority Areas

In accordance with Section E.9.a.ii (c), E9.b.ii (b), and E.11.a.ii of the General Permit requires the City to develop facility inventories of high priority facilities located within the City. Based on the aforementioned sections of the General Permit, the City developed an inventory list of priority facilities that have the potential to contribute pollutants within the MS4. This inventory list will be used to identify target audiences, associated pollutants contribution, and related source or treatment BMP controls.

2.4 City Population Description

The City currently serves a population of 8,562, according to the 2000 U.S. Census. Pismo Beach is a popular tourist destination. Visitors increase the local population, on average, by one-third, and on summer holidays, by as much as two to three times the current population.

Pismo Beach stretches along the Pacific shoreline for some seven miles. Most of the City lies within the California Coastal Zone, although recent development in the southeastern sector now extends into the foothills beyond the coastal boundary. The northwestern half of the City is confined on the northeast by steep hillsides that rise to 1,000 feet in some areas and form a magnificent open-space backdrop to the land and beaches below. The State of California controls about a mile of sandy beach within the city limits, as well as many of the public beach areas that stretch to the south for some 20 miles.

Mobile home parks, RV parks, and camping areas extend along these beaches. North of the downtown, the shore is lined with steep bluffs reaching to 100 feet above the water's edge. Much of this area is developed with large hotels and restaurants.

The remainder of the City is residential neighborhoods; smaller beachoriented cottages and apartments in Shell Beach and the downtown; larger, newer homes and condos east of the freeway and in the extreme northwest sector. The City is currently experiencing a fair amount of infill development and rehabilitation of existing properties because there are very few opportunities to annex additional land into the City's service area due to geographic constraints, such as hillsides to the north and east, two adjacent municipalities to the south and the Pacific Ocean to the west.

2.5 High Priority Pollutants of Concern (E.14aiia1)

A variety of pollutants can be found within a municipality. However, based on limited data available, the City's highest priority pollutant of concern is fecal indicator bacteria (FIB). The City concurs with the examples of potential pollutant generating activities listed in Table 5.4 of the June 2015 California Stormwater Quality Association: Planning for and Assessing the Effectiveness of Stormwater Programs but will also focus on a subset of the City of Pismo likely sources of FIB attributable to urbanized areas per the August 2014 UWRRC Technical Committee Report on Pathogens in Urban Stormwater Systems:

Table 1 Likely Source of FIB in the City of Pismo Beach

General Category	**Sources/Activities**
Domestic Pets	Dogs, cats, etc.
Other Urban Sources (including areas that attract vectors)	Food processing facilities Restaurant grease bins Trash bins
Urban Non-stormwater Discharges (Potentially mobilizing surface-deposited FIB)	Power washing Excessive irrigation/overspray Car washing

III Program Effectiveness Assessment (PEA) Approach

The PEA approach will comprise of three key elements: catchment delineation; BMP tracking, performance, and maintenance; as well as pollutant loading/reduction and risk assessment.

The City will to identify and define drainage catchments within the City's boundaries. Delineating drainage catchments within the City's boundaries will allow City staff to focus stormwater activities in catchment areas that have a higher risk to contribute pollutants to receiving waters.

3.1 Catchment Delineation Approach

The City will implement the following steps to delineate drainage catchment:

1. Office mapping, which utilized existing digital data and mapping to create draft maps
2. Field refinement, which allows staff to verify catchments boundaries, and
3. Incorporate associates attribute tables (land use type, percent impervious surface, etc.).

City staff will utilize existing GIS layers to develop a draft map (i.e., City boundaries, existing storm drain atlas, elevation contours, and aerial/street layer). In addition, staff will incorporate the USGS National Hydrography Dataset, USGS Digital Elevation Model, and the USGS National Land Cover Dataset in to the existing mapping layers. As a result, staff will create a map showing an arterial network of drainages that lead to Pismo Creek and to Ocean outfalls. Staff will delineate the entire MS4 into unique catchments encompassing approximately 100 acres (moderate to high impervious areas) and 200 acres or greater (low to no development). Catchment delineation is primarily based on land uses, drainage patterns, topography, and the City's storm drain distribution system.

Once the drainage catchments are delineated, the City will develop a unique identifier for each catchment. Each unique catchment will be characterized using the following attributes: 1) acreage, 2) percent impervious surface, 3) specific land uses, 4) drainage/hydrologic description (estimated volume), and 5) rainfall totals. These attributes will be inventoried with each catchment.

3.2 BMP Rapid Assessment Method.

The BMP Rapid Assessment Method (RAM) process is a simple six steps approach that allows the City to identify effectiveness and functionality of source and treatment control BMPs identified in specific catchment areas. This approach was successfully developed and implemented in the Lake Tahoe area. The BMP RAM process incorporates the following steps:

1. Defining the urban catchment areas of interest (mapping/delineation discussed in Section 2.1),
2. Creating an inventory of treatment control BMPs,
3. Setting benchmark and threshold values,
4. Conducting BMP field observations,
5. Obtaining BMP RAM scores, and
6. Analyzing results for BMP scoring.

3.2.1 Treatment BMP Inventory

The City will collect information from existing "as-built" drawings and obtain information from planning, building, and maintenance staff to create an inventory of treatment BMPs. Treatment BMPs include, but are not limited to, dry basins, wet basins, infiltration basins, treatment vaults, cartridge filters, bed filters, settling basins, biofilters, infiltration features (rock lined channel), porous pavement, and sediment traps. Each identified treatment BMP will be given a specific identification number/name. In addition, each treatment BMP will be inventoried in the BMP RAM tracking system.

3.2.2 Benchmarks and Threshold Values

A vital component of the BMP RAM process is to establish benchmark and threshold values for each treatment BMP. The benchmark and threshold values and based on field observations. Both the benchmark and threshold values range from 0 to 5. The benchmark for a specific treatment BMP will have a score of 5, which represents the best achievable condition. The threshold value less than or equal to 2 defines a treatment BMP condition that is no longer providing adequate water quality treatment and does not perform/function as originally intended and maintenance for that specific BMP is required to restore performance/functionality. The benchmark and threshold values are then incorporated in a web-based tracking system where specific information for each treatment BMP is recorded (location, size, BMP type, # of inlets/outlets, benchmark and threshold values, as well as # of field observations).

3.2.3 Field Observations

City staff will conduct field observations on a semiannual basis (May and September) in order to quickly assess the condition, performance, and functionality of the treatment BMP. The field observations will be developed specific to the BMP type and may include assessment of soil conditions, vegetation amount, infiltration rates, as well as conditions of inlets and outlets. These visual observations will be recorded on the web-based tracking system, which has the ability to display treatment BMP performance trends over time.

3.2.4 RAM Scoring

Field observation results are then recorded into the web-based tracking system for each treatment BMP. The tracking system calculates a score (ranging from 0 to 5) that allows staff to assess maintenance of the treatment BMP and understand its functionality over time. Table 2 provides the relevant RAM scopes and corresponding descriptions.

Table 2 the relevant RAM scopes and corresponding descriptions

BMP RAM Score	Condition	Maintenance Urgency	Description
0 – 1.0	Failure	Required	Little to no downgradient water quality benefit and downgradient water quality may be adversely affected due to failure of treatment BMP function. Maintenance required immediately.
1.0 - 2.0	Below Acceptable		Treatment BMP load reduction potential is below acceptable condition. Maintenance is required prior to next runoff event.
2.0	Threshold		Threshold condition set by user that corresponds to condition where maintenance is required.
2.0 - 3.0	Fair	Moderate	Acceptable downgradient water quality benefit, but treatment BMP condition is closer to threshold than benchmark. Maintenance should be performance if time and resources permit.
3.0 - 4.0	Acceptable	Low	Acceptable downgradient water quality benefits. No immediate maintenance needed.
4.0 – 5.0	Desired		
5.0	Benchmark	None	Maximum achievable downgradient water quality benefits for the specific treatment BMP. No maintenance actions needed.

3.2.5 RAM Data Analysis

The BMP RAM web-based tracking system will allow greater consistency and ease of data management over time. In addition, the tracking system will allow for spatial and temporal analysis of RAM data, establish color coding scheme (green to red) used to identify maintenance needs, facilitate maintenance schedules, as well as justify allocation of funding and staffing needs.

3.3 Pollutant Load Evaluation and Reduction

One of the most vital components of assessing program effectiveness is to track and determine long-term reductions in pollutant loading. The goal is to develop a simple urban pollutant loading model that provides a user-friendly interface to estimate pollutant loading contributions and risk generating from specific MS4 catchments. The pollutant loading model will allow program managers to:

1. Identify and prioritize urban catchments with the greatest potential threat to receiving water quality;
2. Educate alternatives to reduce volumes/pollutants loads on a catchment scale,
3. Estimate and report benefit of improvement actions implemented on both a catchment and municipal-wide scale, as well as
4. Comply with General Permit requirements.

3.3.1 Tool to Evaluate Load Reduction (TELR) Model

The pollutant loading model that will be used is named the TELR Model. The City purposes to use the TELR Model rather than water quality monitoring due to the fact that monitoring can be costly, is sensitive to climate conditions (drought), difficult to maintain consistent and robust dataset, and would need a large amount of data overtime to better understand program improvements. The TELR will be designed as a “desktop” modeling tool with reduced complexity allowing program managers to prioritize stormwater activities and funding.

Two primary water quality parameters that will be used in the model include volume and sediment. Volume is a large component of the signal. Runoff volume varies by land use density and distribution of impervious surface. Essentially, if there is little to no volume of water then there will be no pollutant loading in the receiving water. The inverse is also true.

Sediment can be observed as a standalone pollutant as well as a proxy for other pollutants. Various bacteria, metals, and nutrients can attach and be transported with fine sediment particulates to local receiving waters. Therefore, evaluating total suspended solids (TSS) can educate the program manager on areas with greater pollutant loading contribution.

3.3.2 Catchment Triage

The output of the TELR Model is a color coded guide that provides volume and sediment loading estimates (pounds per acre) per catchment. The pollutant loading values calculated by the TELR Model will be tied to each unique catchment. Based on these pollutant loading values, the program manager can identify (through color coding) catchment areas that require focused/improved stormwater activity implementation.

3.3.3 Program Activity Prioritization

Once the specific pollutant loading values are documented per catchment, City staff can then identify priority catchments that will benefit from cumulative water quality improvement actions.

3.4 Program Implementation Activities

As a final step in the program evaluation process, City staff will implement program activities that will serve three functions;

1. Facilitate behavioral changes in target audiences,
2. Directly implement treatment BMPs to their optimal potential, and
3. Maintain a high level of programmatic administration (update plans, policies, and ordinances to facilitate implementation of the overall program).

3.4.1 Target Audience Identification and Targeting Tools

In order to implement BMP activities in an effective manner, the City must better understand target audiences that are potential sources of pollutant contributions. Examples of targeted audiences include a multitude of sources ranging from residential home improvement project "do-it-yourselfers" to "refuse collectors". The key to better understanding a targeted audience is to understand behavioral patterns and other attributes such as gender, ethnicity, income, and education. Understanding the diverse nature of the targeted audiences will allow the development of specifically targeted BMPs (i.e., education outreach, training, etc.) to address behavioral changes as necessary.

3.4.2 Bridges to Barriers

One of the greatest functions of changing targeted audience behavior is to understand barriers to a specific outcome. Bridges will need to be understood to overcome specific barriers (i.e., language, socioeconomic, etc.). However, some bridges may take time to understand and will likely consider implementation costs, staffing resource availability, and relative water quality improvements

3.5 Schedule

The implementation of BMPs will depend greatly on implementation costs, staffing resources, level of effort, and relative impact on the improvement of water quality. As required by the General Permit Program Element E.9.a "Outfall Mapping", the initial catchment mapping will be completed prior to June 30, 2015. The BMP RAM web-based database should be beta tested in September 2015 and should be available for use by early 2016. The TELR Model should be available for beta testing in September 2015 and should be available for use in early 2016.

Section E.14.a (iii) of the General Permit requires the City to submit annually, a description of implementation, a data/information summary, the short and long-term progress of the program, and data analysis to document program effectiveness and compliance with the General Permit. The City proposes to review and update (as needed) the PEAIP every five years as prescribed by the General Permit.

IV Program Improvement Process

The Program effectiveness assessment and improvement is an iterative approach and is used as a tool to gradually enhance program implementation with the ultimate goal of improving and protecting water quality. Figure 2 demonstrates the adaptive program management cycle.

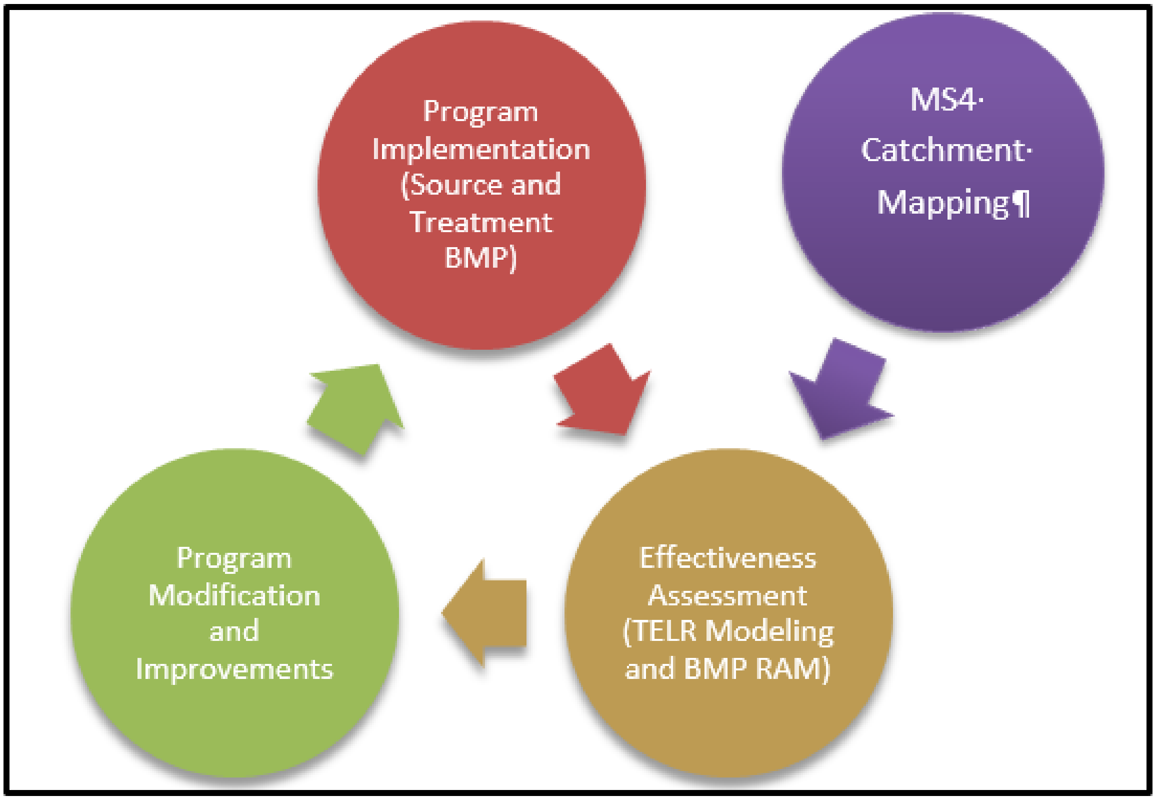

Figure 2 Adaptive Program Management Approach

Pursuant to E.14.b (ii) of the General Permit, the City will identify and summarize BMP and program modification needs for specific programmatic areas. These modifications will include 1) improving BMPs that are underperforming, 2) continue to implement effective BMPs and develop new BMPs to facilitate pollutant load reduction, 3) eliminating and replacing BMPs that are ineffective, and 4) reallocating resources (staffing and funding) to increase effectiveness in focus program areas. Once the aforementioned areas have been identified, City staff can implement and incorporate the changes into the stormwater program by using the adaptive program management approach.