

Purpose

The Program Management Practices (PMPs) are activities and BMPs that Copermittees and target audiences implement to address urban runoff pollutants, pollutant generating activities, and sources. The PMP Profile sheets are provided as a step towards generally defining the PMPs, along with associated sources, pollutants, and target audiences, and beginning to look at the effectiveness potential. The Profile sheets provide a limited discussion on PMPs and further development of PMPs and the direct relationship to measurable outcomes is needed.

Effectiveness Assessment Level 1 Variation

The Copermittees have expanded upon the assessment framework initially developed by the Copermittees in 2003 and subsequently modified by the California Stormwater Quality Association in 2007 in regards to Effectiveness Assessment Outcome Level 1 (Storm Water Program Activities). Outcome Level 1 has been broken down further into the following sub-categories and is utilized throughout the PMP Profile sheets:

Level 1a) Program Administration Activities: These are the activities that are needed to administer the program.

Level 1b) Facilitation Activities: These are the activities that are implemented to bring about (“facilitate”) Level 2, 3, or 4 changes in target audiences – or in some cases, maintain a targeted outcome.

Level 1c) Data Gathering Activities: These are the activities used to determine whether and to what extent Level 2 through 6 changes in target audience has occurred.

Resources/References

The Program Management Practices (PMPs) are primarily based upon reported information from Copermittee’s JURMP, WURMP, and RURMP Annual Reports (2009-2010), the California Stormwater Program Effectiveness Assessment Guidance Document (May 2007), the Baseline Long Term Effectiveness Assessment (2005), and the San Diego Regional Stormwater Copermittees input during watershed data, reporting and assessment needs workshops conducted in 2010. All resources and references are also included in the bibliography of the LTEA. It is important to note that any focused analyses included in a PMP Profile sheet may have limitations and are just provided in summary. It is encouraged that the reader review the noted reports in their entirety.

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Administrative Best Management Practices

Narrative Description

Program administrative BMPs are essential Program Management Practices for program implementation. Administrative BMP activities include:

1. Review/update source inventories and priorities (TCBMPs, construction, industrial and commercial, municipal, etc.)
2. Review/update BMP requirements
3. Develop/review/update standard operating procedures (SOPs), Storm Water Pollution Prevention Plans (SWPPPs), Storm Water Management Plans (SWMPs), manuals etc.
4. Review/update General Plans,
5. Review/update ordinances, municipal code, etc.
6. Maintain appropriate contracts
7. Review/update educational materials
8. Review/update approval process

These activities are important for establishing the foundation of a storm water program.

Target Source(s)

- Municipal Facilities
- Industrial and Commercial Facilities
- Construction Sites
- Residential
- Roads, streets, highways, and parking facilities
- MS4

Target Pollutant(s)

- Indirect relationship to all pollutants

Target Audience(s)

- Municipal Staff

Effectiveness Potential

Program administration is fundamental in achieving effectiveness assessment outcome levels. Administrative BMPs result in a Level 1a (administration) effectiveness assessment which is ultimately confirmation of the activity. Confirmation is often used to track plan implementation. Because administrative BMPs require other PMPs to be implemented, they have the indirect potential to be effective at changing knowledge and awareness (Level 2), behavior (Level 3), and source reduction (Level 4) which ultimately leads to Levels 5 and 6.

Narrative Description

Activity BMPs are those related to target audience implementation as described in the 2005 BLTEA: cover, contain, prevent, good housekeeping and administrative BMPs. Some examples of activity BMPs include:

1. Cover activity/material
2. Clean floor mats, etc. indoors
3. Wash vehicles and equipment in designated areas
4. Properly manage pesticide/fertilizer use
5. Protect storm drains
6. Clean up regularly with dry methods
7. Develop and implement spill prevention plan

Minimum Activity BMPs may vary between Copermitees due to each jurisdiction's requirements, but each jurisdiction strives to require and enforce all minimum BMPs for the appropriate source.

Target Source(s)

- Municipal Facilities
- Industrial and Commercial Facilities
- Construction Sites
- Residential

Target Pollutant(s)

- Bacteria
- Trash
- Heavy Metals
- Nutrients
- Oil and Grease
- Organics
- Sediment
- Pesticides

Target Audience(s)

- Municipal
- Construction
- Residential
- Commercial Owners
- Industrial Owners
- Land Development

Effectiveness Potential

The requirement and enforcement of Activity BMPs is a facilitation activity that when implemented by the target audience can assist in achieving Level 3 and Level 4 targeted outcomes. Tracking of behavior or monitoring over a few years may be needed to attain measurable results.

Narrative Description

Operating and maintaining the MS4 infrastructure which includes storm drain pipes, catch basins, inlets, open channels, etc., encompasses a large variety of activities performed by the Copermittees' municipal or contract staff. Each Copermittee implements a schedule of inspection and maintenance activities for the MS4 and MS4 facilities. The maintenance activities that may be conducted include:

- Inventory and prioritization
- Inspection
- Cleaning and proper disposal of any wastes removed
- Record keeping of maintenance and cleaning including amounts removed.

Additionally, each Copermittee implements controls and measures to prevent and eliminate infiltration of seepage from municipal sanitary sewers to MS4s through thorough, routine preventive maintenance of the MS4.

Target Source(s)

- MS4

Target Pollutant(s)

- Bacteria
- Trash
- Heavy Metals
- Nutrients
- Oil and Grease
- Organics
- Sediment
- Pesticides

Target Audience(s)

- Municipal Staff

Effectiveness Potential

The facilitation of the MS4 inspection and cleaning program can provide a Level 3 effectiveness assessment outcome. Level 3 can be achieved through municipal staff implementing the MS4 inspection and cleaning at the proper frequency and within the

proper cleaning guidelines. MS4 cleaning can achieve source load reductions when the amount of debris removed from the MS4 and MS4 facility cleaning is measured - Level 4 effectiveness assessment.

Narrative Description

Street Sweeping is conducted to remove debris, trash, or particles from improved (possessing a curb and gutter) municipal roads, streets, highways, and parking facilities. Street sweeping can be effective in removing trash, debris and other constituents of concern, such as metals, from roadways and parking facilities before entering the storm drain system and has the potential to reach receiving waters. In addition street sweeping helps prevent blockages in storm drains caused from trash and debris that can create flooding issues during periods of heavy rainfall.

Target Source(s)

- Roads, streets, highways, and parking facilities

Target Pollutant(s)

- Bacteria
- Trash
- Heavy Metals
- Oil and Grease
- Sediment

Target Audience(s)

- Municipal Staff

Effectiveness Potential

The facilitation of the street sweeping program can provide a Level 3 effectiveness assessment outcome. Level 3 can be achieved through municipal staff implementing sweeping in the correct locations and at the proper frequency. Furthermore, the measurement of the amount of trash, debris, and constituents of concern removed through street sweeping provides information on the source load reduction - Level 4 effectiveness assessment.

The San Diego Regional Copermittees have conducted Focused Analyses that are related to street sweeping. The following are results of these analyses that support the effectiveness potential.

1. City of San Diego Targeted Aggressive Street Sweeping Pilot Study Effectiveness Assessment (June 2010):

As stated in the Executive Summary of the Report, the Targeted Aggressive Street Sweeping Study was designed to address the following three study questions:

- 1) Which sweeping machine (i.e. mechanical, regenerative air, or vacuum) is most effective in removing metals and other constituents of concern?
- 2) Is it more efficient and effective to aggressively sweep at a high frequency (e.g., once a week or twice a week)?
- 3) Is there a quantifiable link between aggressive street sweeping and the reduction of metals and other constituents of concern in storm water runoff?

The Executive Summary of the report also stated that the results from this study “indicate that street sweeping provides an effective means of reducing concentrations of some constituents in storm water runoff. While machine effectiveness varied by site, the vacuum sweeper was more effective in reducing storm water constituent concentrations than the mechanical and regenerative-air sweepers”. Additionally “storm water concentrations of total suspended solids (TSS) and metals (copper, lead, and zinc) during the beginning of a storm event (first flush) in the vacuum-swept streets were significantly less than those in the mechanically-swept and unswept streets”.

“Optimal load reductions were achieved by the vacuum machine at an aggressive, twice per week frequency. The mechanical sweeper was most effective at removing debris and contaminants at a less aggressive, once per week frequency. Sweeping frequency did not impact the vacuum sweeper’s effectiveness. The vacuum sweeper collected the same amount of debris and metals per broom mile at both the once and twice per week frequencies. The mechanical machine was less effective, in terms of debris removed per broom mile, when sweeping twice per week versus once per week”.

As a result of this special study the City of San Diego will be evaluation the following key considerations that should be weighed in combination with other environmental, social/community and economic factors. Below is an excerpt of the key considerations from the Executive Summary of the report:

- *Key route features such as street grade, and the presence/absence of curbs and gutters, eroding hillsides, or low overhanging trees should be considered when developing future targeted aggressive street sweeping programs.*
- *IN the drainages with the greatest potential for the accumulation of metals on street surfaces (e.g., Priority Section #1), using the vacuum sweeper at an aggressive frequency of twice per week should be considered to maximize load reduction potential.*

- *Along Route 3J, and other residential areas in the Chollas Creek Subwatershed, sweeping with the vacuum sweeper once per week should be considered to attain the maximum metals load reduction possible (aggressive sweeping frequency limited by public response to parking restrictions).*
- *The mechanical sweeper was effective in remove debris and metals along the steeper roads of La Jolla Shores (Routes 1C and 103) and should be considered for weekly sweeping to maximize metals removal and protect ASBS.*
- *In both the Chollas Creek and La Jolla Shores Subwatersheds, additional storm water monitoring should be considered to verify the results of the pilot study and assess the effectiveness of street sweeping on a site-specific basis (i.e., incorporate route-specific baseline sampling for the “unswept” condition, target larger drainage areas, etc.).*
- *The data from this study and future studies should be used to develop a more robust model that can incorporate environmental conditions and complexities associated with urban runoff.*

2. Target Aggressive Street Sweeping Pilot Program Phase III Median Sweeping Study, City of San Diego (August 2010):

As stated in the Executive Summary of the Special Study Report, “the purpose of the Phase III Median Sweeping Study was to evaluate sweeping of roadway medians adjacent to high volume roadways in order to determine the water quality benefits and feasibility of sweeping the median sweeping routes. The areas are not included in the current City street sweeping routes and are not typically swept during routine sweeping activities”.

An excerpt of the results of the study from the Executive Summary of the report is included below.

The Phase III study results indicate that median sweeping has potential to remove significant amounts of street debris and roadway constituents. Key results include:

- *The initial median sweeping event collected 3-5 times greater amounts of debris than subsequent 3-week interval sweeping events. This suggests significant buildup of roadway debris occurs adjacent to median areas. Extrapolation of data allowed an estimate of 32,000 pounds of material to be removed by a single annual sweeping event or up to 140,000 pounds of material to be removed annually from sweeping median areas at 3-week intervals.*

- *Metals, nutrients, and hydrocarbon constituents were all detected in median street debris and the hand-swept samples in varying concentrations which may impact downstream water quality. These results suggest that median sweeping may provide a significant benefit for controlling input of constituents with potential water quality impacts to the City MS4.*
- *Operational capacity limitations are likely to limit potential implementation of median sweeping activities to quarterly or even less frequent intervals. Examination of relatively infrequent implementation scenarios using the project data indicated that approximately 3 pounds of copper, 0.75 pounds of lead, and 3.5 pounds of zinc may be removed from City streets by median sweeping. Periodic manual sweeping of raised medians will likely result in additional removal of street debris and associated roadway constituents.*

Narrative Description

Structural BMPs are engineered facilities that are generally designed and constructed to capture or filter pollutants from urban runoff. Some structural BMPs may mitigate urban runoff volume and velocities rather than reducing urban runoff pollutants. Some examples of structural BMPs include:

1. Infiltration devices
2. Sediment basins
3. Treatment facilities (ozone, UV)
4. Bioretention
5. Detention ponds
6. Pervious pavement
7. Storm water wetlands
8. Filters

Target Source(s)

- Municipal Facilities
- Industrial and Commercial Facilities
- Construction Sites
- Residential
- Roads, streets, highways, and parking facilities
- MS4

Target Pollutant(s)

- Bacteria
- Trash
- Heavy Metals
- Nutrients
- Oil and Grease
- Organics
- Sediment
- Pesticides

Target Audience(s)

- Municipal Staff
- Construction
- Residential
- Commercial Owners
- Industrial Owners
- Land Development

Effectiveness Potential

Installation and the applicable operation and maintenance of structural BMPs can provide information for Level 3 effectiveness assessment and data on source reductions (Level 4). Observing structural BMP implementation or maintenance trends from year to year can provide information regarding Level 3 effectiveness. Source reductions may be achieved through direct monitoring results or pollutant load estimations, as described in the CASQA Effectiveness Assessment Guidance (2007).

Narrative Description

Education and outreach activities are Program Management Practices (PMPs) conducted to increase the knowledge and awareness of a target community regarding stormwater, change the behavior of the target community, and/or ultimately reduce pollutants and runoff into the MS4 and receiving waters. In general, an education and outreach strategy is developed and the programs typically address high priority pollutants, pollutant-generating activities, and the following target communities, as applicable and appropriate:

- Municipal Departments and Personnel (described in employee training PMP Profile sheet)
- Construction Site Owners and Developers
- Industrial Owners and Operators
- Commercial Owners and Operators
- Residential Community, General Public and School Children

Methods utilized for education and outreach vary and may include mass media, mailers, door hangers, booths at public events, workshops, focus groups, classroom education, field trips, hands-on experiences, clean-up events, websites, etc. Education and outreach can be conducted by a single Copermittee or several Copermittees may combine funds and efforts to conduct activities or develop materials.

Target Source(s)

- Municipal
- Industrial and Commercial Facilities
- Construction Sites
- Residential

Target Pollutant(s)

- Bacteria
- Trash
- Heavy Metals
- Nutrients
- Oil and Grease
- Sediment
- Pesticides

Target Audience(s)

- Municipal Staff
- Construction
- Residential
- General Public
- Commercial Owners
- Industrial Owners
- Land Development

Effectiveness Potential

Education and outreach activities can be facilitation and/or data gathering activities with targeted outcomes focused primarily on Level 2 and Level 3 effectiveness assessments with occasional Level 4 assessments. Education and outreach effectiveness can be measured and assessed through surveys (i.e. web-based, at events, or on the phone) BMP implementation rates, focus groups, observations, participation in events or workshops, hotline calls, and questionnaires.

The San Diego Regional Copermittees have conducted Focused Analyses that are related to education and outreach. The following are results of these analyses that support the effectiveness potential.

Regional Residential Education ProgramTelephone Survey

As part of the Regional Residential Education Program, a Regional Residential Education Plan (Plan) was developed and finalized in March 2008. The Plan provides recommended strategies for education and outreach activity implementation. One recommendation was to conduct a baseline regional residential telephone survey with an additional survey conducted late in the permit cycle to assess the changes resulting from program implementation. The Copermittees established targets to hopefully achieve during the permit cycle: 10% change in knowledge that storm drains are separate from sanitary sewer systems, 10% increase in the awareness that all storm drains are connected to local waterways, and a 15% increase in the number of participants who can identify residential sources of stormwater pollution.

The regional baseline storm water survey was conducted in 2009, but an additional regional telephone survey has not been conducted to compare results. A summary of the baseline survey results as reported in the FY 2009-2010 RURMP Annual Report is included below.

As required under the Municipal Permit Order No. R9-2007-0001 the Regional Residential Sources Workgroup developed and implemented a telephone survey of adult

residents living in San Diego County. The purpose of the study was to begin to evaluate the effectiveness of the co-permittee's storm water pollution education efforts by measuring baseline current levels of polluting practices and awareness of how the storm drain system works. The study was conducted between June 16 and June 26, 2009. A total of 808 telephone interviews were conducted with adult residents randomly identified from across San Diego County. Results of the 2009 baseline telephone survey were as follows:

- **Knowledge of storm drain system:** 37% of respondents knew that water in storm drains is not treated before it is released into local waterways.
- **Knowledge of pollutants in urban runoff:** 41% of respondents volunteered that litter and trash were common sources of pollution in storm drains, 34% mentioned automobile fluids, 16% mentioned cleaning products, 15% mentioned fertilizers and pesticides, 10% mentioned yard trimmings and dirt, 8% mentioned human and animal wastes, and smaller percentages named other sources; 11% could not name a source of pollution in storm drains.
- **Pet waste pick up:** In 76% of households with dogs, the person who walks the dog always or nearly always picks up pet waste; 91% of those who picked up put it in the garbage, 3% hosed it or put it in the street, and 11% left it on the ground.
- **Over-irrigation:** 11% of those with sprinklers said a noticeable amount of water ends up in the street; 76% adjusted the sprinklers to reduce water in the previous year.
- **Reduced use of fertilizer:** 49% of those with yards said they used fertilizer in the previous year; 28% said they used pesticides or chemicals.
- **Sweeping instead of hosing:** 77% of those with driveways said they sweep it, 23% said they hose it down, and 39% blow materials off it.
- **Litter in trash cans:** 14% said they saw litter very frequently on their block; 33% said they always or nearly always pick up litter on their block and dispose of it in a trash container.

The 2009 Regional Residential Sources survey provided substantial information on baseline levels of awareness about how the storm drain system works and current levels of polluting practices. These results were used to inform existing outreach and will be also used as a basis of comparison from which to evaluate the effectiveness of the co-permittee's outreach efforts.

Regional Calendar

Between January and June 2010, Think Blue implemented a two-tiered assessment protocol that was designed to provide both qualitative and quantitative evaluation of the 2010 "Be the Solution to Storm Water Pollution" calendar. The Think Blue San Diego Regional calendar was designed to increase awareness, and educate residents on behaviors that prevent storm water pollution. The goal of the assessment activities was to provide an evaluation of both the clarity and usage of the calendar as well as the impact of the calendar on attitudes and behavior.

Data were collected through pre- and post-test surveys and in-depth interviews with a subset of calendar recipients. 332 pre-tests were collected at the time of calendar distribution, 59 calendar recipients returned a post-test, and 30 participated in an in-depth telephone interview about the calendar.

Among calendar recipients, who completed both the pre- and post-test surveys:

- There was a 14% increase in knowledge that storm water is not treated (83% correct at pre-test, 95% correct at post-test).
- There was a 69% decrease in the number of participants who reported hosing as clean-up method (16% at pre-test compared to 5% at follow-up).
- Reports of doing nothing for weed and pest control more than doubled. At pre-test 18% reported “none” as their method compared to 39% at post-test.
- After receiving the calendar, people were more significantly more likely to be able to mention a specific pollution-prevention behavior. Prior to receiving the calendar 15% of respondents were unable to mention a specific action that they could do to prevent storm water pollution. At post-test, only 2% could not name a specific action.

Telephone interviews with a subset of 30 individuals who remembered receiving the calendar revealed that:

- 73% of participants still had the calendar. Those who no longer had the calendar said that they gave it away to students, friends, or coworkers.
- 59% reported that they looked at the calendar on a daily basis; 39% looked at it weekly, and 5% looked monthly, indicating that the calendar is used regularly.
- Sixty-five percent (65%) of respondents who read the calendar said they made changes to their behavior as a result, validating that the calendar is an effective medium for education and outreach.

Think Blue’s regional calendar received a positive response in regards to graphics, size, and layout. More importantly, the calendar successfully increased knowledge and awareness, suggesting that it is a viable medium for educating people about storm water pollution and promoting behavior change.

Community Based Social Marketing (CBSM): Gen-Y Youth Study

The Copermittes conducted a pilot study of littering behavior among youth in four regions throughout the county, which included observations and in-person interviews with youth (under the age of 24 with specific focus on middle school, high school, and college-age youth). The purpose of the study was to identify the sources of litter, establish a baseline littering rate, and identify avenues for outreach and education to reduce and prevent litter. The study was conducted in 2010, and pilot and control sties were chosen across four regions and included: Central County (beaches), East County (transit centers), North County (skate parks), and South County (parks). The study utilized intercept interviews, behavioral observations, and observations of accumulated trash as the methods of assessment.

The report has not been finalized yet, but initial results indicate that there were positive changes in knowledge and awareness, behavior, and load reductions at some of the sites in the study as a result of intervention-implementation activities.

Individual Copermittee Focused Analyses

In addition to regional efforts, some Copermittees conducted focused analyses to provide assessment information for their jurisdiction. There were four analyses conducted by jurisdictions where education and outreach program effectiveness information was provided in JURMP Annual Reports.

1. City of San Diego – FY 2010 Event Surveys:
 - A total of 10,762 event survey cards were collected
 - 56% of the individuals who completed an event survey had heard of *Think Blue San Diego* prior to attending the event (a 6% increase as compared to FY 2009)
 - 61% of respondents knew that storm water is not treated
 - Nearly 56% of those who filled out a survey card provided some type of contact information

2. City of San Diego – FY 2010 Residential Telephone Survey:
 - 47% of all San Diego residents have heard the *Think Blue* slogan, up from 39% in FY 2009 (a 52% increase since 2001)
 - 52% of residents know that storm water is not treated, which is an increase from 44% in FY 2009 and up from 39% in FY 2008
 - Residents who had heard of *Think Blue* or steps the city has been taking to prevent storm drain pollution were more than twice as likely to make behavior change.

3. City of San Diego – Business Outreach: Focus Groups – FY 2010
Think Blue completed seven focus groups, among business owners and managers who were in either the restaurant industry, the automotive repair industry or in the landscaping industry. Key findings included:
 - High awareness of *Think Blue* ads and storm water pollution issues
 - Knowledge of Storm Water Regulations, mostly from contact with the City
 - English language business owners and managers readily made the connection between water pollution, the economy, and themselves
 - Regulations seen as needed, but a sense of unfairness and imbalance could undermine willingness to comply
 - Cost, labor, and lack of reliable alternatives were stated as a major barrier to compliance among gardeners and landscapers.

4. City of Chula Vista – Storm Water Quality Public Awareness Survey Analysis:
The City of Chula Vista implemented an 11-question survey in FY 2010 and was able to utilize a similar survey administered in 2005 as a general baseline in order to assess effectiveness. However, some of the questions were re-written or re-worded which

can have an impact on the results. Results from two questions that were able to be compared are provided.

- Car washing on the driveway increased from 3.7% in 2005 to 24.21% in 2009 – this may be more of a result of the downturn of the economy (residents prefer to wash cars at home rather than pay for a car wash), than the education and outreach to residents on car washing.
- The majority of respondents knew the best way to dispose of pet waste in both the 2005 baseline survey and the 2009 survey

Narrative Description

Incentives are typically established programs utilized to entice and induce an individual, company, or group to do something. An incentive program may be established for industrial or commercial businesses, municipal employees, general public, or construction site owners and operators. Incentives may include programs such as water conservation rebates or storm water fee credits.

Target Source(s)

- Municipal
- Industrial and Commercial Facilities
- Construction Sites
- Residential

Target Pollutant(s)

- Bacteria
- Trash
- Heavy Metals
- Nutrients
- Oil and Grease
- Sediment
- Pesticides

Target Audience(s)

- Municipal Staff
- Construction
- Residential
- General Public
- Commercial Owners
- Industrial Owners
- Land Development

Effectiveness Potential

The development of incentive programs are administrative activities. When incentive programs are utilized by individuals or groups then Level 3 and Level 4 effectiveness assessments may be reached. Typically if an individual, company, or group utilizes an incentive this can indicate a behavior change which may result in a load reduction. For

example, if a jurisdiction offers a smart irrigation incentive program, then a homeowner may decide to upgrade their sprinkler system in order to get a rebate or other form of incentive. The homeowner will then have changed their behavior related to irrigation, and there is a potential load reduction due to the probable decrease in over-irrigation at the homeowner's location.

Narrative Description

Municipal employee storm water training is conducted to increase the knowledge of the target audience in regards to laws, regulations, permits and requirements; BMPs; general urban runoff concepts; and any other relevant topics as deemed appropriate. Trainings may be job specific (i.e. MS4 cleaning procedures) or may be more general but ultimately provides a mechanism to communicate JURMP requirements to the appropriate employees. Training methods that may be utilized could be computer based interactive tutorials, classroom style trainings, audiovisual methods (i.e. DVD) or on-the-job training (i.e. training on how to use a street sweeper).

Target Source(s)

- Municipal Facilities
- Roads, streets, highways, and parking facilities
- MS4

Target Pollutant(s)

- Bacteria
- Trash
- Heavy Metals
- Nutrients
- Oil and Grease
- Sediment
- Pesticides

Target Audience(s)

- Municipal Staff

Effectiveness Potential

Municipal employee training can be conducted as facilitation or data gathering activities that can provide Level 2 or Level 3 effectiveness assessments. Municipal employee training can provide important information on whether training conducted is effective at increasing employees general and/or job specific knowledge regarding stormwater. This type of assessment is often measured and assessed utilizing pre-and post-test questionnaires/surveys. Several jurisdictions implemented pre-and post-test questions at trainings conducted to assess whether there was an increase in knowledge of storm water issues among employees. In general, there was typically an increase in the pass rate from

the pre-test to the post-test indicating that the trainings were effective in increasing the municipal staff's knowledge and awareness.

In addition to knowledge and awareness, BMP implementation or changes in behavior may be assessed through employee activity. For example, if training for street sweeper operators was conducted to provide routes, sweeping priorities, and frequency of street sweeping and at the end of the year it was implemented properly, then it can be deduced that the training was successful and the operation and maintenance BMPs were implemented. Additionally, if general storm water training was conducted for municipal staff to provide them the tools to identify potential illegal discharges, and then the program receives an increase in the municipal staff reporting of illegal discharges, then it would indicate that there was a change in behavior based upon the training provided.

Narrative Description

Inspections are Program Management Practices (PMPs) conducted to examine facilities or sites for storm water requirements and BMP implementation and are often utilized as an opportunity to educate facility operators or owners regarding storm water and BMPs. Typically, inspections consist of two primary components: a visual/observational assessment of the conditions and operations at facility or site; and, verbal interviewing of the facility or site representative. The purpose of the inspections is to identify issues or potential issues and initiate a course of action to correct identified issues. Typical issues include:

1. Active discharges
2. Presence of evidence identifying previous discharges
3. Required BMPs not implemented
4. Lack of required documentation or paperwork
5. Required operation and maintenance not conducted

As part of the inspection program a complete facility inventory is maintained and facilities are prioritized. In general, an inspection frequency is determined based upon priority, and inspection and enforcement information, along with any applicable follow-up, is retained in a database.

When inspections are conducted, either by Municipal staff or contracted staff, the inspector typically has a checklist or inspection form that is utilized to assist in determining compliance. Some of the items inspectors will look for during inspections are included below.

Development Planning:

- Verifying effective operation and maintenance of Treatment Control BMPs (TCBMPs)
- Verifying TCBMPs compliance with all ordinances, permits, codes, etc.
- Prior to occupancy of each Priority Development Project subject to SUSMP requirements, verifying that the constructed LID, source control, and TCBMPs have been constructed in compliance with all specifications, plans, permits, ordinances, etc.

Construction:

- Check for coverage under the General Construction Permit (Notice of Intent (NOI) and/or Waste Discharge Identification No.) during initial inspections;
- Assessment of Compliance with Permittee ordinances and permits related to urban runoff, including the implementation and maintenance of designated minimum BMPs;
- Assessment of BMP effectiveness;
- Visual observations for non-storm water discharges, potential illicit connections, and potential discharge of pollutants in storm water runoff;
- Education and outreach on storm water pollution prevention, as needed; and

- Creation of a written or electronic inspection report.

Industrial and Commercial:

- Review of BMP implementation plans, if the site uses or is required to use such a plan;
- Review of facility monitoring data, if the site monitors its runoff;
- Check for coverage under the General Industrial Permit (Notice of Intent (NOI) and/or Waste Discharge Identification No.), if applicable;
- Assessment of compliance with Copermittee ordinances and permits related to urban runoff;
- Assessment of BMP implementation, maintenance and effectiveness;
- Visual observations for non-storm water discharges, potential illicit connections, and potential discharge of pollutants in storm water runoff; and
- Education and training on storm water pollution prevention, as conditions warrant.

Municipal Areas and Activities

- Review of BMP implementation plans, if the site uses or is required to use such a plan;
- Assessment of compliance with Copermittee ordinances and permits related to urban runoff;
- Assessment of BMP implementation, maintenance and effectiveness;
- Visual observations for non-storm water discharges, potential illicit connections, and potential discharge of pollutants in storm water runoff.

Based upon inspection findings, each Copermittee should implement follow-up actions necessary to comply with the Municipal Permit and any applicable ordinances, permits, etc.

Target Source(s)

- Municipal Facilities
- Industrial and Commercial Facilities
- Construction Sites
- Roads, streets, highways, and parking facilities
- MS4

Target Pollutant(s)

- Bacteria
- Trash
- Heavy Metals
- Nutrients

- Oil and Grease
- Organics
- Sediment
- Pesticides

Target Audience(s)

- Municipal Staff
- Construction
- Commercial Owners
- Industrial Owners
- Land Development

Effectiveness Potential

Inspections are a data gathering PMP that have the potential to provide data for effectiveness levels 2 through 4. Inspections can target land development, construction, industrial, commercial, and municipal audiences in order to gather the necessary data for program evaluations and effectiveness assessments. Additionally, inspections can address single or multiple pollutants such as bacteria, trash, heavy metals, nutrients, oil and grease, organics, sediment, and pesticides, depending upon the facility type being inspected. However, the effectiveness of inspections in reducing runoff pollutants and discharges is highly variable and dependent upon site-specific conditions, including but not limited to: motivation of facility or site representative/owner; level of difficulty in making required corrections; BMP complexity and others. An example of the variability of effectiveness potential is the knowledge assessments and BMP assessments that were conducted by some jurisdictions during industrial and commercial inspections. In reviewing the results from JURMP Annual Reports, the results were variable depending upon the jurisdiction and the reporting period. Furthermore, measurable results may require tracking over a few years or inspection cycles.

The Copermittees have developed and conducted focused analyses in order to improve the understanding between Program Management Practices and effectiveness assessment. Two special studies applicable to inspections are summarized below.

1. City of San Diego Automotive Facility Watershed Inspections (November 2010):

This special study conducted by the City of San Diego involved the development and implementation of a two-year focused inspection activity in order to answer the following management questions:

- 1) Does inspecting more frequently at automotive facilities improve BMP implementation rates?

- 2) Does type of business ownership change the required inspection frequencies?
- 3) Based on information collected during inspections, can the inventory of specific source types, in this case automotive facilities, be feasibly prioritized?

As stated in the Executive Summary of the report, the study found that increased inspections over a one-year period of automotive facilities does not increase the implementation rates or reduce the amount of pollutant discharge potential at automotive facilities. It also found that based on the result of the inspections, there is potential for the City to feasibly prioritize its inventory specific to automotive facilities based on their site specific characteristics. There may be underlying reasons that had the potential for affecting the findings of the study and further exploration may be needed. For further information see the City of San Diego's WURMP Activity Report.

2. City of San Diego Geographically Based Watershed Inspections (November 2010):

The City of San Diego conducted this special study to answer the following questions related to the implementation of commercial/industrial inspection programs:

- 1) What activities and locations at businesses should be targeted during inspections based on severity of observed/reported issues?
- 2) Can the City increase its commercial/industrial program efficiency by using a tiered inspection process (variable inspection forms and procedures) based on site specific characteristics of the businesses?
- 3) Does the City's commercial/industrial inventory need to be reevaluated (additions of business types or modifications to prioritization process)?

There were two primary findings from the activity as stated in the Executive Summary of the report: (1) in many instances the City can perform inspections and collect valuable information without making contact with owners/manager – potentially increasing the efficiency of the inspection program, and; (2) confirmation that the severity of the issues related to trash areas; onsite storm drains systems and over-irrigation warrant the focus of the inspection program as well as other programs that can support the effort to reduce the impacts of these areas.

Narrative Description

Investigations are a Program Management Practice that is conducted to try to identify illegal discharges and illicit connections as a result of public reporting (hotline, website, etc.), inspection findings, staff referrals, and/or monitoring results. Investigations may include visual observations, closed circuit television (CCTV) often used for the MS4, or additional monitoring. Investigations can occur in municipal, land development, construction, industrial, commercial, or residential areas. Investigations may also address a wide range of pollutants and pollutant generating activities based upon the type of illegal discharge, illicit connection, or possibly natural source discovered. The purpose of investigations is to identify and eliminate any illegal discharges or illicit connections to the MS4. Typical illegal discharges identified through investigations include:

1. Motor oil or antifreeze from automobiles
2. Sanitary wastewater
3. Runoff from excess irrigation
4. Groundwater
5. Household toxic substances
6. Sediment
7. Trash

Target Source(s)

- Municipal Facilities
- Industrial and Commercial Facilities
- Construction Sites
- Residential
- Roads, streets, highways, and parking facilities
- MS4

Target Pollutant(s)

- Bacteria
- Trash
- Heavy Metals
- Nutrients
- Oil and Grease
- Organics
- Sediment
- Pesticides

Target Audience(s)

- Municipal Staff
- Construction
- Residential
- Commercial Owners
- Industrial Owners
- Land Development

Effectiveness Potential

Investigations are a common tool used to respond to reports of potential violations, and this data gathering activity can be effective in finding and eliminating illegal discharges and illicit connections. This can result in a Level 4 source reduction. The Copermittees have discovered that most effective means of identifying illegal discharges or illicit connections is through hotline call or complaint referral response and investigation or visual surveys of the stormwater conveyance system during routine maintenance and/or cleaning.

Narrative Description

Each Copermittee implements and enforces its ordinances, codes, or other legal authority to prevent illegal discharges and connections to its MS4. Enforcement methods are utilized to affect a return to compliance at either a construction, municipal, industrial, commercial, or residential area. Some enforcement methods utilized include verbal warning, letters, educational materials, citations, notices of violation, stop work orders, or civil penalties. Each Copermittee also implements all follow-up actions necessary to achieve the return to compliance for a particular site.

Target Source(s)

- Municipal Facilities
- Industrial and Commercial Facilities
- Construction Sites
- Residential
- Roads, streets, highways, and parking facilities
- MS4

Target Pollutant(s)

- Bacteria
- Trash
- Heavy Metals
- Nutrients
- Oil and Grease
- Organics
- Sediment
- Pesticides

Target Audience(s)

- Municipal Staff
- Construction
- Residential
- Commercial Owners
- Industrial Owners
- Land Development

Effectiveness Potential

Enforcement is a common tool used to not only return violators to compliance but also to educate and promote compliance. Enforcement is a facilitation activity where the tabulation of enforcement data can be associated with a load reduction. If a site or residence where a pollutant is leaving, or has the potential to leave, the site has been stopped or mitigated through enforcement efforts there is an implied load reduction (Level 4). The tabulation of enforcement data may also provide information on assessment Levels 2-3. For example, as noted in the CASQA Effectiveness Assessment Guidance (May 2007), the number of enforcement actions can be compared from year to year to identify trends and to show program progress.

Narrative Description

Regulatory revisions, or “off-ramps”, are essential in an adaptive management approach for storm water programs. For example, if valid monitoring data indicate a pollutant should be removed off of the 303(d) list, then it should be removed and may not be a primary focus of storm water program efforts. Additionally, if a jurisdiction determines that conducting inspections in a certain area or a certain facility classification is the most effective, then the jurisdiction should be able to focus efforts accordingly and not necessarily held to a minimum number. Some examples of regulatory revisions are:

1. 303(d) list changes
2. Beneficial Use modifications
3. Water Quality Objective adjustments
4. Program modifications
5. TMDL amendments

Target Source(s)

- Municipal Facilities
- Industrial and Commercial Facilities
- Construction Sites
- Residential
- Roads, streets, highways, and parking facilities
- MS4

Target Pollutant(s)

- Bacteria
- Trash
- Heavy Metals
- Nutrients
- Oil and Grease
- Organics
- Sediment
- Pesticides

Target Audience(s)

- Municipal Staff
- Construction
- Residential
- Commercial Owners
- Industrial Owners
- Land Development

Effectiveness Potential

While regulatory revisions do not have a direct link to an effectiveness assessment level, they do provide an indirect correlation. When regulatory revisions are made typically based upon scientific data, it provides an opportunity to reallocate resources to other issues which can be more efficient and effective.

Narrative Description

Eliminating the potential for urban runoff to come in contact with constituents of concern is defined as true source control. True source control reduces or prevents pollution, or pollutants, at their source. For example if Industry A was using pollutant X and pollutant X was having a negative impact on a receiving water, then true source control results in Industry A halting the use of pollutant X or replacing pollutant X with a less harmful alternative.

Target Source(s)

- Municipal Facilities
- Industrial and Commercial Facilities
- Construction Sites
- Residential
- Roads, streets, highways, and parking facilities
- MS4

Target Pollutant(s)

- Bacteria
- Trash
- Heaving Metals
- Nutrients
- Oil and Grease
- Organics
- Sediment
- Pesticides

Target Audience(s)

- Municipal Staff
- Construction
- Residential
- General Public
- Commercial Owners and Operators
- Industrial Owners and Operators
- Land Development

Effectiveness Potential

True source control is a facilitation activity aimed at Level 4 effectiveness assessment, and, depending upon the source control, has the potential to target any one or more of the target audiences, sources, and pollutants.

Currently, there are two examples of true source control applicable to the San Diego region as described below.

1. City of San Diego – SB346 – Brake Pad Partnership:

As reported in the City's FY 2010 WURMP Annual Reports, *the City of San Diego (City) and other MS4 dischargers in the Chollas Creek Watershed are mandated by Total Maximum Daily Load (TMDL) Waste Load Allocations (WLAs) to reduce the amount of dissolved copper, lead, and zinc that are discharged to the creek. Previous City investigations determined that copper from automotive brake pads was a major contributor of dissolved copper to Chollas Creek and other waterbodies within City jurisdiction. Because the regulation of automotive brake pads is beyond the authority of any local government, the City collaborated with other California local governments, through California Stormwater Quality Association, to achieve true source control by reducing copper at its source. It was determined that the best way to achieve this goal was through the development of legislation, mandating reductions and then replacement of copper in automotive brake pads.*

During FY 2010, the City of San Diego assisted with writing the proposed Senate Bill (SB346: Motor Vehicle Brake Friction Materials, Removal of Copper in Automotive Brake Pads), provided financial resources for technical experts to assist with its development, participated in negotiations with the automobile and brake pad manufacturers, and provided lobbyist assistance to Senator Kehoe to obtain political support for the bill's passage. Due to the automobile manufacturers renewed interest in this bill, negotiations were re-initiated to obtain support from all stakeholders, as required by the governor. The bill was rewritten multiple times and discussed by all parties before it was presented to Assembly subcommittees for review and approval. After the reporting period, SB346 was passed by both houses, signed into legislation by the governor on September 25, 2010, and incorporated into the California Health and Safety Code, Article 13.5, commencing with Section 25250.50.

SB346 calls for reductions of copper down to 5% by weight by 2021 and 0.05% by 2025. It is anticipated that copper loads from automotive brake pads will decline after the first reduction date in 2021.

2. Diazinon Ban – Nationwide:

A highly effective example of true source control is the ban on the pesticide, Diazinon. In January 2005, a nationwide ban was placed on the retail sale of Diazinon. Since that time, Diazinon concentrations have been steadily declining at the Mass Loading Stations (MLS) throughout the San Diego region.