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CALIFORNIA STORMWATER QUALITY ASSOCIATION

Effectiveness Assessment Baseline Report:
Existing Practices and User Needs

prepared by

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Glossary of Acronyms and Terms

Adaptive Management: Adaptive Management is a structured and iterative process of directing decision-making with an aim toward addressing and reducing uncertainty over time.

Assessment Measures: Assessment Measures are established to determine current conditions, or whether or how successfully an outcome has been achieved. Measures may be qualitative (e.g., yes / no) or quantitative (% of targeted audience reached, % reduction in a constituent level, etc.). All Assessment Outcomes will have at least one Assessment Measure associated with them, but some may have more than one.

Assessment Methods: Assessment Methods are program activities, actions, or processes used to obtain or evaluate assessment data or information. Depending on the particular outcome in question, numerous assessment methods may be used.

Assessment Outcome: Assessment Outcomes are the results associated with the implementation of stormwater control measures, program activities or elements, or overall programs. They define specific measurement points to which stormwater programs can be targeted, evaluated, and periodically modified. Outcomes can be broadly categorized according to six Outcome Levels (see also **Outcome Level**).

Best Management Practices (BMP): BMPs are practices designed to prevent, reduce, or eliminate discharges of pollutants and/or flow.

California Stormwater Quality Association (CASQA): CASQA has been a leader since 1989 when the field of stormwater management was in its infancy. CASQA's represents a diverse range of stormwater quality management organizations and individuals, including cities, counties, special districts, industries, and consulting firms throughout the state. A large part of CASQA's mission is to assist water quality programs in California to learn collectively from the individual experiences of its members, to learn from the mistakes and avoid the pitfalls. In fulfilling this purpose, CASQA recommends objectives and procedures for stormwater discharges control programs which:

- Are technically and economically feasible
- Provide significant environmental benefits and protect our water resources
- Promote the advancement of stormwater management technology
- Effect compliance with State and Federal laws, regulations and policies

CASQA has multiple subcommittees providing in-depth collaboration on water quality issues statewide. The Effectiveness Assessment Subcommittee has provided input and guidance on stormwater program effectiveness assessment issues since 2004.

Effectiveness Assessment (EA): EA is the mechanism by which feedback is evaluated to enable ongoing adaptive management. It evaluates the efficacy of management measures in meeting the interim and end-state Outcomes that include reducing the receiving water impacts; lessening MS4 contributions and source contributions that lead to receiving water impacts; changing behaviors and breaking down barriers to these changes. EA helps identify where management measure refinements are required, utilizing the overarching planning process of the CASQA

Guidance Document[1] to develop and perform outcome specific and integrated assessments and prioritize management measures/BMPs (see also **Program Effectiveness Assessment**).

Iterative Program Management Cycle: The Iterative Program Management Cycle broadly divides stormwater program management into three phases of activity:

1. Program planning and modification;
2. Program implementation; and
3. Effectiveness assessment.

During the program planning phase, implementation and assessment results will be reviewed to identify necessary changes or refinements for future implementation. These modifications can then be made and the next round of implementation initiated, leading again to renewed assessment and planning.

Over time, the repeated application of this process—each phase continuously informing the next—should result in the improvement of stormwater programs and the achievement of the desired results that they are designed to achieve.

Municipal Separate Storm Sewer System (MS4)[2]: An MS4 is a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains) that is:

- Owned by a state, city, town, village, or other public entity that discharges to waters of the U.S.;
- Designed or used to collect or convey stormwater;
- Not a combined sewer; and
- Not part of a Publicly Owned Treatment Works (POTW) (sewage treatment plant).

Outcome Level: The CASQA approach[1] utilizes a series of six categories of Outcomes to establish a logical and consistent organizational scheme for assessing and relating individual Outcomes. The Outcome Levels represent a general progression of conditions that are assumed to be related in a sequence of causal relationships.

- **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. They can include virtually any chemical, biological, or physical parameter that can be measured or assessed in receiving waters (i.e., chemical concentrations, dissolved oxygen levels, biological integrity, species diversity, eutrophication, microbiological or toxicological conditions, or hydromodification). Level 6 Outcomes are best expressed through the attainment of beneficial uses, traditionally measured as compliance with water quality objectives (WQOs).

[1] *A Strategic Approach to Planning for and Assessing the Effectiveness of Stormwater Programs*, California Stormwater Quality Association (CASQA), July 2014.

[2] Based on the definition in Title 40 Code of Federal Regulations §122.26 (b)(8)

- **Outcome Level 5 (MS4 Contributions):** Level 5 Outcomes apply exclusively to MS4s. Level 5 conditions may be measured within the MS4, or as discharges from it. In either case, evaluation typically focuses on flow conditions, pollutant concentrations or loads, or both. Level 5 Outcomes provide a direct linkage between upstream sources and receiving waters and, as such, are a critical expression of program success.
- **Outcome Level 4 (Source Contributions):** Outcome Level 4 addresses two distinct but related types of change: 1) reductions in the discharge of pollutants from sources, and 2) reductions in flow rates and volumes from sites. This latter category is generally associated with selected development and redevelopment activities, but it may also be applied to other Program Elements.
- **Outcome Level 3 (Target Audience Actions):** Level 3 Outcomes address the actions of target audiences, and whether or not changes are occurring in them over time. The major categories of target audience actions are pollutant-generating activities (PGAs); best management practices (BMPs) and supporting behaviors. Supporting behaviors include pollution reporting, public involvement, and completion of stormwater pollution prevention plans.
- **Outcome Level 2 (Barriers and Bridges to Action):** Level 2 Outcomes provide a means of gauging whether outreach, training, or other program activities are producing changes in the awareness, knowledge, or attitudes of target audiences. Examples of Level 2 Outcomes range from awareness of basic concepts (why stormwater pollution is a problem, the difference between storm drains and the sanitary sewer, what a watershed is, etc.) to very specific knowledge (e.g., how to dispose of pet waste, or how to properly install and maintain a silt fence). Level 2 Outcomes are often used to gauge progress in, or to refine approaches for, achieving Level 3 Outcomes.
- **Outcome Level 1 (Stormwater Program Activities):** These Outcomes, which are often defined by specific stormwater permit requirements, address a variety of stormwater program activities such as providing education to residents, inspecting businesses, conducting surveys of target audiences, and conducting receiving water monitoring.

Phase I MS4 Permit: Phase I, issued in 1990, requires medium and large cities or counties with populations of 100,000 or more to obtain National Pollutant Discharge Elimination System (NPDES) permit coverage for their stormwater discharges. Each regulated MS4 is required to develop and implement a stormwater management program/approach to reduce and/or eliminate the discharge of pollutants from the MS4 to the maximum extent practicable (MEP) and effectively prohibit discharges of non-stormwater into its MS4 unless such discharges are authorized.

Phase II MS4 Permit: Phase II, issued in 1999, requires regulated small MS4s in urbanized areas, as well as small MS4s outside the urbanized areas that are designated by the permitting authority, to obtain NPDES permit coverage for their stormwater discharges. Each regulated MS4 is required to develop and implement a stormwater management program/approach to reduce and/or eliminate the discharge of pollutants from the MS4 to the maximum extent practicable (MEP) and effectively prohibit discharges of non-stormwater into its MS4 unless such discharges are authorized.

Program Effectiveness Assessment: Program Effectiveness Assessment includes the methods and activities that stormwater managers use to evaluate how well their programs are working, and to identify modifications necessary to improve them (see also **Effectiveness Assessment (EA)**).

Program Element: Program Elements are distinct components of a stormwater program that focus on reducing pollutants from a particular activity or pollutant source/target audience. Although slightly different terminology may be used depending on the permit, common Program Elements for the municipal stormwater program include the following:

- Program Management
- Illicit Discharge
- Public Outreach/ Residential Sources
- Municipal Operations
- Industrial/ Commercial
- Construction
- Planning & Land Development
- Monitoring

Receiving Water Characterization: Receiving Water Characterization consists of three tasks: evaluating receiving water conditions, defining receiving water problems, and prioritizing receiving water problems.

Receiving Water Conditions: Receiving Water Conditions can include virtually any chemical, biological, or physical parameter that can be measured or assessed in receiving waters (i.e., chemical concentrations, dissolved oxygen levels, biological integrity, species diversity, eutrophication, microbiological or toxicological conditions, hydromodification).

Regional Water Quality Control Boards (RWQCB): There are nine Regional Water Quality Control Boards (Regional Water Boards) in California. The mission of the Regional Water Boards is to develop and enforce water quality objectives and implementation plans that will best protect the beneficial uses of the State's waters, recognizing local differences in climate, topography, geology and hydrology. Regional Water Boards develop "basin plans" for their hydrologic areas, govern requirements/issue waste discharge permits, take enforcement action against violators, and monitor water quality.

Spatial Analysis: Spatial Analysis allows comparisons between watersheds or other geographic areas. Impacts of runoff and/or control measures can be evaluated based on characteristics of the geographic regions (differences in land use, geology and geomorphology, hydromorphology, etc.). The ability to conduct spatial analysis is generally only limited by the availability of appropriate data for spatial characteristics and project budget.

Source: "Source" means anything with the potential to generate urban runoff or pollutants prior to their introduction to the MS4. A typical program broadly addresses the following source categories: residential areas, construction and development sites, commercial and industrial sources, and municipal operations. Sources may alternatively be defined by the populations

associated with areas, facilities, or activities, e.g., residents, dog-walkers, mobile car washers, or restaurant employees.

Source Characterization: Source Characterization consists of evaluating drainage area and source contributions, defining problem drainage areas and sources, and prioritizing drainage area and source problems. Source characterization studies provide information on the types and concentration of pollutants and flow from a source type (restaurants, metal recycling facilities, etc.) or land use type (low-density residential, light industrial, commercial, etc.).

Source Contribution: Source Contribution can refer either to a source loading or to a reduction in that loading. Source loadings are the flows and pollutant loadings added by sources to a MS4. Source reductions are changes in the amounts of pollutants or reductions in flow associated with specific sources before and after control measures are employed.

State Water Resources Control Board (SWRCB or State Water Board): The SWRCB was created by the California Legislature in 1967. Its mission is to ensure the highest reasonable quality for waters of the State, while allocating those waters to achieve the optimum balance of beneficial uses. The joint authority of water allocation and water quality protection enables the State Water Board to provide comprehensive protection for California's waters.

Target Audience: A "Target Audience" consists of the people (individuals and populations) that are expected to gain knowledge or engage in the behaviors that a stormwater program is intended to elicit. BMPs and other controls are implemented by many types of third parties, so the term "target audience" is broadly defined and virtually any group of people could be a target audience, including fellow municipal staff members, the general public, elected and appointed officials, other government agencies, etc.

Temporal Change: Temporal Change is change over time. A few aspects of temporal change that should be of interest to managers are variability, trends, and changes due to program implementation.

United States Environmental Protection Agency (EPA): The EPA has ten Regional offices, each of which is responsible for the execution of the Agency's programs within several states and territories. In California, EPA Region IX is the governing office.

1. Background

Effectiveness assessment (EA) is a fundamental and necessary component for the development and implementation of a successful municipal stormwater management program. A strategic approach for assessing the effectiveness of stormwater programs can provide managers with the ability to ensure that their programs are well-targeted, determine whether intended results are being achieved efficiently and cost-effectively and ultimately, relate these results to conditions in urban runoff and receiving waters.

In addition, a well-conceived, integrated approach for assessing the effectiveness of a stormwater program is necessary to ensure that funds are effectively allocated and efficient progress is made in protecting water quality. When considered as part of a larger program planning process, assessment principles can help to guide managers toward implementation strategies with the greatest opportunity for long-term success.

EA is also the mechanism by which feedback is evaluated to enable ongoing adaptive management. The Iterative Program Management Cycle consists of program planning, implementation, and EA. Over time, the repeated application of this process—each phase continuously informing the next—should result in the improvement of stormwater programs and the achievement of the desired results.

The California Stormwater Quality Association (CASQA) EA approach utilizes a series of six categories of Outcomes to establish a logical and consistent organizational scheme for assessing and relating individual Outcomes. These Outcomes represent a general progression of conditions that are assumed to be related in a sequence of causal relationships. The Outcome Levels are as follows:

- **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. They can include virtually any chemical, biological, or physical parameter that can be measured or assessed in receiving waters (i.e., chemical concentrations, dissolved oxygen levels, biological integrity, species diversity, eutrophication, microbiological or toxicological conditions, or hydromodification). Level 6 Outcomes are best expressed through the attainment of beneficial uses, traditionally measured as compliance with water quality objectives (WQOs).
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- **Outcome Level 1 (Stormwater Program Activities):** These Outcomes, which are often defined by specific stormwater permit requirements, address a variety of stormwater program activities such as providing education to residents, inspecting businesses, conducting surveys of target audiences, and conducting receiving water monitoring.

In recent years, EA has emerged as a distinct discipline within the broader stormwater program management field. Leading the way, CASQA released its *Municipal Stormwater Program Effectiveness Assessment Guidance* in May 2007 (CASQA Guidance Manual). Since its release, this document has been used in interactive training workshops with Phase I and Phase II municipal stormwater program managers and staff, as well as regulators in California. This document was updated in July 2014.[3] Considerable experience has been gained since CASQA initially began its EA work in 2004. To this end, the 2014 update reflects new information, lessons learned, and the refinement of assessment concepts.

Reissued California Phase I and Phase II municipal stormwater permits are also increasingly reflective of the CASQA Guidance Manual, in large part due to the March 2011 release of the *Guidance for Assessing the Effectiveness of Municipal Storm Water Programs and Permits* by the State Water Resources Control Board (SWRCB or State Water Board). California Assembly Bill 739 (Laird, 2007) required the SWRCB to develop this guidance in accordance with the general EA principles established through CASQA, and required the SWRCB and Regional Water Quality Control Boards to utilize the document when establishing assessment requirements for programs and permits.

[3] *A Strategic Approach to Planning for and Assessing the Effectiveness of Stormwater Programs*, CASQA, July 2014

2. Purpose

Phase I and Phase II municipal stormwater program managers are in need of EA guidance and tools. There are currently 21 Phase I municipal stormwater permits in California, as well as the Caltrans Statewide Stormwater Permit. In addition, the Phase II General Permit[4] extends coverage to smaller municipalities, including nontraditional small MS4s[5]. The key EA documents that have been developed within the State of California include the following:

- *Stormwater Program Effectiveness Assessment Survey*, CASQA, July 2005
- *An Introduction to Stormwater Program Effectiveness Assessment*, CASQA, August 2005
- *Municipal Stormwater Program Effectiveness Assessment Guidance*, CASQA, May 2007 (CASQA Guidance Manual)
- *Assessing the Effectiveness of Your Municipal Stormwater Program*, EPA Webcast, July 2008
- *A California Perspective on the Assessment of Municipal Stormwater Programs, Methods and Activities to Gauge Effectiveness and Make Improvements*, Brosseau et al., Stormwater Magazine, 2010
- *Guidance for Assessing the Effectiveness of Municipal Storm Water Programs and Permits,* SWRCB, March 2011[6] (State Guidance Manual)
- *A Strategic Approach to Planning for and Assessing the Effectiveness of Stormwater Programs,* CASQA, July 2014

These documents represent state-of-the-art guidance and tools for the assessment of California municipal stormwater programs. Although additional guidance is available to stormwater program managers (see **Section 6**), a means of disseminating and encouraging use of these tools does not currently exist.

In 2012, the CASQA Effectiveness Assessment Subcommittee submitted a Proposition 84 Stormwater Grant Program application for a Planning and Monitoring Project focused on "Storm Water Program Effectiveness Assessment Tools." CASQA proposed to further the development of stormwater program EA methods and approaches by conducting a comprehensive review and summary of real-world examples of municipal stormwater program assessments that have been conducted throughout the state and developing a mechanism by which EA tools and guidance could be shared with a wider audience. CASQA was subsequently awarded Proposition 84 Stormwater Grant Program funding for this project.[7]

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[4] Waste Discharge Requirements for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems (MS4s), SWRCB Water Quality Order No. 2013-0001-DWQ

[5] Fairgrounds, community colleges and universities, military bases, ports, state parks and beaches, school grounds, state and federal prisons, state and federal health institutions, water agencies, and transit agencies.

[6] Developed in response to California Assembly Bill 739 (Laird, 2007)

[7] State Water Board-CASQA Grant Agreement No. 12-418-550

The Proposition 84 funding allows CASQA to develop a Web Portal to distribute and encourage the use of existing EA guidance and tools. The Web Portal will be a central venue where users can obtain updated guidance, share data and information (e.g., sample reports, research, literature), communicate with each other, and obtain planning and assessment support. In time, this will improve a program manager's ability to conduct EAs and adaptively manage their program to reduce and prevent stormwater pollution to the maximum extent practicable (MEP).

The EA Web Portal project comprises six major tasks:

- Task 1 – Project Management
- Task 2 – Technical Advisory Committee
- Task 3 – CASQA Guidance Manual Update
- **Task 4 – Assessment of Existing Practices and User Needs**
- Task 5 – Education and Outreach
- Task 6 – Project Evaluation

This document, *Effectiveness Assessment Baseline Report: Existing Practices and User Needs* (*Baseline Report*), summarizes the work that has been completed pursuant to Task 4, Assessment of Existing Practices and User Needs. The primary work efforts are described in the subsequent sections of this *Baseline Report* and include the following:

- **Section 3 – Summary of Existing Permit Requirements (Subtask 4.1)**

  A detailed review and analysis of existing Phase I and Phase II municipal stormwater permit EA requirements was conducted. Municipal permits throughout the state and the nine Water Board regions were reviewed. Relevant requirements were identified, compared/contrasted, and summarized.

- **Section 4 – Summary of Current Assessment Practices (Subtask 4.2)**

  A review of available annual reports, reports of waste discharge (ROWDs) (across all nine Water Board regions), and related materials was conducted in order to understand how municipal stormwater programs are currently approaching EAs and what metrics and methods are being used.

- **Section 5 - Survey of Assessment Needs and Opportunities (Subtasks 4.3 and 4.4)**

  Baseline surveys were developed and conducted to document the expectations and knowledge base of municipal stormwater program managers, regulatory staff, and non-governmental organizations (NGOs)/Third Parties (i.e., American Rivers, California Coastkeeper, Heal the Bay, Los Angeles Waterkeeper, San Diego Coastkeeper).

- **Section 6 - Materials Review and Compilation (Subtask 4.5)**

  EA-related materials were compiled, including, but not limited to, completed assessments, regulatory resources, and stormwater-related research and literature. These resources will be made available via the Web Portal and will be expanded upon over time.

Once this *Baseline Report* is finalized, CASQA will complete the education and outreach (Task 5) and project evaluation (Task 6) tasks (see **Section 7, Conclusions**).

3. Summary of Existing Permit Requirements (Subtask 4.1)

The purpose of this task was to assess existing permit requirements which can then be compared with existing practices (determined in Subtask 4.2) to assess potential user needs. California municipal stormwater permits require that EAs be conducted and, at times, reference specific guidance, including the CASQA Guidance Manual or other relevant guidance documents. Phase I and Phase II municipal stormwater program EA requirements were evaluated from permits throughout the state, including permits from all nine Regional Water Quality Control Boards (Regional Water Boards). A total of 21 Phase I MS4 permits, as well as the Phase II General Permit and Caltrans Statewide Stormwater Permit, which apply statewide, were reviewed (for a total of 23 permits). The specific permits reviewed are summarized in **Table 1**.

Table 1. California Municipal Stormwater Permits Reviewed, by Region

# [a]	Order Number	Permittees	Regional Water Board Jurisdiction
Phase I Stormwater Programs			
1	R1-2009-0050	City of Santa Rosa, the County of Sonoma, and the Sonoma County Water Agency	North Coast (1)
2	R2-2009-0074	Municipal Regional Stormwater Permit (San Francisco Bay Area)	San Francisco Bay (2)
3	R3-2012-0005	City of Salinas Municipal Stormwater Discharges	Central Coast (3)
4	99-060	City of Long Beach	Los Angeles (4)
5	R4-2012-0175	Coastal Watersheds of Los Angeles County (except City of Long Beach)	Los Angeles (4)
6	R4-2010-0108	Ventura County Watershed Protection District, County of Ventura and the Incorporated Cities Therein	Los Angeles (4)
7	R5-2008-0142	Cities of Citrus Heights, Elk Grove, Folsom, Galt, Rancho Cordova, Sacramento, and County of Sacramento	Central Valley (5)
8	R5-2010-0102	Eastern Contra Costa County - City of Antioch, City of Brentwood, City of Oakley, Contra Costa County, Contra Costa County Flood Control and Water Conservation District	Central Valley (5)
9	R5-2008-0092	City of Modesto	Central Valley (5)
10	R5-2007-0173	City of Stockton and County of San Joaquin	Central Valley (5)
11	R5-2011-0005	Stockton Port District	Central Valley (5)
12	R5-2013-0153	County of Kern and City of Bakersfield	Central Valley (5)
13	R5-2013-0080	Fresno Metropolitan Flood Control District, City of Fresno, City of Clovis, County of Fresno, and California Status University Fresno	Central Valley (5)

# [a]	Order Number	Permittees	Regional Water Board Jurisdiction
14	R6T-2011-101A1	El Dorado County, Placer County, and the City of South Lake Tahoe within the Tahoe Hydrologic Unit	Lahontan (6)
15	R7-2013-0011	Riverside County Flood Control and Water Conservation District, County of Riverside, Coachella Valley Water District, and Incorporated Cities of Riverside County within the Whitewater River Basin	Colorado River (7)
16	R8-2010-0036	County of San Bernardino and the Incorporated Cities of San Bernardino County	Santa Ana (8)
17	R8-2009-0030	County of Orange, Orange County Flood Control District, and the Incorporated cities of Orange County within the Santa Ana Region	Santa Ana (8)
18	R8-2010-0033	Riverside County Flood Control and Water Conservation District, the County of Riverside, and the Incorporated Cities of Riverside County within the Santa Ana Region	Santa Ana (8)
19	R9-2009-0002	County of Orange, Orange County Flood Control District, and the Incorporated cities of Orange County within the San Diego Region	San Diego (9)
20	R9-2010-0016	Riverside County Flood Control and Water Conservation District, the County of Riverside, and the Incorporated Cities of Riverside County within the San Diego Region	San Diego (9)
21	R9-2013-0001	Watersheds within the San Diego Region	San Diego (9)
Phase II Stormwater Programs			
22	2013-0001-DWQ	Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (General Permit)	Statewide
Other Statewide Permits			
23	2012-0011-DWQ	Statewide Stormwater Permit - State of California, Department of Transportation	Statewide

[a] Number is used to reference the permit/permittee in the matrices and tables.

The permits listed in **Table 1** were reviewed to evaluate the EA requirements. Excerpts from all 23 permits with the EA requirements highlighted will be made available on the Web Portal. The municipal stormwater EA permit requirements were evaluated for the following characteristics:

- Specificity of EA Requirements
- Inclusion of/References to Outcome Levels
- Types of EAs

The results of this review have been compiled (**Appendix A: Permit Review Matrix**) and summarized below. The results were used to identify overarching trends and/or trends by region.

3.1 SUMMARY AND INTERPRETATION OF RESULTS

3.1.1 Specificity of Effectiveness Assessment Requirements

Although the permits require EAs, the requirements vary significantly from permit to permit.

The core questions assessed and the related observations included the following:

Does the Permit require EAs?

- All permits required, at least to some extent, that EAs be conducted by the stormwater program managers.

What level of specificity is included for the EAs?

- For ease of comparison, the level of specificity for the EA requirements was divided into three categories: low, medium, and high.[8]
    - Overall, the specificity of EA requirements varied throughout the state.
        - 26% (6) were considered to have a high level of specificity.
        - The majority, 65% (15) of the permits reviewed were considered to have a medium level of specificity.
        - 9% (2) were considered to have a low level of specificity.
- The following regional trends were observed.
    - Permits in the North Coast and Colorado River Regions provided low levels of specificity in their permit requirements for EAs.
    - Permits in the San Francisco Bay, Los Angeles, Central Valley, and Lahontan Regions generally provided medium levels of specificity. In addition, the Caltrans permit had medium levels of specificity.
    - Permits in the Santa Ana and San Diego Regions provided both medium and high levels of specificity, depending on the permit.
    - The permit in Central Coast Region and the Phase II General Permit provided high levels of specificity.

[8] The specificity of permit EA requirements was determined based on several factors.

- "Low" specificity permits had broad, general requirements, no or little identification of Program Elements for assessment, and no reference to Outcome Levels or the CASQA Guidance Document. If a permit contained EA requirements for specific Program Elements and/or required identification of program modifications, it was considered to have "Medium" or "High" specificity.
- "Medium" specificity permits generally contained broad assessment requirements for identified Program Elements.
- "High" specificity permits generally contained more specific assessment and/or evaluation requirements, e.g., particular Outcome Levels to be evaluated or explicit evaluations to be conducted for indicated Program Elements.

Does the Permit specifically reference the CASQA Guidance Manual and/or the State Guidance Manual?

- 35% (8) of the permits specifically referenced the CASQA Guidance Manual.
- 48% (11) of the permits included specific language from the CASQA Guidance Manual, even though it was not specifically referenced.
- It appears that the CASQA Guidance Manual is used as a guide for permit writing in almost all of the Regions.
- It is unclear to what degree the State Guidance Manual is used to support EA requirements in the municipal stormwater permits.

3.1.2 Inclusion of/References to Outcome Levels

Outcome Levels were introduced in the CASQA Guidance Manual in order to help permittees distinguish between the different types of impacts their stormwater programs may have. The use of Outcome Levels in the EA permit requirements was evaluated as described below.

The core questions assessed and the related observations included the following:

Does the Permit specifically reference Outcome Levels?

- 52% (12) of the permits included references to Outcome Levels.
- Most of the permits from the Central Valley, Santa Ana, and San Diego Regions referenced Outcome Levels.

Which Outcome Levels does the Permit require assessments for?

The permits were reviewed to determine which of the six Outcome Levels were required as a part of the EA. If the Outcome Level was not explicitly identified, the permit requirements were reviewed to determine which Outcome Level was implied.

- All permits incorporated the concept of Outcome Levels either explicitly or implicitly.
- Some Regional Water Boards required assessments at all six Outcome Levels, while others only required assessments at certain Outcome Levels.
    - Permits in the Central Valley, Santa Ana, and San Diego Regions, as well as the Phase II Permit, explicitly reference and require assessments at all six Outcome Levels.
    - All other permits included requirements for assessments at most Outcome Levels (although they did not use this specific term), with the exception of the Los Angeles, Lahontan, and Colorado River Regions, which required fewer assessments at specific Outcome Levels.

3.1.3 Types of EAs

The permits were reviewed for explicit types of EAs that were required, including which Program Elements require assessment, and at what Outcome Level(s) (whether implicit or explicit).

The core questions assessed and the related observations included the following:

What types of EAs are required?

- The permits were reviewed to identify the specific types of EAs that were required, including which Program Elements required assessment, and at what Outcome Level(s) (whether implicit or explicit) assessments were to be conducted. Due to high variability among permits with regard to prescriptiveness of EA requirements, it was difficult to identify trends; a detailed summary for each permit is provided in **Appendix A.** In general, the types of EAs that were required were consistent with the level of specificity identified for the EA requirements (i.e., low, medium, and high).
    - "Low" specificity permits had broad, general EA requirements, identified no or only a few Program Elements for EA, and did not include specific references to Outcome Levels or the CASQA Guidance Document.
    - "Medium" or "High" specificity permits contained EA requirements for specific Program Elements. "Medium" specificity permits generally contained broad assessment requirements for identified Program Elements. "High" specificity permits generally contained more specific assessment and/or evaluation requirements, e.g., particular Outcome Levels to be evaluated or explicit evaluations to be conducted for indicated Program Elements.

Does the Permit include a timeframe for EAs?

- 30% (7) of the permits required that an EA be conducted in a short-term timeframe (1-5 years).
- 8% (2) of the permits required that an EA be conducted in a long-term timeframe (> 5 years).
- 57% (13) of the permits required that an EA be conducted in both a short-term and long-term timeframe.
    - 33% (5) of the 15 long-term timeframes specified were explicitly for assessing the effectiveness of Monitoring and/or TMDLs.
- One permit did not specify a timeframe for the EA.

Does the Permit link EAs to program modifications (adaptive management, iterative approach)?

- All permits recognized the need to use the information gained from the EAs to identification of program modifications.
- In 17% (4) of the permits (from the North Coast, San Francisco Bay, Los Angeles, and Lahontan Regions), the Program Element to be reviewed for potential modifications was specified (e.g., Monitoring, Public Outreach/ Residential Sources, pollutant load reduction).

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4. Summary of Current Assessment Practices (Subtask 4.2)

The purpose of this task is to assess existing practices which can be compared with existing requirements (determined in Subtask 4.1) to assess user needs. The State Water Board and CASQA Guidance Manuals provide an overarching framework for conducting the EAs but leave the specific strategies and details to the individual stormwater programs. In order to provide assistance to the program managers, it is important to understand how individual programs are approaching the EAs and what the opportunities and limitations are. A review of available annual reports, reports of waste discharge (ROWDs), and related materials was conducted. Documents were reviewed for MS4s across all nine Regional Water Board regions listed in **Table 1**. The most recent documents available were used; in most cases, the documents were from the 2012-2013 reporting period. All stormwater program documents reviewed are listed in **Appendix F**.

The municipal stormwater EAs were evaluated for the following characteristics:

- EA Overview

  The documents were reviewed for general observations regarding EA, including existing strategies, whether EAs were conducted, and whether existing EA guidance and resources were referenced.

- EA Approach

  The documents were reviewed to obtain an understanding of how municipal stormwater programs are currently approaching EAs, what metrics and methods are being used, and if the results of the assessments are being used to identify program modifications.

The results of this review have been compiled (**Appendix B: Annual Report Review Matrix**) and summarized below. The results were used to identify overarching trends, trends by region, or trends by Program Element.

4.1 SUMMARY AND INTERPRETATION OF RESULTS

4.1.1 Effectiveness Assessment Overview

The core questions assessed and the related observations included the following:

Does the Stormwater Program have its own EA Guidance/ Strategy?

- 48% (11) of the stormwater programs have prepared their own EA guidance documents. This included stormwater programs in the Central Valley, Lahontan, Santa Ana, and San Diego regions, as well as Caltrans. Although the Phase II communities do not currently have their own guidance documents, they are required to develop a Program Effectiveness Assessment and Implementation Plan (PEAIP) by June 2015.

Does the Annual Report/ ROWD include explicit EAs?

- 74% (17) of the stormwater programs included explicit EAs in their annual reports.

- This included the 11 stormwater programs who had prepared their own EA guidance documents.
- Of these 17 stormwater programs, three (13%) also included EAs in their ROWDs.
- In some cases, the countywide program conducted a regional EA; however, the individual agencies in that area did not.

- In 48% (11) of the annual reports, the EAs may have benefitted from additional data and/or information to support the conclusion(s).

Does the Annual Report/ ROWD specifically reference the CASQA Guidance Manual and/or the State Guidance Manual?

- 48% (11) of the stormwater programs referenced the CASQA Guidance Manual in their annual reports or ROWDs.

4.1.2 Effectiveness Assessment Approach

While reviewing the Program Elements for which the annual reports and/or ROWDs included EAs, it was necessary to determine a standard set of Program Elements to effectively summarize the findings. For the purposes of this report, the standard terms used to describe the major stormwater Program Elements are listed in **Table 2**. The corresponding variations on the Program Element names used by the stormwater programs are summarized in **Appendix C**.

Table 2. Stormwater Program Element Names Used in Baseline Report

Code	Program Element
PM	Program Management
ID	Illicit Discharge
PO	Public Outreach/ Residential Sources
MO	Municipal Operations
IC	Industrial/ Commercial
CO	Construction
PLD	Planning & Land Development
MON	Monitoring

The core questions assessed and the related observations included the following:

Are management/ assessment questions used?

In other words, were program- or pollutant-specific questions asked which provide an overall framework for the EA?

- 35% (8) of the stormwater programs have management/assessment questions (i.e., program- or pollutant-specific questions) to provide an overall framework for the EA in their annual reports or ROWDs.
    - The regions that tend to include management questions include the Central Valley, San Diego, and Los Angeles Regions.

Are metrics (e.g., assessment data) used?

In other words, did the Annual Report or ROWD include qualitative or quantitative data or information pertaining to specific Program Elements and/or performance standards that are collected for use in the EA—or, if EA was not yet conducted, could be used for that purpose?

- Metrics were used in all reports.
- 74% (17) of the stormwater programs included explicit EAs in their annual reports and/or ROWDs.

For which Program Elements does the Annual Report/ ROWD include EAs?

In other words, which Program Elements included explicit EAs using the collected metrics?

- EAs were conducted by the stormwater programs for each of the standardized Program Elements, as follows:
    - Illicit Discharge – 96% (22)
    - Public Outreach/ Residential Sources – 96% (22)
    - Municipal Operations – 96% (22)
    - Planning & Land Development – 91% (21)
    - Industrial/ Commercial – 87% (20)
    - Construction – 87% (20)
    - Monitoring – 78% (18)
    - Program Management – 65% (15)

Does the Annual Report/ ROWD specifically reference Outcome Levels?

- 39% (9) of the stormwater programs reference Outcome Levels in the annual reports and/or ROWDs.

For each Program Element, at which Outcome Levels does the Annual Report/ ROWD conduct EAs[9]?

- The Outcome Levels reported for each Program Element are described in **Table 3**.[10]
    - All Program Elements were assessed at Outcome Level 1.
    - A total of six Program Elements were assessed at Outcome Levels 1-4.
    - Monitoring is the primary Program Element that was assessed at Outcome Levels 5 and 6.

[9] If outcome levels were not specified, this question was answered by reviewing the available metrics and defining the outcome level using best professional judgment. If outcome levels were specified, this question was answered based on specified outcome levels where supporting information (such as metrics) was available.

[10] The reported percentages indicate the percent of all 23 stormwater programs reviewed.

Table 3. Outcome Levels Reported in Stormwater Program Documents, by Program Element

Program Element	Outcome Level					
	1	2	3	4	5	6
Program Management	65%	4%	--	--	--	--
Illicit Discharge	96%	35%	26%	30%	--	--
Public Outreach/ Residential Sources	96%	52%	22%	57%	--	--
Municipal Operations	96%	39%	35%	70%	--	4%
Industrial/ Commercial	87%	43%	35%	9%	--	--
Construction	87%	35%	26%	4%	--	--
Planning & Land Development	91%	22%	13%	4%	--	--
Monitoring	74%	--	--	9%	9%	17%

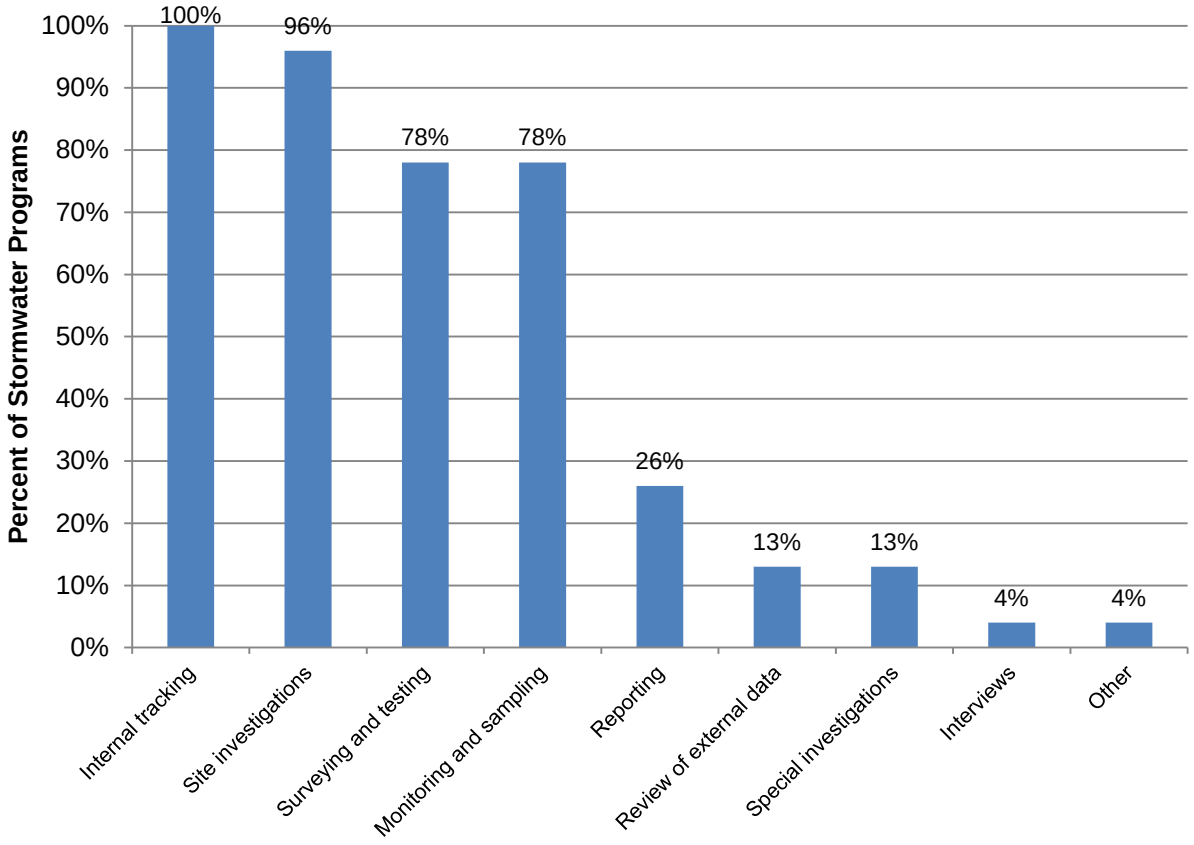
What are the program's data collection methods for EA?

Nine data collection methods are specified by the 2014 CASQA Guidance Manual[11], including:

- Internal tracking by stormwater program
- Reporting to stormwater program (by Third Parties)
- Site investigations (also inspections)
- Interviews (of Third Parties or MS4 staff)
- Surveying and testing (including pre- and post-training surveys)
- Monitoring and sampling
- Review of external data sources
- Special investigations
- Other

The results of the review of annual reports and/or ROWDs are summarized in **Figure 1**.

Figure 1. Data Collection Methods Used by Municipal Stormwater Programs



Stormwater programs tend to collect data using internal tracking by stormwater program, site investigations, surveying and testing, and monitoring and sampling. This indicates that most of the data and information used for EAs originates from within the stormwater programs.

[11] See Section 6.3 of the 2014 CASQA Guidance Manual

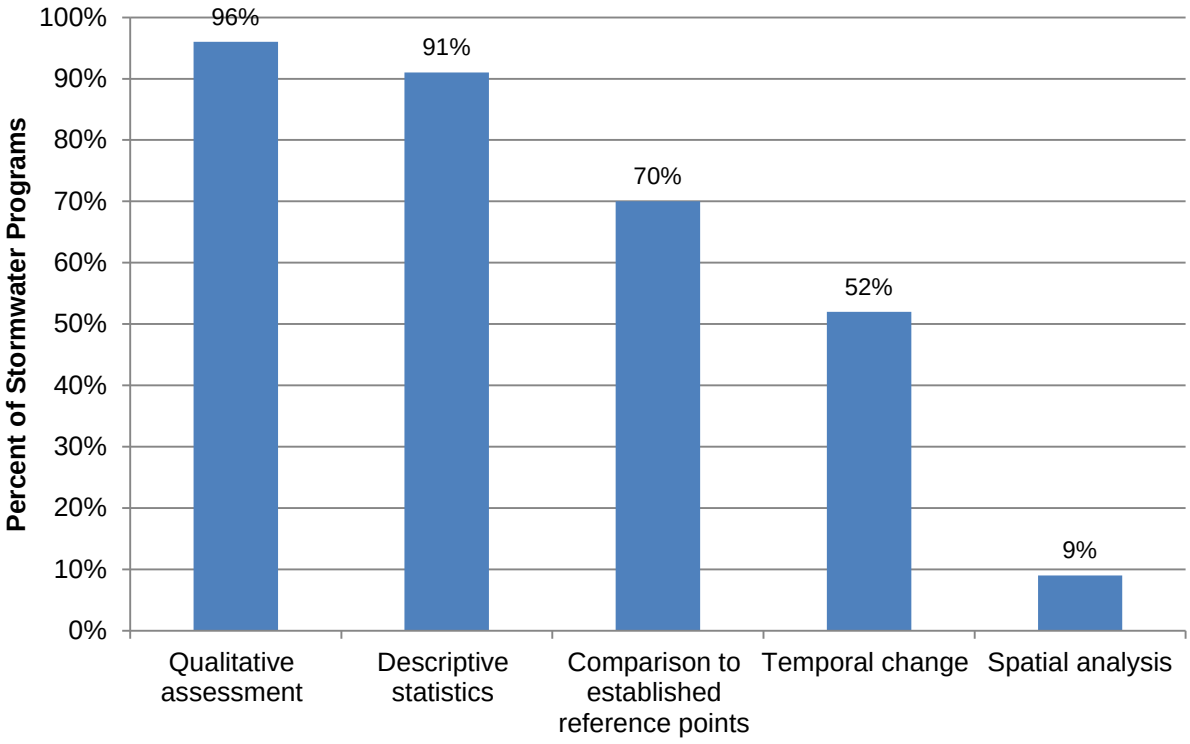
What are the program's data analysis approaches?

Five data analysis methods are specified by the 2014 CASQA Guidance Manual[12], including:

- Qualitative assessment (confirmation, completion, narrative assessment)
- Descriptive statistics (quantification and tabulation)
- Comparison to established reference points (targeted outcomes or others)
- Temporal change (change over time, including absolute, % change, or statistical trends)
- Spatial analysis (such as spatial variability, comparisons between watersheds, etc.)

The results of the review of annual reports and/or ROWDs are summarized in **Figure 2**.

Figure 2. Data Analysis Approaches Used by Municipal Stormwater Programs



Stormwater programs tend to analyze data using qualitative assessment, descriptive statistics, and comparison to established reference points. The use of types of analysis indicates that most of the data and information is being used for EAs at lower Outcome Levels (OLs 1-3).

On what timeframe are the EAs conducted?

The EA timeframe was broken into three terms: annual, short-term (longer than annual but within one permit term, 2-5 years), and long term (longer than one permit term, >5 years).

The primary findings from the review of annual reports and/or ROWDs were as follows:

[12] See Section 6.3 of the 2014 CASQA Guidance Manual

- 100% (23) of stormwater programs presented annual EAs or metrics that could potentially be used to conduct EAs.
- 52% (12) of stormwater programs presented short-term EAs or metrics.
- 43% (10) of stormwater programs presented long-term EAs or metrics, most of which were for the Monitoring Program Element.

Does the Annual Report/ ROWD discuss program modifications based on the EAs?

- 57% (13) of stormwater programs included a discussion of program modifications based on EAs.

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5. Survey of Assessment Needs and Opportunities (Subtasks 4.3 and 4.4)

The purpose of this task was to document the expectations and knowledge base of municipal stormwater program managers, regulatory staff, and third parties so that the stormwater community can collaborate and share ideas regarding the current state of EAs and identify what the additional needs and opportunities are. To this end, surveys were developed and conducted to establish an informational baseline to help identify what education and/or outreach is needed and against which future survey results can be compared. Understanding the needs and priorities of a range of interested parties will help to ensure that future efforts are focused on the highest priorities. Each of the surveys encompassed a series of general questions, as well as specific content tailored to each of the three audience types (**Appendix D**). The survey content included the following types of information:

- Participant Information
- Familiarity, Knowledge, and/or Current Usage of CASQA/ SWRCB and/or Other EA Approaches
- Strengths and Weaknesses of Current Assessment Efforts
- Priorities for Assessment
- Key Data Deficits and Limitations of Current Methods
- Options for Web Portal Functionality and Content that have the Greatest Interest and Utility for Participants
- Training Priorities and Needs

Full survey results are provided in **Appendix E**.[13] The summary and interpretation of survey results presented herein are organized by the categories above.

5.1 SUMMARY AND INTERPRETATION OF RESULTS

5.1.1 Participant Information

General participant information is summarized below. It should be noted that not all participants answered all survey questions. Thus, at times, the total participants for an individual survey question may not add up to the total number of participants.

MS4 Program Managers

A total of 23 MS4 Program Managers were contacted, and 18 (78%) completed the surveys.

- The survey participants represented seven of the nine regions, as well as the Phase II community.

[13] In order to receive candid responses from the participants, the individual responses are being kept confidential.

- Approximately 11% of the survey participants have been involved in stormwater management for more than 20 years, and approximately 56% of the MS4 Stormwater Programs have been in place for more than 20 years.

Regulators

A total of 11 Regulators were contacted, and eight (72%) completed the surveys (note: one survey was only partially completed).

- The survey participants represented six of the nine regions, as well as the SWRCB and the EPA.
- Approximately 25% of the survey participants have been involved in stormwater management for more than 20 years.

NGOs/Third Parties

A total of five NGOs/Third Parties were contacted, and two (40%) completed the surveys.

- The survey participants were located in two of the nine regions.
- Both participants have been involved with municipal stormwater management for less than 20 years.

5.1.2 Familiarity, Knowledge, and/or Current Usage of CASQA/ SWRCB and/or Other Effectiveness Assessment Approaches

Participants were asked to rate their use of the following two documents:

- *Municipal Stormwater Program Effectiveness Assessment Guidance*, CASQA, May 2007
- *Guidance for Assessing the Effectiveness of Municipal Storm Water Programs and Permits*, SWRCB, 2011

The responses of all three participant groups are summarized below. The familiarity of participants with the CASQA and SWRCB Guidance Manuals is summarized by survey participant group in **Figure 3**.[14] The current use of the CASQA and SWRCB Guidance Manuals is summarized by survey participant group in **Figure 4**.[15]

[14] "Familiar" = Survey Question 1 responses a(i), a(ii), a(iii); b(i), b(ii), b(iii); "Not Familiar" = Survey Question 1 responses a(iv), a(v), a(vi); b(iv), b(v), b(vi)

[15] "Uses" = Survey Question 1 responses a(i), a(ii); b(i), b(ii); "Does Not Use" = Survey Question 1 responses a(iii), a(iv), a(v), a(vi); b(iii), b(iv), b(v), b(vi)

Figure 3. Familiarity with Municipal Stormwater Program Effectiveness Assessment Guidance (CASQA) and Guidance for Assessing the Effectiveness of Municipal Storm Water Programs and Permits (SWRCB)

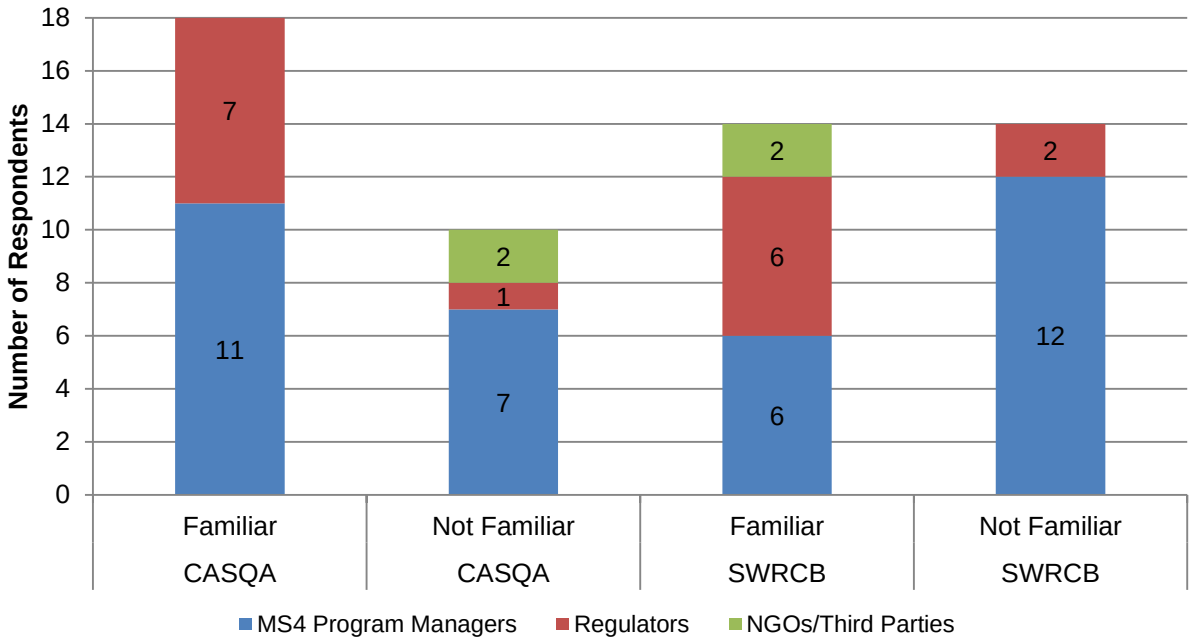
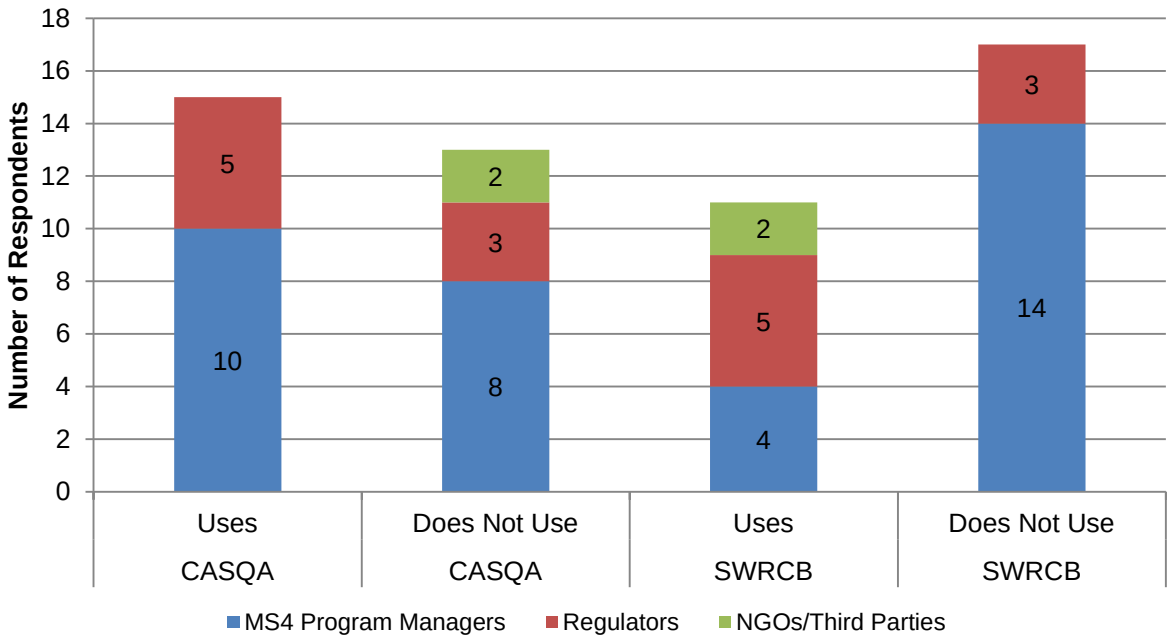


Figure 4. Current Use of Municipal Stormwater Program Effectiveness Assessment Guidance (CASQA) and Guidance for Assessing the Effectiveness of Municipal Storm Water Programs and Permits (SWRCB)



Approximately 64% of survey participants were familiar with the CASQA Guidance Manual, and 54% currently use it or have used it in the past. Approximately 50% of survey participants were familiar with the SWRCB Guidance Manual, and 39% currently use it or have used it in the past. Fewer survey participants are familiar with or use the SWRCB Guidance Manual than the CASQA Guidance Manual. This is consistent with the result, discussed in **Section 4.1.1**, that approximately half of the annual stormwater reports reviewed reference the CASQA document.

Survey participants provided comments regarding the usefulness of the CASQA Guidance Manual and potential ideas for improvement. In general, what participants found to be most useful about the CASQA Guidance Manual focused on the following themes:

Overall Comment Theme	Survey Participant Group		
	MS4s	Regulators	NGOs
Provides introduction to using performance metrics	X	X	--
Provides a structured, overall framework for clear, measurable EAs	X	X	--
Provides approaches/strategies to help MS4s more easily assess their programs	X	X	--
Assists MS4s and Regulators in understanding the level of assessment that can be performed for, as well as the potential outcomes from, different Program Elements (i.e., Fact Sheets for Program Elements)	X	X	--

In general, participants thought the CASQA Guidance Manual needs to be improved the most with regard to the following:

Overall Comment Theme	Survey Participant Group		
	MS4s	Regulators	NGOs
Specific guidance for planning, incorporation into a stormwater program, and conducting assessments	X	--	--
Accounting for limitations regarding which outcome levels can be achieved	X	--	--
Consistency with increased EA requirements in some MS4 Permits	--	X	--
Real-life examples of successful use, to serve as models	X	X	--
More detailed information on pollutants of concern	X	--	--
Guidance on pollutant load quantification (MS4 Program Managers, Regulators)	X	X	--
Clarifying differences between OL4, OL5, and OL6, as well as utility in distinguishing them	X	--	--
Focusing on the goal of improved water quality (OL6), rather than program implementation (OL1)	X	--	--

Survey participants provided comments regarding the usefulness of the SWRCB Guidance Manual and potential ideas for improvement. In general, what participants found to be most useful about the SWRCB Guidance Manual focused on the following themes:

Overall Comment Theme	Survey Participant Group		
	MS4s	Regulators	NGOs
Provides an introduction to using performance metrics	--	X	--
Effectively outlines the issues and concepts for effective assessments	X	--	--
Provides a structured approach for effective assessments	--	X	--
Provides monitoring outcomes, measures, and methods that can be used to determine whether proper monitoring and assessment is occurring	--	--	X
Provides some additional specificity on some topics as compared to the CASQA Guidance Manual	X	--	--

In general, participants thought the SWRCB Guidance Manual needs to be improved the most with regard to the following:

Overall Comment Theme	Survey Participant Group		
	MS4s	Regulators	NGOs
Needs to provide more detail and an implementation perspective	X	--	--
Consistency with increased EA requirements in some MS4 Permits	--	X	--
More detailed guidance on effective assessment measures, indicators of effectiveness, outcomes	X	--	X
Measures and indicators that are simple and easy to use, track, and report	X	--	--

In addition to the CASQA and SWRCB documents, participants were asked to rate their use of the following guidance documents:

- *Monitoring to Demonstrate Environmental Results: Guidance to Develop Local Stormwater Monitoring Studies*, Center for Watershed Protection, 2008
- *MS4 Program Evaluation Guidance Manual*, EPA, 2007
- Other documents

Most participants were familiar with at least one of the two documents.

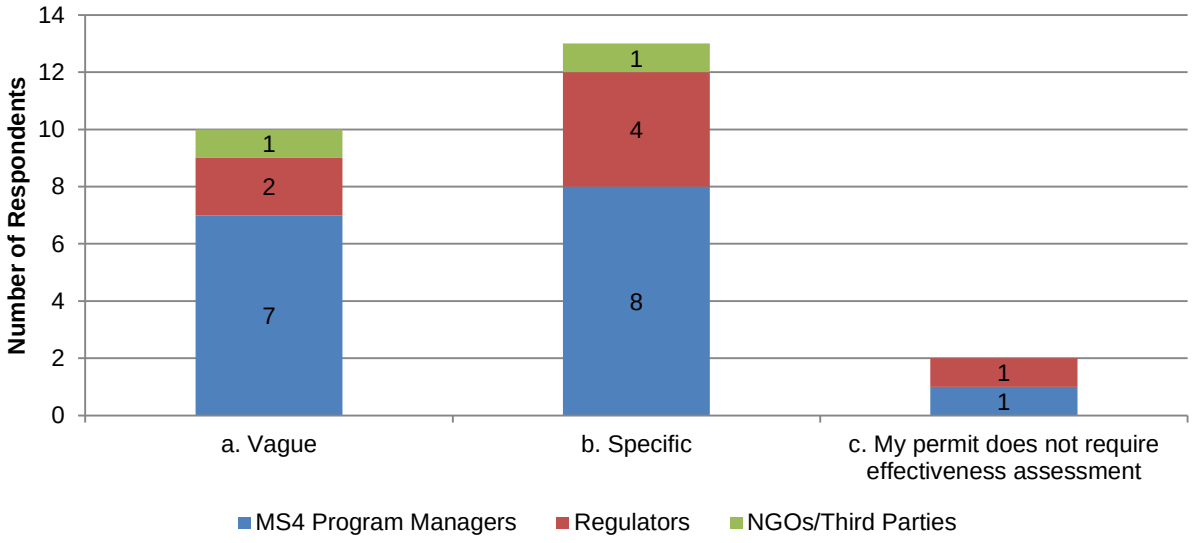
- A total of 11 participants (41%) were familiar with the Center for Watershed Protection Guidance
- A total of 16 participants (56%) were familiar with the EPA Guidance.

Some participants suggested other documents to be used as potential resources for inclusion on the Web Portal (see **Section 6**). One survey participant noted that the Center for Watershed Protection and EPA guidance documents both provide useful information, but neither are designed to help users select and monitor outcomes.

5.1.3 Strengths and Weaknesses of Current Assessment Efforts

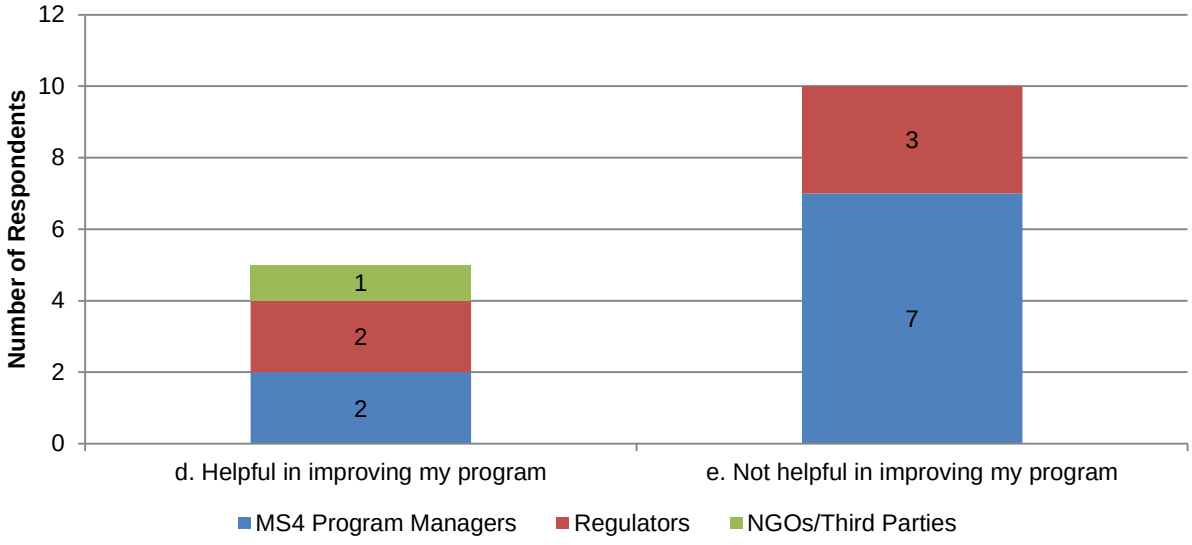
Participants were asked to describe their perception of EA requirements in the current MS4 permit(s). The responses are summarized by survey participant group in **Figure 5**.[16]

Figure 5. Perception of Effectiveness Assessment Requirements in Current MS4 Permits



Participants were asked to indicate whether they consider the EA requirements in the current MS4 permit(s) to be helpful in improving their program. The responses are summarized by survey participant group in **Figure 6**.

Figure 6. Helpfulness of Effectiveness Assessment Requirements in Improving Programs



[16] The question for which results are presented in Figures 5 and 6 allowed participants to choose more than one response; thus, there may be more responses than actual participants.

Although survey participants generally perceived their permit EA requirements to be specific rather than vague, the participants indicated that the requirements were not necessarily helpful with regard to improving the stormwater programs. This is consistent with the results of the permit review (Subtask 4.1) that indicated that approximately 91% of the permit requirements were determined to have high or medium specificity.

As demonstrated below, there was no clear relationship between the specificity of the EA requirements and the perception that the requirements were helpful to the improvement of the stormwater programs.

- Of the ten participants who indicated that the permit requirements are "vague," two indicated that the requirements are helpful in improving the stormwater programs, and five indicated that the requirements are not helpful in improving the stormwater programs.
- Of the 13 participants who indicated that the permit requirements are "specific," three indicated that the requirements are helpful in improving the stormwater programs, and four indicated that the requirements are not helpful in improving the stormwater programs.[17]

Regardless of the specificity of the requirements, more MS4 Program Managers perceived permit EA requirements to be unhelpful (7) than helpful (2) in improving the stormwater programs, while the responses of the Regulators were split more evenly.

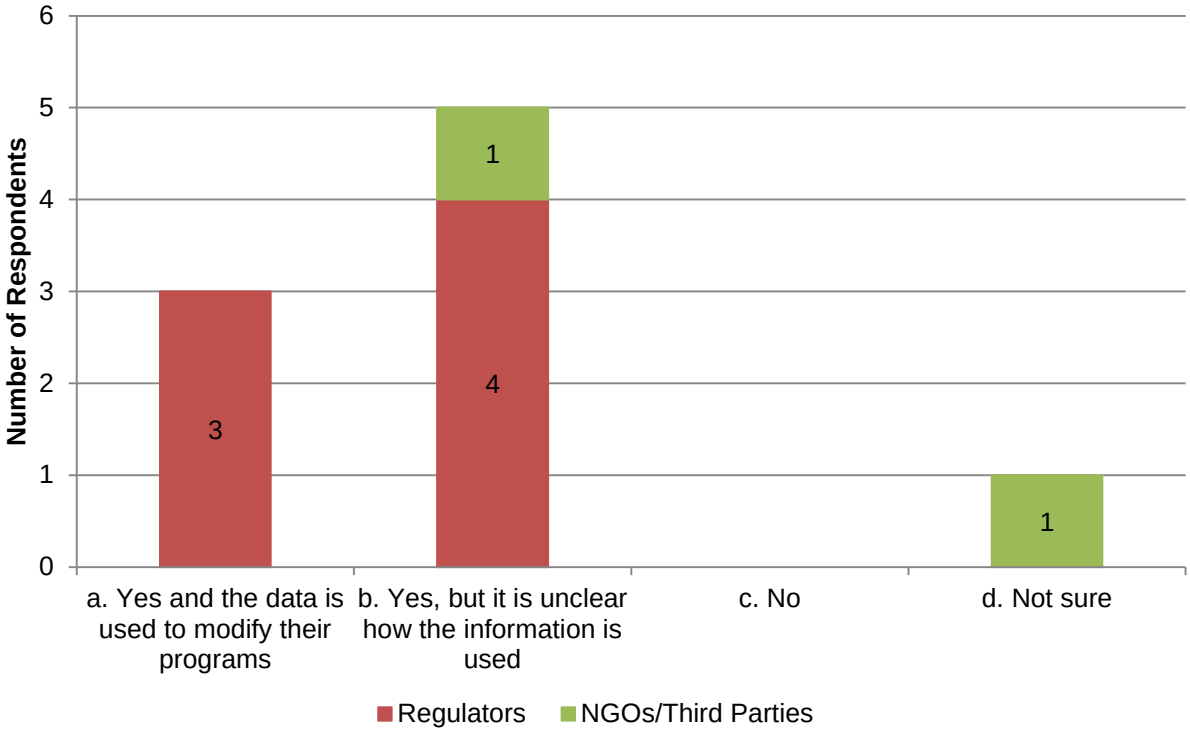
MS4 Program Managers were asked if they have developed a written strategy for assessing the effectiveness of their program.

- 33.3% (6) of survey participants have a written strategy in place
- 22.2% (4) do not have a written strategy, but they do use an informal process.
- 44.4% (8) do not have a written strategy or are not sure if they do

[17] One MS4 participant noted that their permit requirements were both "vague" and "specific," and that the requirements are not helpful. One regulator participant noted that their permit requirements were both "vague" and "specific," and that the requirements are helpful and not helpful. Three MS4 participants did not indicate whether their permit requirements were "vague" or "specific" but noted that the requirements were not helpful.

Regulators and NGOs/Third Parties were asked if the MS4 programs assess the effectiveness of their programs in their respective region. The responses are summarized in **Figure 7**.

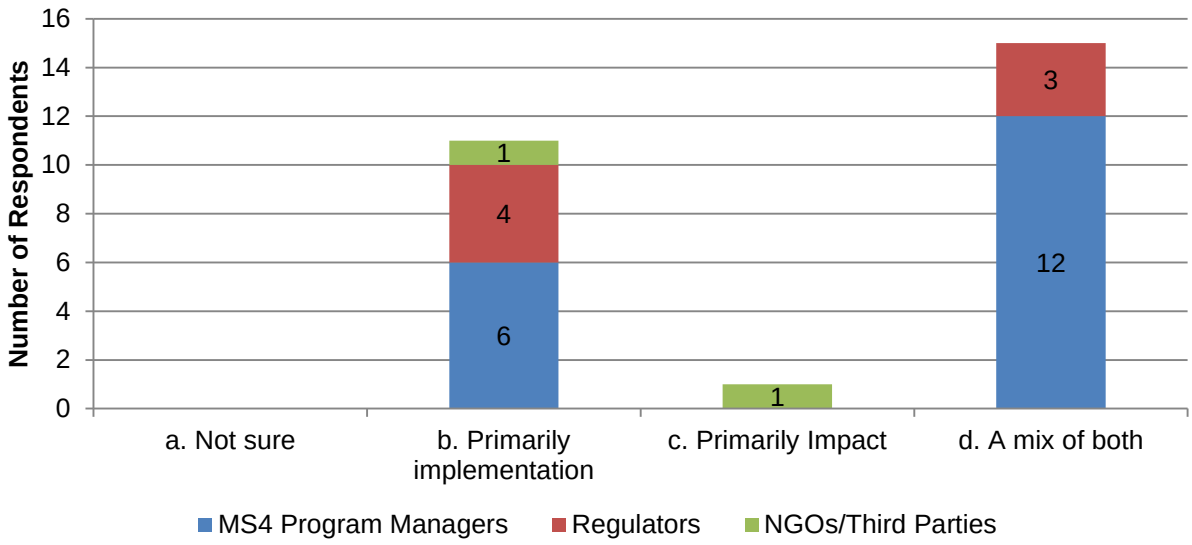
Figure 7. Regulator and NGO/Third Party Perception of Whether MS4 Programs Assess Effectiveness



The results suggest that although the Regulators recognize that MS4 Program Managers are conducting EAs of their programs and using the results to modify their programs, the Regulators and NGOs/Third Parties were unclear on how the EAs are being used (**Figure 7**). Those MS4 Program Managers who perceived the permits' EA requirements to be unhelpful in improving their programs (**Figure 6**) may also be limited by the current regulatory structure regarding to what extent they can use the results of EAs to adaptively manage their programs.

Survey participants were asked if the MS4s primarily report on the implementation of the stormwater program (# inspections, # enforcement actions, # brochures distributed) OR the impact that the stormwater program is having (results of surveys, results of inspections, monitoring). The responses are summarized by survey participant group in **Figure 8**.

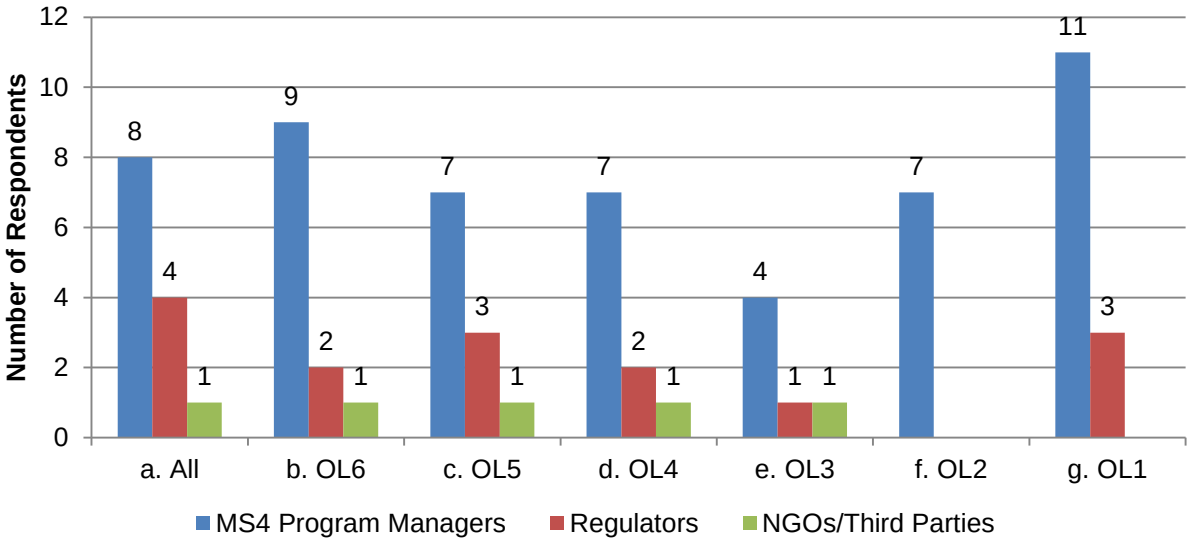
Figure 8. Perception of Focus of MS4 Program Effectiveness Assessments



Most participants (15 of 27, or 56%) perceive the MS4 programs to be reporting on both implementation and impact; however, a large number of participants (11 of 27, or 41%) perceive the MS4 programs to be reporting primarily on program implementation. This split perception is consistent with the review of recent annual reports and EAs conducted, since the focus of EAs varies by Program Element and by permit and/or region (see **Section 4.1.2**).

MS4 Program Managers were asked what Outcome Levels they evaluate and report on in the annual report. Similarly, Regulators and NGOs/Third Parties were asked a question regarding what Outcome Levels they think should be evaluated and reported out on in the annual reports. The responses are summarized by survey participant group in **Figure 9**.

Figure 9. Outcome Level Evaluation and Reporting: Actual (MS4s) and Expected (Regulators/NGOs/Third Parties)

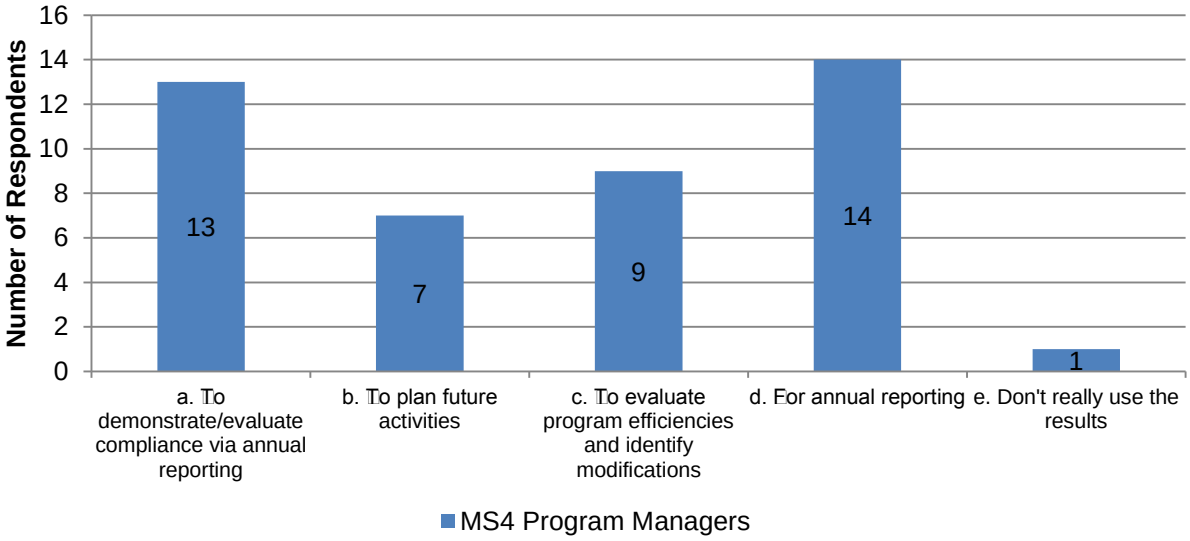


a. All
b. Outcome Level 6 – Receiving Water Quality
c. Outcome Level 5 – Urban Runoff/Discharge Quality
d. Outcome Level 4 – Source Load Reductions
e. Outcome Level 3 – Target Audience Behavior
f. Outcome Level 2 – Target Audience Knowledge or Awareness
g. Outcome Level 1 – Program Implementation

MS4 Program Managers generally indicated that they are evaluating and reporting out on all six Outcome Levels, and more than half of the Regulators/NGOs/Third Parties indicated that all six Outcome Levels should be evaluated and reported out on in the annual reports.

MS4 Program Managers were asked how their agencies use the information obtained from conducting the effectiveness assessments. The responses are summarized in **Figure 10**.[18]

Figure 10. Use of Information from Effectiveness Assessments by MS4 Program Managers



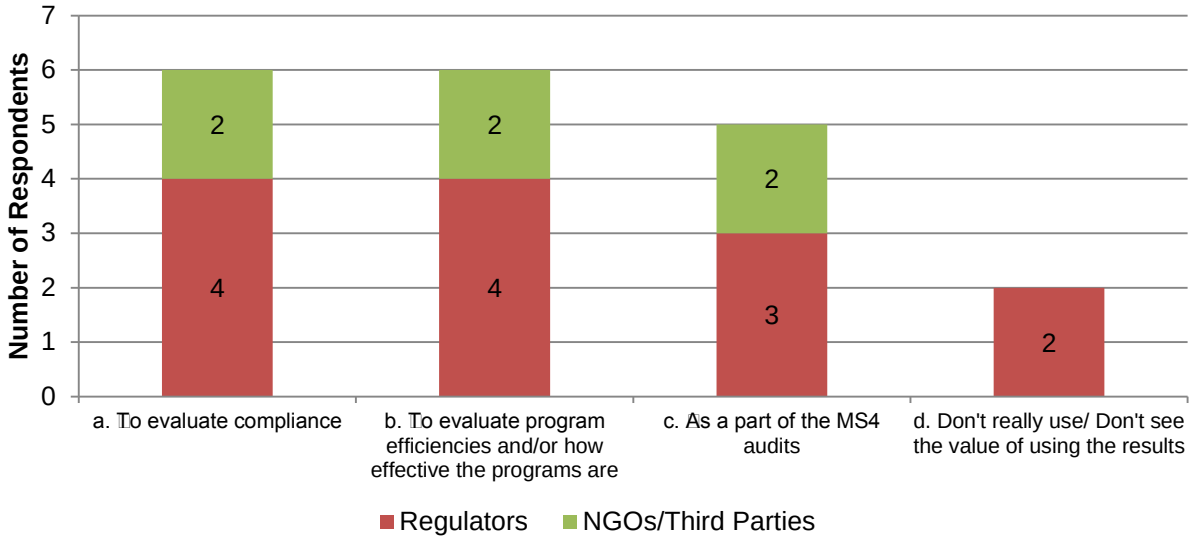
Generally, these results indicate that MS4 Program Managers are using the information obtained from EAs primarily for reporting purposes and to modify and/or adaptively manage their programs.

- MS4 Program Managers are using EA results for annual reporting (78%) and/or to demonstrate/evaluate compliance of their programs with permit requirements (72%).
- Some are also using the results to plan future activities (39%) and/or to evaluate program efficiencies and identify modifications (50%).
- These results are consistent with the findings that 57% (13) of stormwater programs included a discussion of program modifications based on EAs (see **Section 4.1.2**).

Regulators were asked how their Regions use the information obtained from the effectiveness assessments that are conducted. Similarly, Third Parties/NGOs were asked how the information obtained from the effectiveness assessments that are conducted should be used. The responses are summarized in **Figure 11.**

[18] The question for which results are presented in Figures 10 and 11 allowed participants to choose more than one response; thus, there may be more responses than actual participants.

Figure 11. Use of Information from MS4 Program Effectiveness Assessments by Regulators/NGOs



These results indicate that Regulators are primarily using the information obtained from EAs to evaluate compliance and/or program efficiencies/effectiveness. Some Regulators and NGOs/Third Parties also considered this information to be useful for MS4 audits.

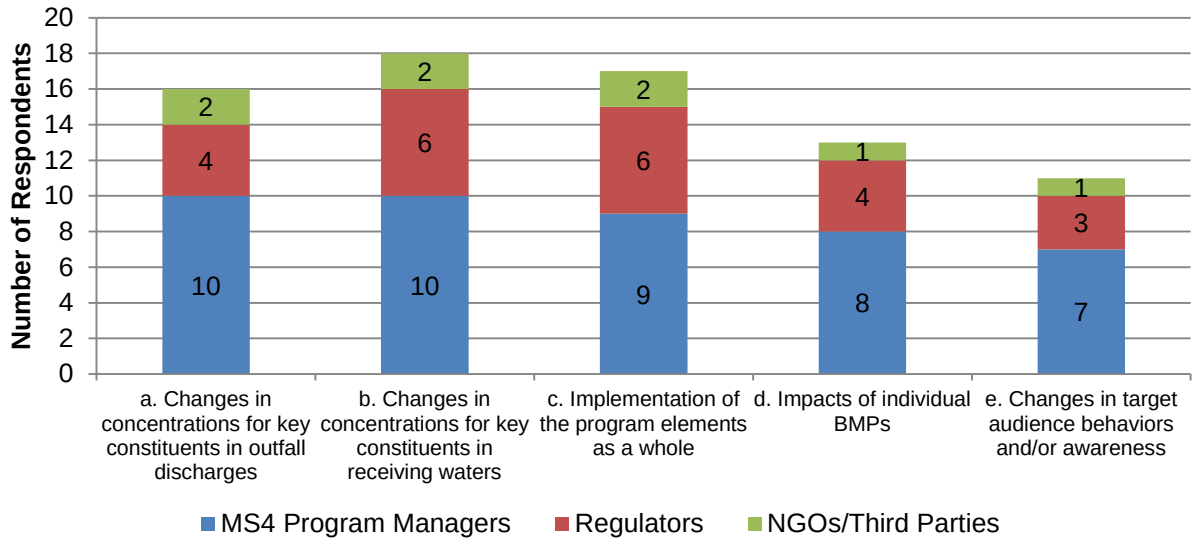
Survey participants provided additional thoughts or comments on what is working or not working for existing program EA efforts. Responses generally focused on the following topics:

Overall Comment Theme	Survey Participant Group		
	MS4s	Regulators	NGOs
Practical guidance and indicators of program effectiveness are needed.	X	--	--
EA can be overwhelming and time-consuming.	X	--	--
It is challenging to complete assessments at all six Outcome Levels.	X	--	--
A disconnect may exist between identification of Outcome Levels and the EA evaluations actually being conducted by stormwater programs.	--	X	--
It is a challenge to decide what data to capture and how much data is needed. Data collection can be costly, and the benefits are not always clear.	X	--	--
Permit requirements may limit the ability for program managers to significantly modify programs based on annual EAs.	X	--	--
Long-term EAs have value for the identification and proposal of program modifications.	X	--	--
If the focus is on improving water quality, EA should be based on an understanding of pollutant loading, BMP effectiveness, monitoring results, and meaningful program modifications.	--	X	X

5.1.4 Priorities for Assessment

Survey participants were asked what the highest priority areas are that should be assessed for a stormwater program's effectiveness. The responses are summarized by survey participant group in **Figure 12**.

Figure 12. Highest Priority Areas for MS4 Program Effectiveness Assessments



All areas were considered to be equally important by survey participants. The highest priority areas for assessment were considered to be:

- Changes in concentrations for key constituents in receiving waters (18 of 27, or 67%);
- Implementation of the Program Elements as a whole (17 of 27, or 63%); and
- Changes in concentrations for key constituents in outfall discharges (16 of 27, or 59%).

Some participants specified other priority areas for the assessment of stormwater management programs, including:

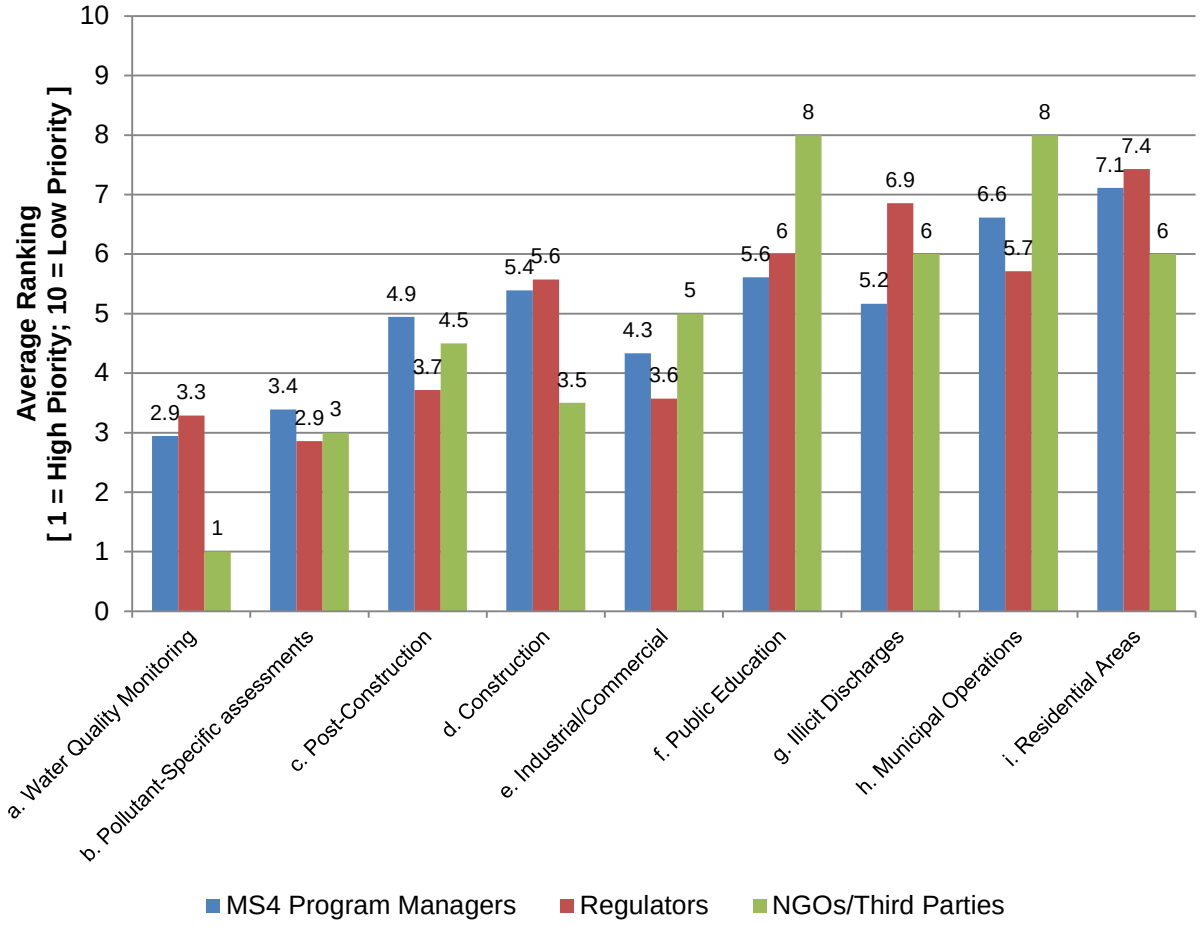
Overall Comment Theme	Survey Participant Group		
	MS4s	Regulators	NGOs
Appropriate Beneficial Use designations and Water Quality Objectives	X	--	--
Need to shift from assessing the implementation of the program to the impacts that the programs are having on water quality	--	X	--
Cost comparison between regional [treatment control BMPs] versus individual lot LID practices	X	--	--
Information on how to prioritize resources so the most effective BMPs are implemented	X	--	--

For the program areas listed below, survey participants were asked where guidance is needed most for conducting EAs.

- Water Quality Monitoring/Watershed Assessment (MON)
- Pollutant-specific assessments (MON)
- Post-construction (PLD)
- Construction (CO)
- Industrial/Commercial (IC)
- Public Education (PO)
- Illicit Discharges (ID)
- Municipal Operations (MO)
- Residential Areas (PO)
- Not sure

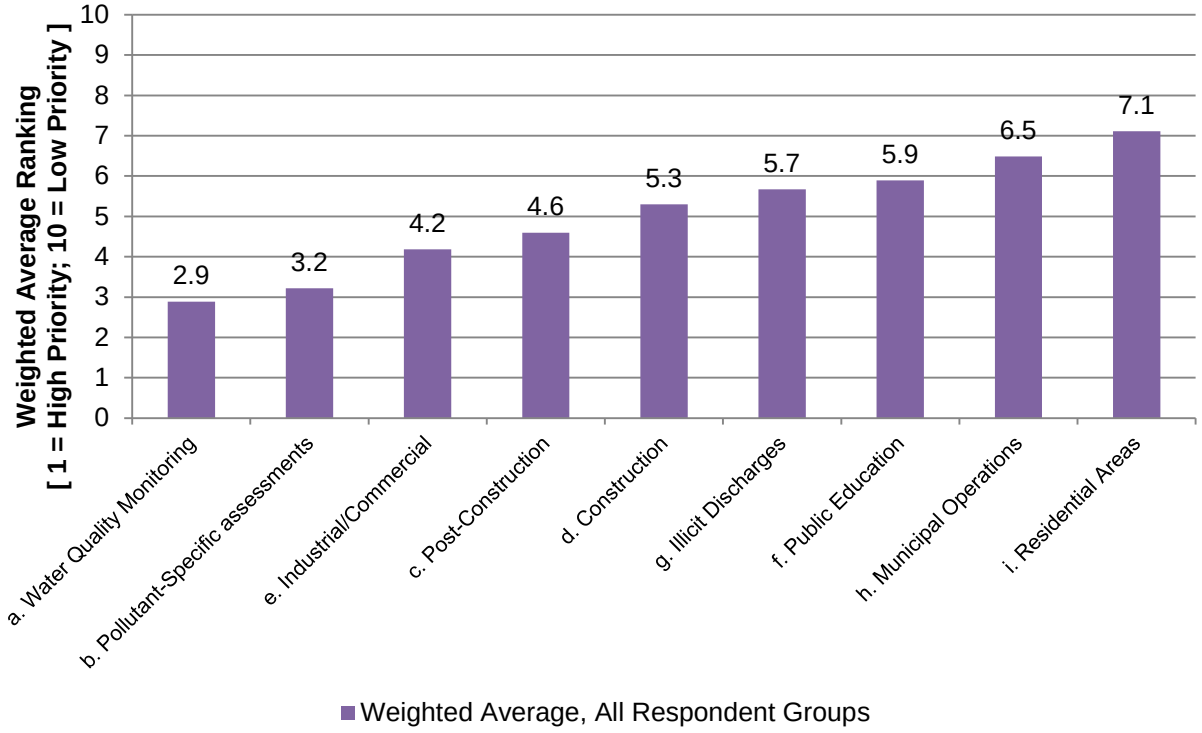
The items listed above were ranked in the order of most important (1) to least important (10). The average rankings of each participant group are shown in **Figure 13**. Most survey participants ranked "Not sure"' as the lowest priority of 10. "Not sure" is not included in **Figure 13** or **Figure 14**.

Figure 13. Need for Effectiveness Assessment Guidance, Average Ranking of Participant Groups, by Program Area



Because responses were similar for all three groups, the responses are summarized using weighted rankings combining the responses for all groups, as shown in **Figure 14**. The ranking is based on the highest priority being a "1" and the lowest being a "10."

Figure 14. Need for Effectiveness Assessment Guidance, Weighted Average for All Groups, by Program Area



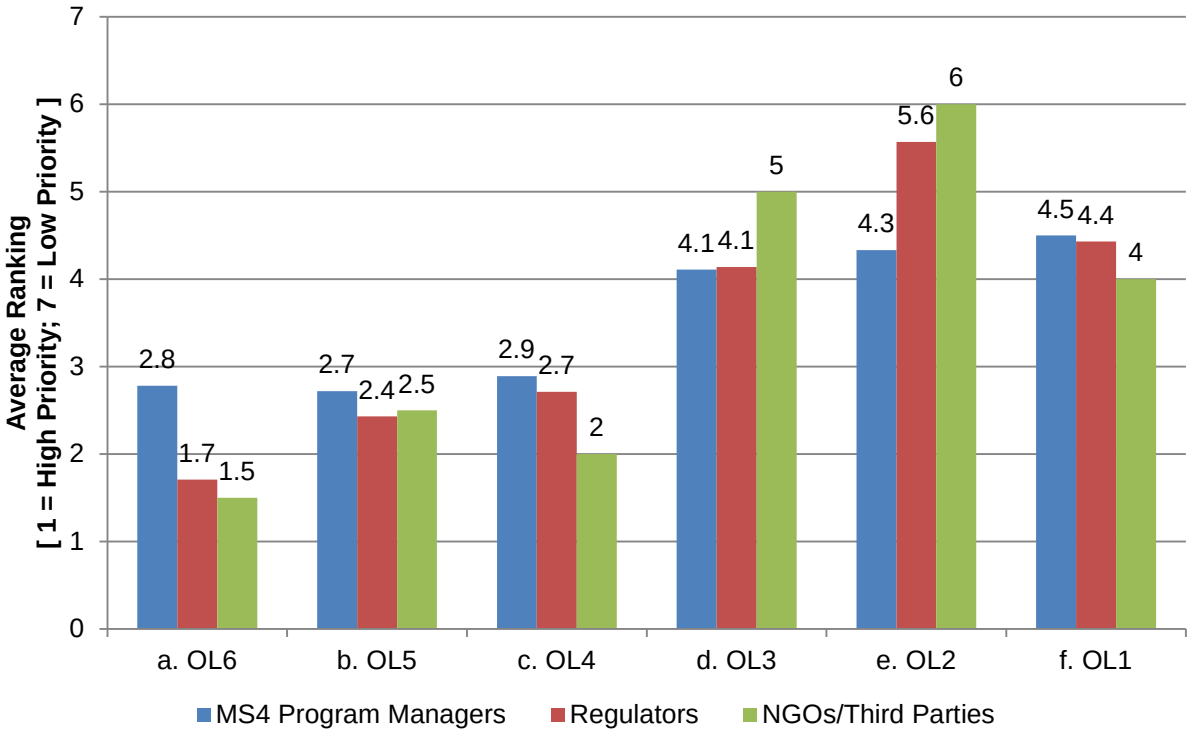
Based on these results, it is clear that participants would prefer that EA guidance focus on water quality monitoring and watershed assessment, as well as pollutant-specific assessments. In addition, there is a strong preference for EA guidance for Program Elements with an inspection component (i.e., Industrial/ Commercial, Post-Construction, perhaps because inspections yield data and information that can be used for EAs.

Survey participants were asked for which Outcome Levels is guidance needed most for conducting EAs.

- Outcome Level 6 – Receiving Water Quality
- Outcome Level 5 – Urban Runoff/Discharge Quality
- Outcome Level 4 – Load Reductions
- Outcome Level 3 – Target Audience Behavior
- Outcome Level 2 – Target Audience Awareness
- Outcome Level 1 – Program Implementation
- Not sure

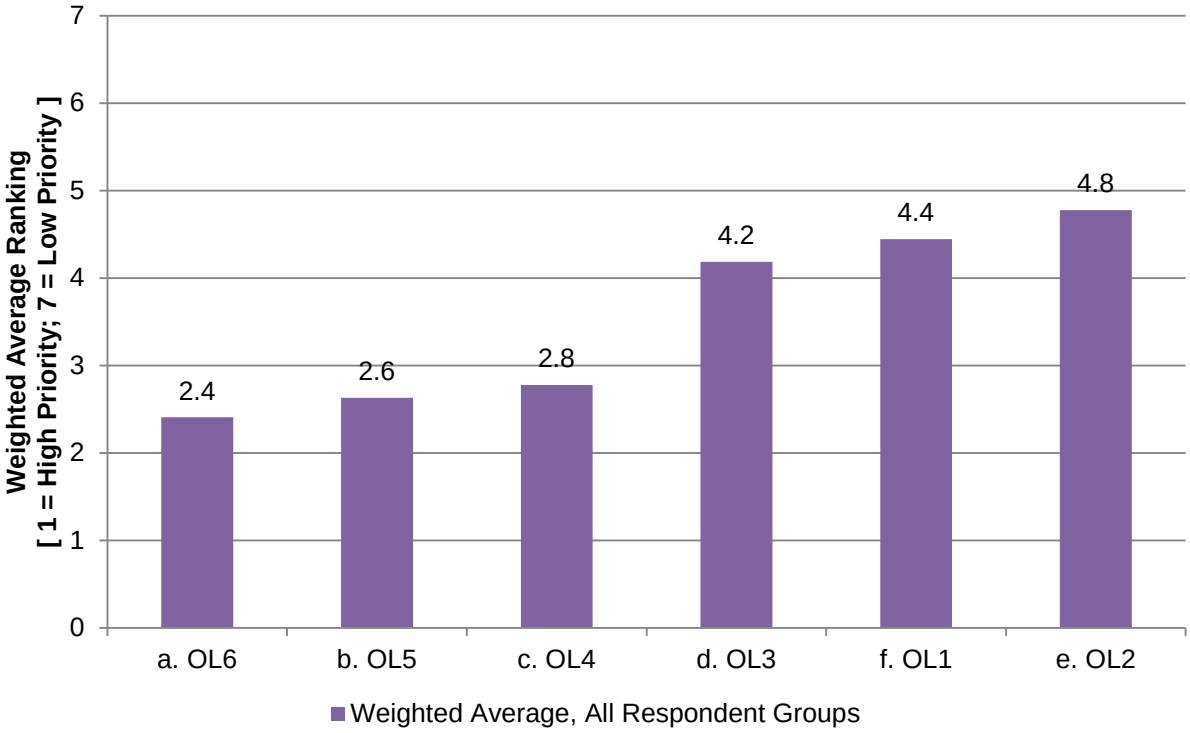
The items listed above were ranked in the order of most important (1) to least important (7). The average rankings of each participant group are shown in **Figure 15**. Most survey participants ranked "Not sure" as the lowest priority of 7. "Not sure" is not included in **Figure 15** or **Figure 16**.

Figure 15. Need for Effectiveness Assessment Guidance, Average Ranking of Participant Groups, by Outcome Level



Because responses were similar for all three groups, the responses are summarized using weighted rankings combining the responses for all groups, as shown in **Figure 16**. The ranking is based on the highest priority being a "1" and the lowest being a "10."

Figure 16. Need for Effectiveness Assessment Guidance, Weighted Average for All Groups, by Outcome Level



Based on these results, participants have a strong preference for EA guidance focusing on Outcome Levels 6, 5, and 4 (i.e., Receiving Water Quality, Urban Runoff/Discharge Quality, and Load Reductions). This is consistent with the results shown in **Table 3** that very few programs report on EA at Outcome Levels 5 and 6, in particular.

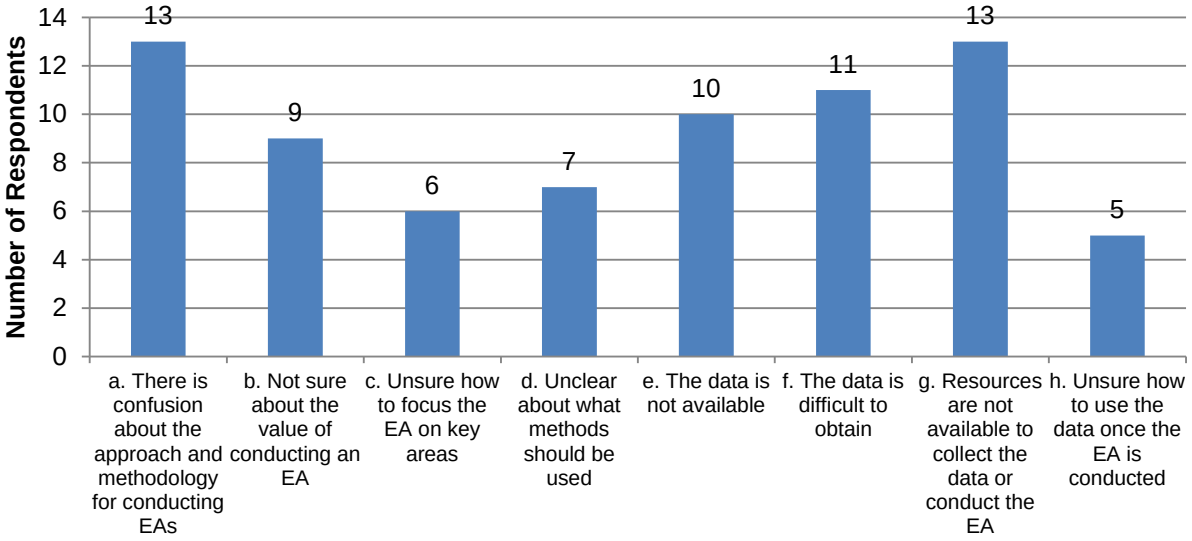
Survey participants provided additional thoughts or comments regarding priorities for the assessment of stormwater management programs, which generally focused on the following topics:

Overall Comment Theme	Survey Participant Group		
	MS4s	Regulators	NGOs
More dialogue between permittees and regulators regarding challenges and feasibility of EAs	X	--	--
Questioned if Outcome Levels are needed	--	X	--
Validity of municipal action levels (MALs)/numeric effluent limits (NELs) for assessing discharge quality	X	--	--
Use of water quality data for long-term EAs of a program	X	--	--
Use of hydrology (i.e., identification of specific catchments, drainage areas) to frame assessments and collect data	--	X	--

5.1.5 Key Data Deficits and Limitations of Current Methods

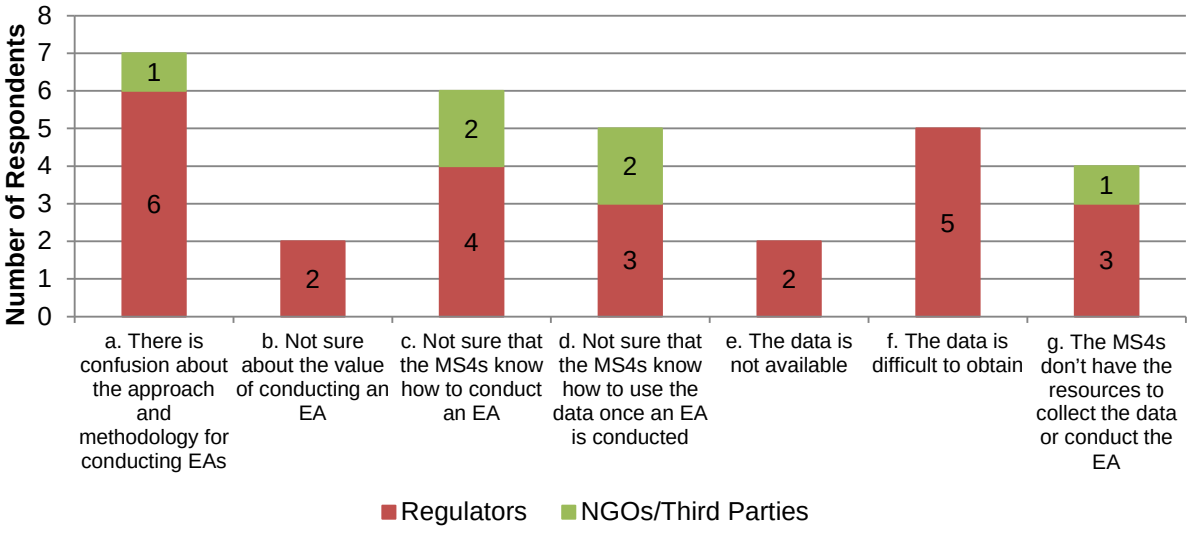
MS4 Program Managers were asked what they consider to be the greatest limitations to conducting program EAs. The responses are summarized in **Figure 17**.

Figure 17. Limitations to Effectiveness Assessment, MS4 Program Manager Perspective



Regulators and NGOs/Third Parties were asked a similar question regarding what they consider to be the greatest limitations for MS4s in conducting program EAs. The responses are summarized by survey participant group in **Figure 18**.

Figure 18. Limitations to Effectiveness Assessment, Regulator and NGO/Third Party Perspective



The results shown in **Figure 17** and **Figure 18** indicate that participants are in agreement that:

- Additional information is needed the approach and methodology for conducting EAs (72% of MS4 Program Managers, 78% of Regulators/NGOs/Third Parties); and
- The resources are not available (72% of Stormwater Program Managers) and/or the EA data is difficult to obtain (61% of MS4 Program Managers, 56% of Regulators/NGOs/Third Parties).

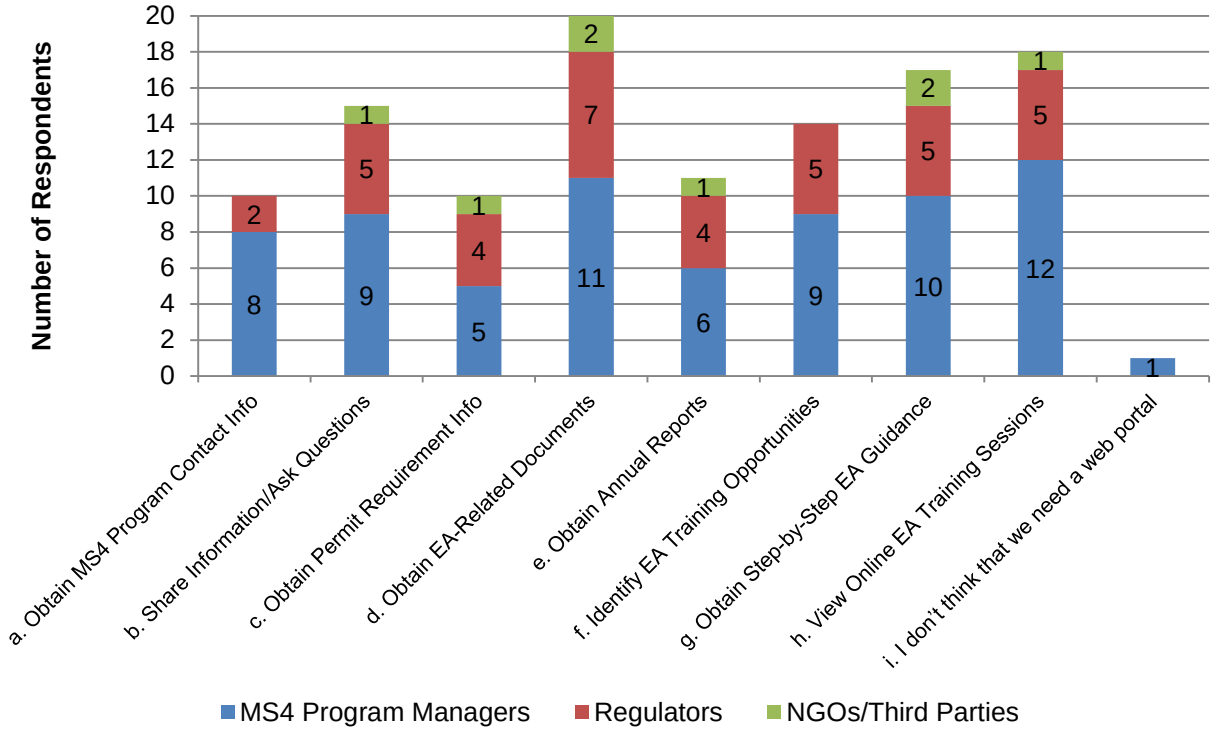
Some survey participants provided additional thoughts regarding key data deficits and/or limitations of current methods in conducting program EAs, which focused on the following:

Overall Comment Theme	Survey Participant Group		
	MS4s	Regulators	NGOs
Focus on water quality rather than program implementation	X	--	--
It is challenging to obtain reliable programmatic data.	X	--	--
The benefits of data collection are not always clear.	X	--	--
Data collection should be to answer specific management questions.	--	X	--
Data analysis is non-trivial and requires expertise to which permittees may not have access.	--	X	--
Program managers need the flexibility to modify programs based on EAs.	X	--	--
Assessment should be used for adaptive management rather than demonstration of program compliance.	X	--	--
Consistent application of the methodology is needed statewide, and the methodology needs to be refined and clarified.	X	--	--
A greater understanding of the impacts of MS4 discharges on receiving water quality is needed.	--	X	--
Uncertainties exist in BMP effectiveness due to lack of information on pollutant loads from different sources and the expected load reduction from BMPs.	--	X	--
More robust assessment methods may also be more expensive.	--	X	--

5.1.6 Options for Web Portal Functionality and Content that have the Greatest Interest and Utility for Participants

Survey participants were asked what functions are most critical for the Web Portal. The responses are summarized by survey participant group in **Figure 19**.

Figure 19. Critical Web Portal User Functions



The results shown in **Figure 19** indicate that the participants are in agreement that the Web Portal should provide access to critical resources/documents to the stormwater community regarding EAs (74%), as well as much-needed training (67%) and/or step-by-step guidance (63%). It should also function as a forum so that the stormwater community can collaborate more closely regarding EAs (56%).

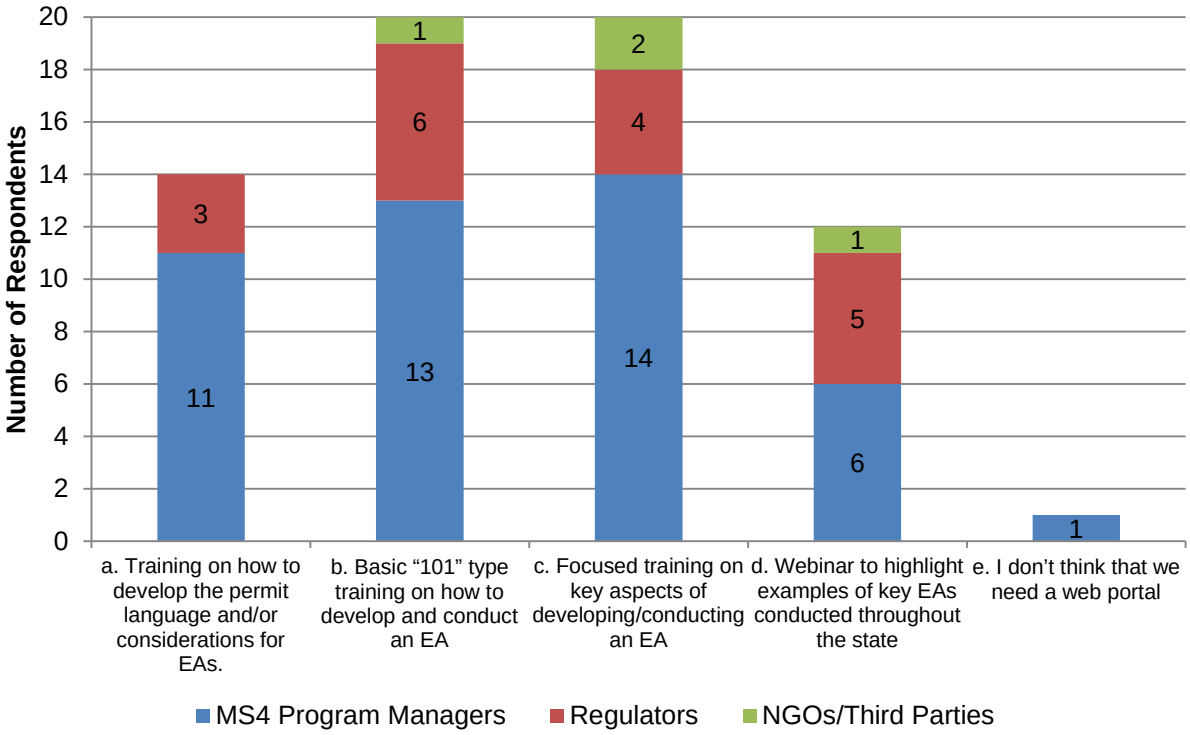
Some survey participants provided additional thoughts regarding what options should be incorporated as a part of the Web Portal functionality and/or content, which focused on the following:

Overall Comment Theme	Survey Participant Group		
	MS4s	Regulators	NGOs
The Web Portal should primarily serve those who need to conduct EAs.	--	X	--
The Web Portal should be current with permit requirements and terminology.	X	--	--
Clear, well-defined EA criteria are needed so everyone has a similar understanding of how they can be applied.	X	--	--
Standardized information (e.g., load reductions) would be helpful	X	--	--
Include a BMP effectiveness rating area for pollutants of concern that can be populated with information and reviews from users of specific BMPs	X	--	--
Include the ability to search by pollutant and by load reduction that is achievable	X	--	--

5.1.7 Training Priorities and Needs

Survey participants were asked what resources are most critical for the Web Portal. The responses are summarized by survey participant group in **Figure 20**.

Figure 20. Critical Web Portal Resources



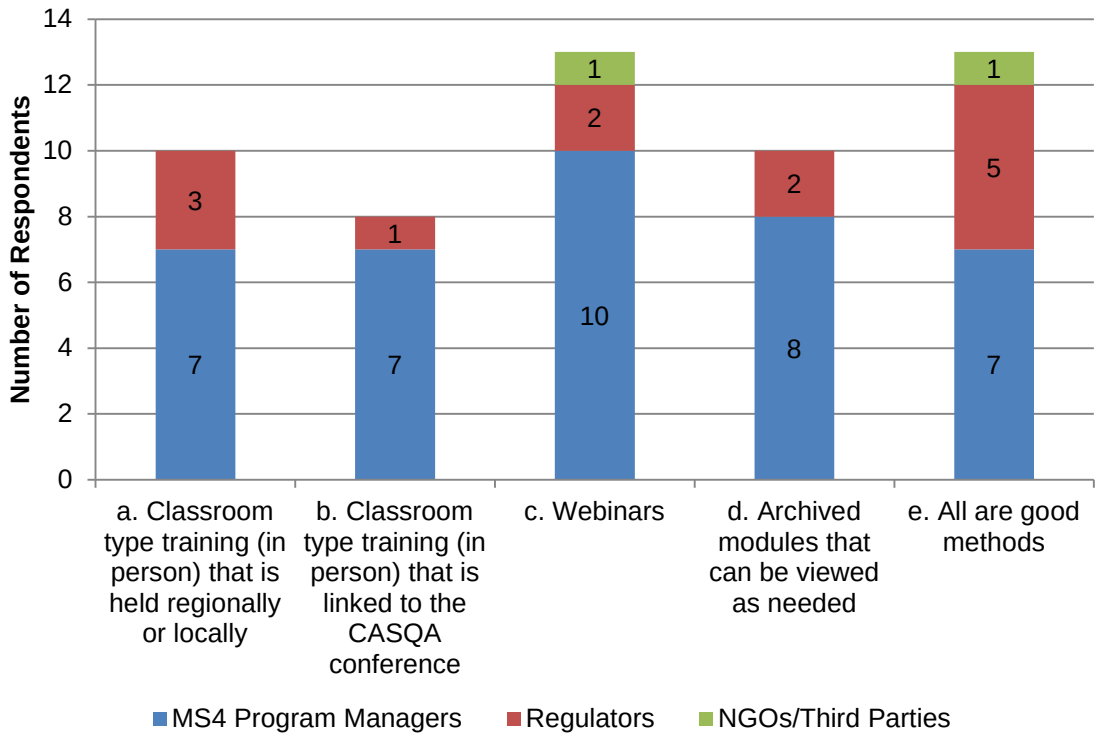
The results shown in **Figure 20** indicate that the participants are in agreement that the Web Portal should assist in providing critical training on EAs and highlight examples of EAs that have been conducted by other Permittees.

Some survey participants provided additional thoughts regarding critical Web Portal resources, including the following:

Overall Comment Theme	Survey Participant Group		
	MS4s	Regulators	NGOs
Training on basic EA and development of permit language could be provided as a part of the CASQA conference.	X	--	--
Development of permit language seems to have no place in a portal.	--	X	--
Include clear, downloadable examples of key EAs conducted throughout the state	--	X	--

Survey participants were asked to identify their preferred method of training. The responses are summarized by survey participant group in **Figure 21**.

Figure 21. Preferred Training Methods



The results shown in **Figure 21** indicate that webinars are the preferred method of training, and there is value in having the training sessions archived on the Web Portal so that they can be accessed in the future. It was also noted that webinars should include the ability to ask questions via phone or email.

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6. Materials Review and Compilation (Subtask 4.5)

EA-related documents of value to stormwater managers and other individuals involved in municipal stormwater programs were identified. This initial list of resources will be available through the Web Portal and will be expanded upon over time.

The following types of materials were identified, reviewed, and compiled:

- Stormwater program documents;
- Regulatory resources; and
- Other research and literature.

All materials are summarized in **Appendix F: Effectiveness Assessment Resources**.

6.1 STORMWATER PROGRAM DOCUMENTS

The stormwater program documents include completed assessments or related documents generated by MS4 programs such as annual reports, reports of waste discharge (ROWDs), surveys, and/or studies. A total of 35 documents were identified. Most documents were reviewed as a part of the work completed in Subtask 4.2. These documents include:

- Annual reports (23);
- Monitoring reports (8); and
- Long-term EAs/guidance documents and/or ROWDs (4).

6.2 REGULATORY RESOURCES

Regulatory resources included assessment-related guidance or other documents. A total of five regulatory resources were identified and reviewed. These documents were authored by the SWRCB and U.S. EPA and cover topics such as stormwater monitoring, EA of stormwater programs, stormwater BMPs, stormwater inspections, and program compliance and effectiveness evaluation by regulators.

6.3 RESEARCH AND LITERATURE

Other research and literature includes resources relevant to various aspects of stormwater assessment (e.g., water quality monitoring, source characterization or loading studies, and behavioral studies). A total of 12 research and literature resources were identified and reviewed. These resources include those from international, national, and state agencies and focus on stormwater monitoring, stormwater management, audits, and BMP effectiveness.

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7. Conclusions

EA is a fundamental component for the development and implementation of a successful municipal stormwater management program. When considered as part of a larger program planning process, assessment principles can help to guide managers toward implementation strategies with the greatest opportunity for long-term success.

As a result of its importance within the stormwater program, EA has emerged as a distinct discipline within the broader stormwater program management field. Leading the way, CASQA released a Guidance Manual in May 2007, and the State Water Board released its own Guidance Manual for permit writers in March 2011. Considerable experience has been gained since CASQA initially began its EA work in 2004. To this end, the 2014 update to the CASQA Guidance Manual reflects new information, lessons learned, and the refinement of assessment concepts.

Although some EA guidance is available to the stormwater community, a means of disseminating and encouraging use of these tools does not currently exist. In 2012, the CASQA Effectiveness Assessment Subcommittee submitted a Proposition 84 Stormwater Grant Program application for a Planning and Monitoring Project focused on "Storm Water Program Effectiveness Assessment Tools." The Proposition 84 funding allows CASQA to develop a Web Portal to distribute and encourage the use of existing EA guidance and tools. The Web Portal will be a central venue where users can obtain updated guidance, share data and information (e.g., sample reports, research, literature), communicate with each other, and obtain planning and assessment support.

This document summarizes the work that has been completed pursuant to Task 4 of the Proposition 84 Grant, *Assessment of Existing Practices and User Needs*. Existing permit EA requirements and current assessment practices were reviewed and analyzed to obtain a better understanding of what is required, as well as what assessment approaches and metrics are being used by stormwater program managers. In addition, surveys were conducted to discern familiarity with and knowledge of EAs, strengths and weaknesses of current EAs, data needs and limitation of current EA methods, and whether EA is perceived as useful. Once this task is completed, CASQA will conduct additional education and outreach to the stormwater community (see Next Steps, **Section 7.3**).

7.1 OVERVIEW OF RESULTS

The key results from this work effort are summarized below.

7.1.1 Summary of Existing Permit Requirements (Subtask 4.1)

The purpose of this task was to assess existing EA requirements, which can then be compared with existing practices (determined in Subtask 4.2) to assist in identifying user needs. A total of 23 MS4 permits were reviewed, including 21 Phase I permits, the Phase II General Permit, and the Caltrans Statewide Stormwater Permit.

The primary observations regarding EA permit requirements included the following:

- All of the stormwater permits in the state contained EA requirements.
- The actual EA language and specificity varies significantly throughout the state.

    - 26% (6) were considered to have a high level of specificity.
    - The majority, 65% (15) of the permits reviewed were considered to have a medium level of specificity.
    - 9% (2) were considered to have a low level of specificity.
- Most of the permits (~80%) referred directly to the CASQA Guidance Manual and/or used language from the document and incorporated the concept of Outcome Levels (either explicitly or implicitly).
- It is unclear to what degree the State Guidance Manual is used to support EA requirements in the municipal stormwater permits.
- The permits generally recognized that EAs need to be conducted on short- and long-term timeframes, and all permits linked EAs to program modifications/adaptive management.

7.1.2 Summary of Current Assessment Practices (Subtask 4.2)

The purpose of this task was to assess existing EA practices, which can then be compared with existing requirements (determined in Subtask 4.1) to assist in identifying user needs. In order to provide assistance to the program managers, it is important to understand how individual programs are approaching the EAs and what the opportunities and limitations are. A review of available annual reports, ROWDs, and related materials was conducted. Documents were reviewed for MS4s across all nine Regional Water Board regions.

The primary observations regarding EA assessments included the following:

- Approximately half (~50%) of stormwater programs have developed some form of EA guidance(Central Valley, Lahontan, Santa Ana, and San Diego regions, as well as Caltrans). This percentage will increase as the Phase II municipal programs develop their Program Effectiveness Assessment and Implementation Plans (PEAIPs) by June 2015.
- Most (~75%) of the stormwater programs included explicit EAs in the annual reports and/or ROWDs
- Approximately half (~50%) of the annual reports and/or ROWDs specifically referenced the CASQA Guidance Manual.
- With respect to the approaches used to assess effectiveness, 35% of the stormwater programs used management/assessment questions (i.e., program- or pollutant-specific questions) to provide an overall framework for the EA in their annual reports and/or ROWDs (Central Valley, San Diego, Los Angeles Regions, and Caltrans).
- The annual reports and/or ROWDs that include EAs collectively report on all of the Program Elements. However, the Outcome Level that is reported on varies greatly between Program Elements:
    - Almost all annual reports included EAs for Outcome Level 1 across all Program Elements (ranging from 65% for Program Management to 96% for Illicit Discharge, Public Outreach/ Residential Sources, and Municipal Operations).

- With the exception of Program Management and Monitoring, EAs for Outcome Levels 2 and 3 are reported for most Program Elements (ranging from 13% for Planning & Land Development to 52% for Public Outreach/ Residential Sources).
- EAs for Outcome Level 4 was primarily limited to Illicit Discharge (~30%), Public Outreach/ Residential Sources (~60%), and Municipal Operations (~70%). This is due to the fact that these Program Elements provide opportunities for directly quantifying and/or estimating waste streams.
- Even fewer reports included EAs for Outcome Levels 5 (9%) and 6 (17%) This is due to the fact that these types of assessments require a robust water quality dataset that spans multiple years.

- EAs are used by most (~60%) stormwater programs to assist in determining future program direction and/or program modifications.

7.1.3 Survey of Assessment Needs and Opportunities (Subtasks 4.3 and 4.4)

The purpose of this task was to document the expectations and knowledge base of municipal stormwater program managers, regulatory staff, and third parties so that the stormwater community can collaborate and share ideas regarding the current state of EAs and identify what the additional needs and opportunities are. To this end, surveys were developed and conducted to establish an informational baseline to help identify what education and/or outreach is needed and against which future survey results can be compared.

A total of 23 MS4 Program Managers, 11 Regulators, and 5 NGOs/Third Parties were surveyed regarding their understanding, practices, and expectations regarding EA. Of those surveyed, 28 responded (~70%). Collectively, the survey participants represented all nine Regional Board regions.

The primary observations from the survey included the following:

- Most survey participants are familiar with the CASQA Guidance Manual (~65%) and the SWRCB Guidance Manual (~50%). However, the NGOs are not familiar with the CASQA Guidance Manual, and half of the MS4 Program Managers (~50%) are not familiar with the SWRCB Guidance Manual.
- Most survey participants use the CASQA Guidance Manual (~50%) and the SWRCB Guidance Manual (~40%) to some degree. However, the MS4 Program Managers tend to use the CASQA Guidance Manual more.
    - Comments indicated that both documents provide a good basic framework and approach, but need more detail and specific examples, especially as EA relates to pollutants of concern and pollutant load quantification.
- Although survey participants generally perceived their permit EA requirements to be specific (~50%), the participants also indicated that the requirements were not necessarily helpful with regard to improving the stormwater programs.
- The results also suggest that although some (~30%) Regulators recognized that MS4 Program Managers are conducting EAs of their programs and using the results to modify

their programs, an equal number of Regulators and NGOs/Third Parties (~30%) were unclear on how the EAs are being used.

- Most survey participants (~60%) perceive the MS4 programs to be reporting on both implementation (typically OL1) and impact (typically OLs 2-6); however, a large number of participants (~40%) perceive the MS4 programs to be reporting primarily on program implementation.
- The overarching comments included the following:
    - More training and specific guidance is needed regarding EA, especially at the higher outcome levels.
    - Effectiveness assessment can be overwhelming and time-consuming. Practical guidance and indicators of program effectiveness are needed.
    - It is a challenge to decide what data to capture and how much data is needed. Data collection can be costly, and the benefits are not always clear.
    - The permit requirements limit the ability of the program managers to modify the stormwater programs based on the results of the EAs. That is, because the permit requirements tend to be specific, the program manager does not have the ability to shift priorities or resources without first amending the permit language.
- The potential Web Portal functions that were considered most useful were obtaining EA-related documents (~70%), viewing online training sessions (~70%), and obtaining step-by-step guidance (~60%).

7.1.4 Materials Review and Compilation (Subtask 4.5)

EA-related documents of value to stormwater managers and other individuals involved in municipal stormwater programs were identified and reviewed. A total of 35 stormwater program documents (i.e., annual reports, monitoring reports, long-term EAs or EA guidance documents, and ROWDs), five regulatory documents, and 12 documents categorized as "research and literature" were compiled.

The primary observations included the following:

- There are a limited number of resources and tools directly pertaining to EA available for stormwater program managers. Of the documents reviewed, the following are considered to be the most comprehensive resources or tools directly pertaining to EA:
    - *Environmental Indicators to Assess Stormwater Control Programs and Practices*, Center for Watershed Protection, 1996
    - *Controlling Pollution at Its Source: Wastewater and Stormwater Demonstration Projects*, Water Environment Research Foundation, 2001
    - *Evaluating the Effectiveness Municipal Stormwater Programs*, U.S. Environmental Protection Agency, January 2008
    - *Guidance for Assessing the Effectiveness of Municipal Storm Water Programs and Permits,* SWRCB, March 2011

- *A Strategic Approach to Planning for and Assessing the Effectiveness of Stormwater Programs,* CASQA, August 2014

- The regulatory and research and literature documents could be used by stormwater program managers to obtain a greater understanding of EA approaches and how regulators assess their programs—or to assist them in creating an EA strategy. In addition, the stormwater program documents that include EAs could provide useful, real-world examples for stormwater program managers.
- A need exists for a mechanism to collect, distribute, and encourage the use of the existing guidance and tools; this will be assisted by the Web Portal.

7.2 RECOMMENDATIONS

Based on the review of permit requirements, the current assessment practices, and survey responses, the following are recommended:

- The Web Portal would be most helpful if it provided easy access to EA guidance materials, basic EA 101 training, and other step-by-step directions for conducting EAs, along with clear, comprehensive examples.
- The timing for the development of the Web Portal is critical, since the information would be useful to the Phase II stormwater programs as they develop their PEAIPs, which are due June 2015. It is recommended that the Web Portal be developed as soon as possible or even in phases so that the MS4s can begin to access EA-related information.
- The education and outreach should be provided to the MS4 program managers, regulators, and NGOs/Third Parties so that the same information is provided to all three audiences.
- The education and outreach should include a focus on basic as well as advanced information so that it can reach a wider target audience and continue to advance the use of EAs.
- There is a clear need for additional detailed, guidance regarding how MS4 program managers can conduct EAs at the higher Outcome Levels (OL4, OL5, and OL6). CASQA should consider developing additional guidance and/or focusing the outreach and training on these Outcome Levels.

7.3 NEXT STEPS

Once this *Baseline Report* is finalized, CASQA will complete the final tasks, Education and Outreach (Task 5) and Project Evaluation (Task 6), pursuant to the scope outlined for the EA Web Portal project.

- **Education and Outreach (Task 5)**

  The purpose of this task is to develop and provide outreach and training to the target audiences that will be the primary users of the Web Portal. The initial outreach, in the form of a webinar, will educate potential users regarding the CASQA/State Water Board EA framework, provide a means to solicit input on the Web Portal, and identify additional training needs. Online training materials will also be developed to assist the

Web Portal users. The results of the baseline surveys (Task 4) will be used as needed to guide the design of these materials.

- **Project Evaluation (Task 6)**

  The purpose of this task is to evaluate the success of the Web Portal in reaching the intended target audiences and increasing their awareness of the CASQA/State Water Board approach, as well as the usefulness of the webinar and training materials developed and delivered under Task 5. This will be accomplished primarily by conducting follow-up, project evaluation surveys. In addition, a comprehensive evaluation of the overall project, including accomplishments and recommendations for next steps, will be completed.

7.3.1 Recommended Metrics to be Used to Characterize Project Success

The purpose of Task 6 will be to gauge knowledge before and after the Web Portal is unveiled and training is conducted (Task 5). In general, the goals are to:

- Increase awareness and use of the CASQA and SWRCB Guidance Manuals
- Increase awareness and use of EA methods; and
- Increase the number of stormwater programs conducting EAs at the higher Outcome Levels (OL4, OL5, and OL6).

To assist with Task 6, recommended metrics and baseline results that will be used to characterize project success have been identified. This effort will focus primarily on conducting follow-up surveys, the results of which will be compared to the baseline results from the surveys that were conducted as part of Subtask 4.3 and 4.4. Consistent with the baseline survey approach, MS4 Program Managers representing all California stormwater programs, Regulators representing all nine Regional Water Boards, and representative NGOs/Third Parties within the state of California will be contacted.

The metrics will include critical survey questions that will be revisited to gauge changes in awareness and understanding. The key areas that will be used for assessment are as follows:

- Familiarity, Knowledge, and/or Current Usage of CASQA/State Water Board and/or Other EA Approaches
- Strengths and Weaknesses of Current Assessment Efforts (What's Worked Well and What Hasn't)
- Key Data Deficits and Limitations of Current Methods (e.g., resources, methodologies, data collection, data availability, etc.)

The language of the key areas listed above and the questions used will be modified, as needed, to reflect priorities for assessment of the success of the Web Portal. Additional metrics, such as results of pre- and post-training surveys, may also be identified.

APPENDIX A

Permit Review Matrix

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Appendix A

California Stormwater Quality Association (CASQA)
Development of an Effectiveness Assessment Web Portal
Summary of Existing Municipal Stormwater Permit Requirements (Task 4.1)

Ref No.[1]	Region	Order No.	Permittee(s)	No. of Permittees	Does the Permit require specific EAs?	What level of specificity is included for the EAs?			Does the Permit specifically reference the CASQA Guidance Manual and/or the SWRCB Guidance Manual?	Does the Permit specifically reference Outcome Levels?	For which Outcome Levels does the Permit require assessments?						What types of EAs are required?	Does the Permit include a timeframe for EAs?		Does the Permit link EAs to program modifications (adaptive management, iterative approach)?	Other Required Assessments
						Low	Med	High			6	5	4	3	2	1		Short Term (1-5 years)	Long Term (>5 years)		
1	1	R1-2009-0050	City of Santa Rosa, the County of Sonoma, and the Sonoma County Water Agency	3	Yes	x			No; includes elements	No	x	x	x	x	x	x	Generally requires evaluation, assessment, synthesizing monitoring program results and BMP implementation effectiveness. Public Information and Participation Program (PIPP) requires development and implementation of a strategy for assessment at OL2 and OL3. Implementation of New Development/Redevelopment Post-Construction BMPs requires data on effectiveness and performance of local post-construction BMPs. Development Construction Program may require monitoring to ensure BMP effectiveness. Monitoring Program requires assessment at OL6, OL5, OL4.	No	Yes (Monitoring)	Yes (Monitoring)	Hydromodification Control Plan BMP Effectiveness Special Study
2	2	R2-2009-0074	Municipal Regional Stormwater Permit (San Francisco Bay Area)	76	Yes		x		No; includes elements	No	x	x	x	x	x	x	Generally requires effectiveness evaluations for each action sufficient to determine compliance. New Development and Redevelopment requires EA of O&M Program. Construction Site Control requires effectiveness assessment of site-specific BMPs. Public Information and Outreach requires EA at OL2, OL3, OL4. Urban Creeks Monitoring Report requires effectiveness assessment of existing control measures and long-term trends at OL5 and OL6.	Yes	Yes (Monitoring)	Yes (Public Information and Outreach)	BMP Effectiveness Investigation (Stormwater Treatment or Hydrograph Modification Control) Pollutant-Specific Requirements (Pesticides, Sediment, Mercury, PCBs, Copper)
3	3	R3-2012-0005	City of Salinas	1	Yes			x[2]	Yes (CASQA)	No	x	x	x	x	x	x	The Permit is highly prescriptive with regard to the EA that needs to occur for each program component. Public Education and Municipal Staff Training is to be assessed at OL2 and OL3. Specific procedures for assessment ("Focused BMP Effectiveness Assessment") are included for: Inspections Municipal Maintenance Program; Industrial Facilities; Riparian Protection. Pollutant Load and Water Quality Stressor Quantification procedures (including load reductions) are included for: Pollutant Load Quantification; Trash Quantification. Additional EAs are required under: Stormwater Discharge Quality Monitoring; Receiving Water Monitoring and Background Receiving Water Monitoring; Program Effectiveness Rating; Reporting (Annual Reports and ROWD).	Yes	Yes (Monitoring)	Yes (Program Improvement Needs; this is a strong focus throughout Permit.)	TMDL
4	4	99-060	City of Long Beach	1	Yes		x		No	No		x				x	The Permit requirements are broad, referencing [improvement of] stormwater quality or reduction of stormwater pollution. Generally requires an effectiveness assessment based on programmatic, monitoring, and other available data. Permit calls out the following: Developer Information Program for general EA; Monitoring - trend analyses and BMP effectiveness	No	No	Yes (Monitoring)	Dry Diversion Study (Alamitos Bay)
5	4	R4-2012-0175	Coastal Watersheds of Los Angeles County (except City of Long Beach)	86	Yes		x		No; includes elements	No	x	x				x	The Permit requires Annual Assessment and Reporting, particularly at OL5 and OL6. The Permit suggests data analysis and assessment methods that could be used. In addition, broad assessment requirements are specifically included for: New Development/Re-Development Effectiveness Tracking; Construction BMPs.	Yes	No	Yes (Adaptive Management Process; Adaptive Management Strategies)	

Notes:
1. Number corresponds to file numbering of Permit excerpts
2. This Permit contains highly prescriptive PEA requirements that are more detailed than other Permits with "High" PEA specificity.

Appendix A

California Stormwater Quality Association (CASQA)
Development of an Effectiveness Assessment Web Portal
Summary of Existing Municipal Stormwater Permit Requirements (Task 4.1)

Ref No.[1]	Region	Order No.	Permittee(s)	No. of Permittees	Does the Permit require specific EAs?	What level of specificity is included for the EAs?			Does the Permit specifically reference the CASQA Guidance Manual and/or the SWRCB Guidance Manual?	Does the Permit specifically reference Outcome Levels?	For which Outcome Levels does the Permit require assessments?						What types of EAs are required?	Does the Permit include a timeframe for EAs?		Does the Permit link EAs to program modifications (adaptive management, iterative approach)?	Other Required Assessments
						Low	Med	High			6	5	4	3	2	1		Short Term (1-5 years)	Long Term (>5 years)		
6	4	R4-2010-0108	Ventura County Watershed Protection District, County of Ventura and the Incorporated Cities Therein	12	Yes		x		No; includes elements	No				x	x	x	The Permit requires a behavioral change assessment strategy for the Public Information and Participation Program. The Permit requires confirmation of effective implementation of BMPs for: Restaurants; Automotive Service Facilities; Retail Gasoline Outlets and Automotive Dealerships; Industrial Facilities.	Yes	No	Yes (Annual Report is required to include an "integrated summary" of results of analyses from monitoring and program components.)	Hydromodification Control Criteria
7	5	R5-2008-0142	Cities of Citrus Heights, Elk Grove, Folsom, Galt, Rancho Cordova, Sacramento, and County of Sacramento	7	Yes		x		No; includes elements	Yes	x	x	x	x	x	x	EA is a required component of the SQIPs. The Annual Report is required to include EA and recommended/necessary modifications for each Program Element. General EA is called out for the following Program Elements: Construction, Industrial/Commercial, Municipal, Illicit Discharge, Public Outreach, Planning and New Development. A separate EA Provision is included. A Long Term Effectiveness Assessment (LTEA) is required.	Yes	Yes	Yes	Mercury Pilot Watershed - New Development BMP Effectiveness Evaluation Proprietary Treatment BMP Effectiveness Evaluation
8	5	R5-2010-0102	Eastern Contra Costa County - City of Antioch, City of Brentwood, City of Oakley, Contra Costa County, Contra Costa County Flood Control and Water Conservation District	5	Yes			x	No; includes elements	No	x	x	x	x	x	x	EA is called out for the following Program Elements: Operation and Maintenance of Stormwater Treatment Systems; Construction Site Control; Public Outreach; Monitoring.	No	Yes (Monitoring)	Yes	Stressor/Source Identification (toxicity) BMP Effectiveness Investigation Evaluate Implementation of Source Control Actions Relating to Pesticides Methylmercury Exposure Reduction Program Exempted and Conditionally Exempted Discharges
9	5	R5-2008-0092	City of Modesto	1	Yes		x		No; includes elements	Yes	x	x	x	x	x	x	The Annual Report is required to include EA and recommended/necessary modifications for each Program Element. General EA is called out for the following Program Elements: Construction; Industrial/Commercial; Municipal Operations; Illicit Discharge Detection and Elimination; Public Outreach; Planning and Land Development; Monitoring. A separate EA Provision is included. A Long Term Effectiveness Assessment (LTEA) Strategy is required.	Yes	Yes	Yes	Targeted Pollutant Reduction Program Rock Well and Groundwater Monitoring BMP Effectiveness Study
10	5	R5-2007-0173	City of Stockton and County of San Joaquin	2	Yes		x		No; includes elements	Yes	x	x	x	x	x	x	EA is a required component of the SWMPs. The Annual Report is required to include EA and recommended/necessary modifications for each Program Element. General EA is called out for the following Program Elements: Construction; Industrial/Commercial; Municipal; Illicit Discharge Detection and Elimination; Public Outreach; Planning and Land Development; Monitoring; ROWD. A separate EA Provision is included. A Long Term Effectiveness Assessment (LTEA) Strategy is required.	Yes	Yes	Yes	BMP Effectiveness Study
11	5	R5-2011-0005	Stockton Port District	1	Yes		x		No; includes elements	Yes	x	x	x	x	x	x	The Annual Report is required to include EA and recommended/necessary modifications for each Program Element. General EA is called out for the following Program Elements: Construction; Industrial/Commercial; Municipal; Illicit Discharge Detection and Elimination; Public Outreach; Planning and Land Development; Monitoring. A separate EA Provision is included. A Long Term Effectiveness Assessment (LTEA) Strategy is required.	Yes	Yes	Yes	Pesticides Toxicity Control Program Methylmercury Control Studies BMP Effectiveness Study

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Appendix A

California Stormwater Quality Association (CASQA)
Development of an Effectiveness Assessment Web Portal
Summary of Existing Municipal Stormwater Permit Requirements (Task 4.1)

Ref No.[1]	Region	Order No.	Permittee(s)	No. of Permittees	Does the Permit require specific EAs?	What level of specificity is included for the EAs?			Does the Permit specifically reference the CASQA Guidance Manual and/or the SWRCB Guidance Manual?	Does the Permit specifically reference Outcome Levels?	For which Outcome Levels does the Permit require assessments?						What types of EAs are required?	Does the Permit include a timeframe for EAs?		Does the Permit link EAs to program modifications (adaptive management, iterative approach)?	Other Required Assessments
						Low	Med	High			6	5	4	3	2	1		Short Term (1-5 years)	Long Term (>5 years)		
12	5	R5-2013-0153	County of Kern and City of Bakersfield	2	Yes		x		Yes (CASQA)	Yes	x	x	x	x	x	x	The Annual Report is required to include EA and recommended/necessary modifications for each Program Element. General EA is called out for the following Program Elements: Construction; Industrial/Commercial; Municipal Operations; Illicit Discharge Detection and Elimination; Public Outreach; Planning and Land Development; Monitoring. A separate EA Provision is included. A Long Term Effectiveness Assessment (LTEA) Strategy is required.	Yes	Yes	Yes	
13	5	R5-2013-0080	Fresno Metropolitan Flood Control District, City of Fresno, City of Clovis, County of Fresno, and California Status University Fresno	5	Yes		x		No; includes elements	Yes	x	x	x	x	x	x	The Annual Report is required to include EA and recommended/necessary modifications for each Program Element. General EA is called out for the following Program Elements: Construction; Industrial/Commercial; Municipal Operations; Illicit Connection and Discharge; Public Outreach; Planning and Land Development. A separate EA Provision is included. A Long Term Effectiveness Assessment (LTEA) Strategy is required.	Yes	Yes	Yes	
14	6	R6T-2011-101A1	El Dorado County, Placer County, and the City of South Lake Tahoe within the Tahoe Hydrologic Unit	3	Yes		x		No	No			x				EA is required for the Pollutant Load Reduction Plans and the overall Monitoring Program, with a focus on OL4.	Yes	No	Yes (Pollutant Load Reduction Plans, Stormwater Monitoring Plans)	BMP Effectiveness Monitoring
15	7	R7-2013-0011	Riverside County Flood Control and Water Conservation District, County of Riverside, Coachella Valley Water District, and Incorporated Cities of Riverside County within the Whitewater River	13	Yes	x			No	No							The Annual Report is required to include EA and recommended/necessary modifications for each Program Element. General EA is called out for the following Program Elements: IC/ID, Litter, Debris, and Trash; Commercial/Industrial; New Development/Redevelopment; Private Construction; Permittee Facilities and Activities; Public Education and Outreach.	Yes	No	Yes	
16	8	R8-2010-0036	County of San Bernardino and the Incorporated Cities of San Bernardino County	18	Yes		x		Yes (CASQA)	Yes	x	x	x	x	x	x	EA is called out for the following Program Elements: ID/IC, Litter, Debris, and Trash; Municipal Inspection Programs; Construction Sites; Residential Program; New Development, Program Management Assessment. A separate EA Provision is included. The Annual Report is required to include EA and recommended/necessary modifications for each Program Element.	Yes	Yes (TMDLs)	Yes (Program Management Assessment)	Phosphorus WLAs Addressing WQEs LID and Hydromodification Management Hydromodification Monitoring Plan TMDL/WLA Monitoring LID BMP Monitoring Regional Bioassessment Monitoring
17	8	R8-2009-0030	County of Orange, Orange County Flood Control District, and the Incorporated cities of Orange County within the Santa Ana Region	28	Yes		x		No; includes elements	Yes	x	x	x	x	x	x	EA is called out for the following Program Elements: Municipal Inspections of Construction Sites; Municipal Inspections of Commercial Facilities; WQMP for New Development/Significant Redevelopment; Public Education and Outreach; Municipal Facilities/Activities. A separate EA Provision is included. Refers to "the various outcome levels." The Annual Report is required to include EA for program activities.	Yes	No	Yes	

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Appendix A

California Stormwater Quality Association (CASQA)
Development of an Effectiveness Assessment Web Portal
Summary of Existing Municipal Stormwater Permit Requirements (Task 4.1)

Ref No.[1]	Region	Order No.	Permittee(s)	No. of Permittees	Does the Permit require specific EAs?	What level of specificity is included for the EAs?			Does the Permit specifically reference the CASQA Guidance Manual and/or the SWRCB Guidance Manual?	Does the Permit specifically reference Outcome Levels?	For which Outcome Levels does the Permit require assessments?						What types of EAs are required?	Does the Permit include a timeframe for EAs?		Does the Permit link EAs to program modifications (adaptive management, iterative approach)?	Other Required Assessments
						Low	Med	High			6	5	4	3	2	1		Short Term (1-5 years)	Long Term (>5 years)		
18	8	R8-2010-0033	Riverside County Flood Control and Water Conservation District, the County of Riverside, and the Incorporated Cities of Riverside County within the Santa Ana Region	16	Yes			x	Yes (CASQA)	Yes	x	x	x	x	x	x	Permit requires annual review and effectiveness evaluation of Urban Runoff programs. EA is called out for the following Program Elements: Legal Authority/Enforcement; Co-Permittee Inspection Programs; Construction Sites; Commercial Facilities; Residential Program; WQMP for New Development/Significant Redevelopment; Program Management Assessment. A separate EA Provision is included. Refers to both "six" and "the various outcome levels." The Annual Report is required to include an overall EA and identify program modifications/improvements.	Yes	Yes	Yes	TMDLs/WQBELs Hydromodification Management Plan and Monitoring Plan Mass Emissions Monitoring Bioassessment CMP Low Impact Development BMP Monitoring
19	9	R9-2009-0002	County of Orange, Orange County Flood Control District, and the Incorporated cities of Orange County within the San Diego Region	13	Yes			x	Yes (CASQA)	Yes	x	x	x	x	x	x	General EA is called out for the following Program Elements: Inspection of Construction Sites; Commercial/Industrial; Residential; Existing Development; Watershed Runoff Management Program. A separate EA Provision is included that requires assessment of all program components. The Annual Report is required to include an overall EA and identify program modifications/improvements.	Yes	Yes	Yes	BMP Effectiveness Study Hydromodification
20	9	R9-2010-0016	Riverside County Flood Control and Water Conservation District, the County of Riverside, and the Incorporated Cities of Riverside County within the San Diego Region	5	Yes			x	Yes (CASQA)	Yes	x	x	x	x	x	x	General EA is called out for the following Program Elements: Non-Storm Water Dry Weather Action Levels; SSMPs/Criteria and Requirements for Priority Development Projects; Inspection of Construction Sites; Commercial/Industrial; Existing Development. A separate EA Provision is included that requires assessment of all program components. The Annual Report is required to include an overall EA and identify program modifications/improvements. The Permit states that an appropriate assessment interval and timeframe for assessing change must be established.	Yes	No	Yes	Hydromodification Pyrethroid Toxicity/Sediment Toxicity Watershed Water Quality Workplan LID Impacts to Camp Pendleton's Water Supply (Substituted for the MS4 and Receiving Water Maintenance Study) Agricultural, Federal and Tribal Input Study Trash and Litter Investigation Intermittent and Perennial Stream Conversion Study
21	9	R9-2013-0001	Watersheds within the San Diego Region	21	Yes		x		No	No	x	x	x	x	x		General EA is called out for the following Program Elements: Non-Storm Water Action Levels; Storm Water Action Levels; Construction Site Inspections. Monitoring and Assessment Program Requirements are included.	Yes	Yes	Yes	Special Studies
22	All	2013-0001-DWQ	Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (General Permit)	100s	Yes			x	Yes (CASQA)	Yes	x	x	x	x	x	x	Requires a **Program Effectiveness Assessment and Improvement Plan (PEAIP)** for the entire stormwater program.	Yes	Yes	Yes	Special Studies
23	All	2012-0011-DWQ	Statewide Stormwater Permit - State of California, Department of Transportation	1	Yes		x		Yes (CASQA)	No	x					x	EA is specifically required for Water Quality Monitoring (Ocean Receiving Water and Reference Area Monitoring Program); Maintenance Program Activities and Facilities Operations (Highway Maintenance Activities - Vegetation Control); Storm Water Program Implementation Requirements (Program Evaluation (Field Activities -- Construction, Highway Maintenance, Facility Maintenance, Selected Targeted Program Components)); Training and Public Education Program. An Overall Program Effectiveness Evaluation provision is included. The evaluation scope is expected to increase each year.	Yes	No	Yes	TMDL Status Review Report

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APPENDIX B

Annual Report Review Matrix

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Appendix B

California Stormwater Quality Association (CASQA)
Development of an Effectiveness Assessment Web Portal
Summary of Annual Report Effectiveness Assessments (Task 4.2)

Criteria Used to Answer Each Question in the Task 4.2 Matrices

Question		Description	CASQA Language
Agency Reviewed		There can be an individual agency and/or a regional agency (encompassing several entities).	
Available Sources	Annual Report	Always review; indicate year of report	
	ROWD	Review when available	
	Mon Report	Review when available	
	Guidance	Review when available	
	Other Reports	If reviewed, specify	
1. Does the Permittee have its own EA Guidance/ Strategy?		Sometimes this information may be contained within a different document (e.g., SWMP, LIP). Some agencies may have a Long Term Effectiveness Assessment (Strategy).	
2. Does the AR/ ROWD include explicit EAs?		Yes/No: Does the effectiveness assessment in the annual report or ROWD include proof of outcome levels or specific descriptions/data that can be used to determine the appropriate outcome level? If an effectiveness assessment is indicated, but justification for specific outcome levels is not provided, it is noted that "not all EAs fully reported." If "no," outcome levels were determined by the reviewer through consideration of reported program activities. In some cases, an agency may track metrics but not use them for an explicit effectiveness assessment. See Questions 5 and 7.	
3. Does the AR/ ROWD specifically reference the CASQA Guidance Manual and/or the SWRCB Guidance Manual?		Yes/No	
4. Are management/ assessment questions used?(2)		Yes/No: Are program- or pollutant-specific questions asked which provide an overall framework for the effectiveness assessment?	
5. Are metrics (e.g., assessment data) used?(3)		Yes/No: Does the Annual Report or ROWD include qualitative or quantitative data or information pertaining to specific program elements/components and/or performance standards that are collected for use in the effectiveness assessments--or, if effectiveness assessments are not yet conducted, could be used for that purpose? The program element/ component is noted.	
6. For which Program Elements/ Components does the AR/ ROWD include EAs?		Which program elements include explicit effectiveness assessments using the collected metrics? If no effectiveness assessment was provided, this is left blank.	
6a. Does the AR/ ROWD specifically reference Outcome Levels?		Yes/No: If outcome levels are not specified, question 6b is answered by reviewing the available metrics and defining the outcome level using best professional judgment. If outcome levels are specified, 6b is answered based on specified outcome levels, unless stated otherwise.	
6b. For each Program Element/Component, at which Outcome Levels does the AR/ ROWD conduct EAs?(2)		If outcome levels are not specified, question 6b is answered by reviewing the available metrics and defining the outcome level using best professional judgment. If outcome levels are specified, 6b is answered based on specified outcome levels where supporting information (such as metrics) are available. "X" indicates individual reports, "R" indicates a regional report.	

Appendix B

California Stormwater Quality Association (CASQA)
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Criteria Used to Answer Each Question in the Task 4.2 Matrices

Question		Description	CASQA Language
7. What are the program's data collection methods for EA?	Internal Tracking by Stormwater Program	Include all information reported by the program, qualitative and quantitative.	Internal program data only; inspection data, outreach conducted, etc.
	Reporting to Stormwater Program	Include information reported to the program from third parties.	Reported by third parties only; BMP maintenance certifications, industrial facility monitoring data, correction of violations, etc.
	Site Investigations	Include OL2 for inspections where outreach is provided.	Performed by MS4 programs only; inspections, complaint investigations, audits, etc.
	Interviews		Interviews of third parties or MS4 staff; municipal staff, focus groups, etc.
	Surveying and Testing	Include reports of tests or measured increase in knowledge through tests.	Surveying and testing of third parties or MS4 staff; pre-/post-training, phone surveys, etc.
	Monitoring and Sampling		Data obtained directly by MS4 staff (or contractors); receiving water or MS4 sampling, industrial facility visual observations during inspections, etc.
	Review of External Data Sources		Review by MS4 staff; data or information obtained via literature, through other regulatory programs, online databases, third party sources, etc.
	Special Investigations		Can encompass any of the categories above, but normally a more intensive one-time focus.
	Other	Include notes	Specify
8. What are the program's data analysis approaches?	Qualitative assessment	Include any report of item completion (~OL1)	• Confirmation -- e.g., confirmation (Y/N) that a stormwater hotline was operated during the year, or that outreach materials were made available at a building counter. • Completion -- e.g., confirmation (Y/N) that a specific task was completed. For example, completion of a brochure or updating of a source inventory. • Narrative assessment
	Descriptive statistics	Quantification (~OL1,4)	Counts [incl. quantification and tabulation], averages, variance, etc.
	Comparison to established reference points	Includes (but not limited to) comparisons to previous one-time results or targeted outcomes (~OL2-6)	Established targets [targeted outcomes, discharge prohibitions, WQS, required activity levels, etc.], or other reference points ["state of the art," other programs, previous results, baseline values, etc.]
	Temporal change	Includes change or trends over time (~OL2-6)	Simple change [absolute or %] or statistical trends.
	Spatial analysis	(~OL4-6)	Spatial variability, comparisons between watersheds or other geographic areas, etc.
9. On what timeframe are the EAs conducted?	Annual	Include element here if effectiveness assessment uses information collected during one annual reporting period.	
	Short Term (2-5 years)	Include element here if effectiveness assessment uses information collected during two to five years' time.	
	Long Term (>5 years)	Include element here if effectiveness assessment uses information collected over more than five years' time.	
10. Does the AR/ ROWD discuss program modifications based on the EAs?		Yes/No: Is there a clear linkage between the recommended program modifications and the effectiveness assessment results?	

Appendix B

California Stormwater Quality Association (CASQA)
Development of an Effectiveness Assessment Web Portal
Summary of Annual Report Effectiveness Assessments (Task 4.2)

Ref No.[1]	Region	Order No.	Stormwater Program Reviewed	Available Sources					1. Does the Stormwater Program have its own EA Guidance/ Strategy?	2. Does the AR/ ROWD include explicit EAs?	3. Does the AR/ ROWD specifically reference the CASQA Guidance Manual and/or the SWRCB Guidance Manual?	4. Are management/ assessment questions used?	5. Are metrics (e.g., assessment data) used?	6. For which Program Elements/ Components does the AR/ ROWD include explicit EAs?	7. What are the program's data collection methods for EA?								8. What are the program's data analysis approaches?					9. On what timeframe are the EAs conducted?			10. Does the AR/ ROWD discuss program modifications based on the EAs?
				Annual Report	ROWD	Mon Report	Guidance	Other Reports							Internal Tracking by Stormwater Program	Reporting to Stormwater Program	Site Investigations	Interviews	Surveying and Testing	Monitoring and Sampling	Review of External Data Sources	Special Investigations	Other	Qualitative assessment	Descriptive statistics	Comparison to established reference points	Temporal change	Spatial analysis	Annual	Short Term (2-5 years)	Long Term (>5 years)	
1	1	R1-2009-0050	City of Santa Rosa	12-13					No	No	No	No	Yes -Program Management (PM) -Public Information & Participation (PO) -Industrial/Commercial (IC) -Planning & Land Development (PLD) -Public Agency Activities (MO) -IC/ID (ID) -Monitoring (MON)	--	PM-OL1 PO-OL1 IC-OL1 PLD-OL1,2 MO-OL1 ID-OL1 MON-OL1		IC-OL1 PLD-OL1 ID-OL1		MO-OL1	MON-OL1		Bioassessment sampling		PM-OL1 IC-OL1 PLD-OL1 MO-OL1 ID-OL1 MON-OL1	PLD-OL2				PM PO IC PLD MO ID	MON		No
2	2	R2-2009-0074	City of San Ramon	12-13					No	No	No	No	Yes -Municipal Operations (MO) -New Development (PLD) -Industrial and Commercial (IC) -Illicit Discharge (ID) -Construction (CO) -Public Information and Outreach (PO) -Trash Load Reduction (ID)	--	MO-OL1 PLD-OL1 IC-OL1 ID-OL1,4 CO-OL1 PO-OL1		PLD-OL1 IC-OL2,3 CO-OL1		IC-OL2					MO-OL1 PLD-OL1 IC-OL1 ID-OL1 CO-OL1 PO-OL1	ID-OL4				MO PLD IC ID CO PO			No
3	3	R3-2012-0005	City of Salinas	12-13					No	Yes (AR)	No	No	Yes -MO -MON	-Municipal Maintenance (MO) -Commercial & Industrial (IC) -Residential (PO) -IC/ID (ID) -Development & Planning (PLD) -Construction Site Management (CO) -Public Education & Involvement (PO) -Trash Load Reduction (ID) -Monitoring (MON)	MO-OL1 IC-OL1 PO-OL1 ID-OL1 PLD-OL1 CO-OL1 MON-OL1	IC-OL1 ID-OL1	IC-OL1,2,3 ID-OL1 CO-OL1		MO-OL1 PO-OL1 ID-OL1 PLD-OL1	MON-OL1,4			MON-OL4	MO-OL1 IC-OL1 ID-OL1 PLD-OL1 CO-OL1 PO-OL1	MO-OL1 IC-OL2,3 MON-OL1	MO-OL1 PO-OL1 MON-OL1	MON-OL4	MON-OL1	MO IC PO ID PLD CO MON	MON		Yes (AR)
4	4	99-060 R4-2014-0024	City of Long Beach	2013		06-07			No	No	No	No	Yes -Program Management (PM) -Development Planning & Construction (PLD) -Public Information (PO)	--	PM-OL1 PLD-OL1,2,4 PO-OL1,2		MON-OL1			MON-OL1				PLD-OL1 PO-OL1,2	PLD-OL2,4 PO-OL4	MON-OL1			PM PLD PO		MON	No
5	4	R4-2012-0175	County of Los Angeles	12-13					No	Yes (AR) Note: Not all EAs fully reported.	No	No	Yes; -PM -PO -IC -PLD -CO -MO -ID -MON	-Public Information and Participation Program, PIPP (PO) -Illicit Connection and Illicit Discharge (ID)	PM-OL1 PO-OL1,2,4 IC-OL1 PLD-OL1 CO-OL1 MO-OL1,4 ID-OL1 MON-OL1		IC-OL1 CO-OL1 MO-OL1		PO-OL1,2	MON-OL1				PM-OL1 PO-OL1 IC-OL1 PLD-OL1 CO-OL1 MO-OL1 ID-OL1 MON-OL1	PM-OL1 PO-OL1,4 IC-OL1 PLD-OL1 CO-OL1 MO-OL1,4 MON-OL1	PO-OL2	PO-OL2		PM PO IC PLD CO MO ID MON	PO IC PLD CO MO ID MON	ID MON	No
6	4	R4-2010-0108	Ventura County Watershed Protection District	12-13		11-12			No	Yes (AR)	Yes-CASQA (AR)	Yes (AR)	Yes -PM -PO -IC -PLD -CO -MO -ID -MON	-Program Management (PM) -Public Outreach (PO) -Industrial/Commercial Facilities (IC) -Planning and Land Development (PLD) -Development Construction (CO) -Public Agency Activities (MO) -Illicit Connections & Illicit Discharges Elimination (ID) -Water Quality Monitoring (MON)	PM-OL1 PO-OL1 IC-OL1 PLD-OL1 CO-OL1 MO-OL1 ID-OL1,3		IC-OL1,2,3 PLD-OL1 CO-OL2		PO-OL2,3 IC-OL1 PLD-OL2 CO-OL2 MO-OL2 ID-OL2	MON-OL1				PO-OL1 IC-OL1,2 PLD-OL1 CO-OL1 MO-OL1 ID-OL1	PLD-OL2 CO-OL2 MO-OL4 ID-OL4	IC-OL3 MON-OL1	PO-OL2,3 ID-OL2,3 MON-OL6		PM IC PLD CO MO	PO	ID MON	Yes (AR)
7	5	R5-2008-0142	County of Sacramento	12-13	2013		2013		Yes (ROWD/ LTEA and SQIP)	Yes (AR & ROWD) Note: Not all EAs fully reported.	Yes-CASQA (AR & ROWD/ LTEA)	Yes (ROWD/ LTEA and SQIP); -MON	Yes; -CO -IC -MO -ID -PO -PLD -MON	-Program Management (PM) -Construction (CO) -Commercial/ Industrial (IC) -Municipal Operations (MO) -Illicit Discharge (ID) -Public Outreach (PO) -New Development (PLD) -Monitoring and Target Pollutant Program (MON)	PM-OL1 CO-OL1,2,3 IC-OL1,2,3 MO-OL1,2,3,4 ID-OL1,2,4 PO-OL1,4 PLD-OL1,4 MON-OL1,5		CO-OL1,2 IC-OL1,3 MO-OL1 ID-OL1,2 PLD-OL1		CO-OL1,2 IC-OL1,2 MO-OL1,2,3 ID-OL1 PO-OL1,2 PLD-OL1	MON-OL1,5				PM-OL1 CO-OL1,2 IC-OL1,2 MO-OL1,2,3 ID-OL1,2 PO-OL1 PLD-OL1 MON-OL1	CO-OL1 IC-OL1 MO-OL1,4 ID-OL1,4 PO-OL1,4 PLD-OL1,4 MON-OL1	CO-OL2,3 IC-OL3 MO-OL2,3 MON-OL1,5	CO-OL2,3 IC-OL3 MO-OL2,3 PO-OL2 MON-OL1,5		PM CO IC MO ID PO PLD MON	PM CO IC MO ID PO PLD MON	IC MO ID MON	Yes (ROWD/ LTEA)

Notes:
1. Corresponds to file numbering of Permit excerpts

Appendix B

California Stormwater Quality Association (CASQA)
Development of an Effectiveness Assessment Web Portal
Summary of Annual Report Effectiveness Assessments (Task 4.2)

Ref No.[1]	Region	Order No.	Stormwater Program Reviewed	Available Sources					1. Does the Stormwater Program have its own EA Guidance/ Strategy?	2. Does the AR/ ROWD include explicit EAs?	3. Does the AR/ ROWD specifically reference the CASQA Guidance Manual and/or the SWRCB Guidance Manual?	4. Are management/ assessment questions used?	5. Are metrics (e.g., assessment data) used?	6. For which Program Elements/ Components does the AR/ ROWD include explicit EAs?	7. What are the program's data collection methods for EA?								8. What are the program's data analysis approaches?					9. On what timeframe are the EAs conducted?			10. Does the AR/ ROWD discuss program modifications based on the EAs?
				Annual Report	ROWD	Mon Report	Guidance	Other Reports							Internal Tracking by Stormwater Program	Reporting to Stormwater Program	Site Investigations	Interviews	Surveying and Testing	Monitoring and Sampling	Review of External Data Sources	Special Investigations	Other	Qualitative assessment	Descriptive statistics	Comparison to established reference points	Temporal change	Spatial analysis	Annual	Short Term (2-5 years)	Long Term (>5 years)	
8	5	R5-2010-0102	Contra Costa Clean Water Program (CCCWP) Reviewed: -CCCWP (AR and IMP) -Individual Permittees (5): Antioch, Brentwood, Oakley, Contra Costa County, Contra Costa County Flood Control and Water Conservation District (Individual ARs)	12-13		12-13			No	Yes (Individual AR) Note: Not all EAs fully reported.	No	Yes (AR); -MON	Yes; -MO -ID -CO -PO -MON -IC -PLD	-Construction Site: Inspection Program (CO) -Public Information and Outreach: Public Outreach Events (PO) -Public Information and Outreach: Citizen Involvement Events (PO) -New Development and Redevelopment: O&M Program (PLD)	MO-OL1,4 PLD-OL1 ID-OL1,2 CO-OL1 PO-OL1,2,4 MON-OL1 IC-OL1		MO-OL1 ID-OL1,2 IC-OL1 PLD-OL1	PO-OL1	PO-OL1 MO-OL1	MON-OL1	PO-OL1	MON-OL1		MO-OL1 PLD-OL1 ID-OL1,2 CO-OL1 PO-OL1 MON-OL1 IC-OL1	MO-OL1,4 ID-OL1 CO-OL1 PO-OL1,4 IC-OL1 PLD-OL1	PO-OL2			MO PLD ID CO PO MON IC	MON PLD PO	MON	Yes (AR)
9	5	R5-2008-0092	City of Modesto	12-13			2009		Yes (2009 SWMP)	Yes (AR) Note: Not all EAs fully reported.	Yes-CASQA (AR)	Yes (AR); -ID -PO -MO -IC -CO -PLD -Water Quality-Based Program -MON	Yes; -ID -PO -MO -IC -CO -PLD -Water Quality-Based Program -MON	-Illicit Discharges and Illegal Connections (ID) -Public Outreach, Education, and Participation (PO) -Municipal Operations (MO) -Industrial and Commercial Businesses (IC) -Construction (CO) -Planning and Land Development (PLD) -Water Quality-Based Program (MON) -Monitoring (MON)	PM-OL1 ID-OL1,2 PO-OL1,2,4 MO-OL1,2,3,4 IC-OL1,3 CO-OL1,2 PLD-OL1 MON-OL1	PLD-OL1	ID-OL1 MO-OL1,3 IC-OL1,2,3 CO-OL1,2 PLD-OL1		ID-OL1,2 PO-OL1 MO-OL1,2	MON-OL1,5,6		MON-OL1		PM-OL1 ID-OL1 PO-OL1 MO-OL1,2,3 IC-OL1,2 CO-OL1,2 PLD-OL1 MON-OL1,5,6	ID-OL1 PO-OL1,4 MO-OL1,4 IC-OL1 CO-OL1 PLD-OL1 MON-OL1	ID-OL2 PO-OL2 MO-OL2,3,4 IC-OL3 CO-OL2 MON-OL5,6	ID-OL2 PO-OL2 MO-OL2,3,4 IC-OL3 CO-OL2 MON-OL6		PM ID PO MO IC1 CO PLD MON	PM ID PO MO-IC CO PLD MON	MON	Yes (AR)
10	5	R5-2007-0173	City of Stockton	11-12, 12-13	2012	11-12, 12-13			Yes (ROWD/ SWM	Yes (AR & ROWD/ SWMP) Note: Not all EAs fully reported.	Yes-CASQA (AR & ROWD/ SWMP)	Yes (ROWD/ SWMP); -PM -ID -PO -MO -IC -CO -PLD -Environmental -MON -Water Quality Based Programs	Yes; -ID -PO -MO -IC -CO -PLD -MON	-Program Management (PM) -Illicit Discharges (ID) -Public Outreach (PO) -Municipal Operations (MO) -Industrial and Commercial (IC) -Construction (CO) -Planning and Land Development (PLD)	PM-OL1 ID-OL1,2,3 PO-OL1,2,3,4 MO-OL1,3,4 IC-OL1,3 CO-OL1,2,3 PLD-OL1 MON-OL1	IC-OL1,2,3	ID-OL1,2,3 MO-OL1 IC-OL1 CO-OL1,3 PLD-OL1		PO-OL1	MON-OL1				PM-OL1 ID-OL1 PO-OL1 MO-OL1 IC-OL1 PLD-OL1 MON-OL1 CO-OL1	ID-OL1 PO-OL1,4 MO-OL1,4 IC-OL1 PLD-OL1 MON-OL1 CO-OL2	ID-OL2,3 PO-OL2,3,4 MO-OL1,3,4 IC-OL3	ID-OL2,3 PO-OL2,3,4 MO-OL1,3,4 IC-OL3 CO-OL3		PM ID PO MO IC CO PLD MON	ID PO PLD MON CO	ID PO MO IC CO PLD MON	Yes (AR & ROWD/ SWMP)
11	5	R5-2011-0005	Port of Stockton	12-13					No	Yes (AR) Note: Not all EAs fully reported.	Yes-CASQA (AR & ROWD)	No	Yes; -CO -IC -MO -ID -PO -PLD -MON	-Construction (CO) -Industrial and Commercial (IC) -Municipal Operations (MO) -Illicit Discharges (ID) -Public Outreach (PO) -Planning and Land Development (PLD) -Water Quality-Based Program Element (MON) -Water Quality Monitoring (MON)	CO-OL1,2,3,4 IC-OL1,2,3 MO-OL1,2,3,4 ID-OL1,2,3,4 PO-OL1,3,4 PLD-OL1 MON-OL1		CO-OL1,2,3,4 IC-OL1,2,3 ID-OL1,3		MO-OL1,2 ID-OL1 PO-OL1	MO-OL1 ID-OL1 MON-OL1				CO-OL1,2 IC-OL1,2 MO-OL1,2 ID-OL1 PO-OL1 PLD-OL1 MON-OL1	CO-OL1,4 IC-OL1 MO-OL1,4 ID-OL1,4 PL-OL1,4 MON-OL1	CO-OL2,3 IC-OL2,3 MO-OL2 ID-OL2,3	CO-OL2,3 MO-OL2,3 ID-OL2 PO-OL3 PLD-OL2		CO IC MO ID PO PLD MON	CO IC MO ID PO PLD MON	MON	Yes (AR)
12	5	R5-2013-0153	City of Bakersfield	12-13					No	No	No	No	-Maintenance of Structural Controls (MO) -New Development and Significant Redevelopment Plan (PLD) -Operations and Maintenance of Roads, Streets, and Highways (MO) -Existing and Proposed Management Projects (MO) -Control for Pesticides, Herbicides and Fertilizer (MO/ PO) -Illicit Discharge Controls (ID) -Spill Prevention, Containment, and Response Procedures (ID) -Illegal Dumping Controls (PO/ ID) -Leaking Sanitary Sewage Controls (ID) -Storm Drain System Inspection and Control Measure (MO) -Monitoring Program of Industrial Activities (IC) -Data Analysis (MON) -Program Analysis: Evaluation of Existing SWMP (MON)	--	MO-OL1,4 PLD-OL1 PO-OL1 ID-OL1 MON-OL1 IC-OL1		ID-OL1 IC-OL1 MO-OL1			IC-OL1 MO-OL1 MON-OL1				MO-OL1 PLD-OL1 PO-OL1 ID-OL1 MON-OL1 IC-OL1	MO-OL1,4 PO-OL1,4 ID-OL1 IC-OL1				MO PLD PO ID IC MON			No

Notes:
1. Corresponds to file numbering of Permit excerpts

Appendix B

California Stormwater Quality Association (CASQA)
Development of an Effectiveness Assessment Web Portal
Summary of Annual Report Effectiveness Assessments (Task 4.2)

Ref No.[1]	Region	Order No.	Stormwater Program Reviewed	Available Sources					1. Does the Stormwater Program have its own EA Guidance/ Strategy?	2. Does the AR/ ROWD include explicit EAs?	3. Does the AR/ ROWD specifically reference the CASQA Guidance Manual and/or the SWRCB Guidance Manual?	4. Are management/ assessment questions used?	5. Are metrics (e.g., assessment data) used?	6. For which Program Elements/ Components does the AR/ ROWD include explicit EAs?	7. What are the program's data collection methods for EA?								8. What are the program's data analysis approaches?					9. On what timeframe are the EAs conducted?			10. Does the AR/ ROWD discuss program modifications based on the EAs?
				Annual Report	ROWD	Mon Report	Guidance	Other Reports							Internal Tracking by Stormwater Program	Reporting to Stormwater Program	Site Investigations	Interviews	Surveying and Testing	Monitoring and Sampling	Review of External Data Sources	Special Investigations	Other	Qualitative assessment	Descriptive statistics	Comparison to established reference points	Temporal change	Spatial analysis	Annual	Short Term (2-5 years)	Long Term (>5 years)	
13	5	R5-2013-0080	Fresno Metropolitan Flood Control District	12-13			2013		Yes (LTEA Strategy)	Yes (AR) Note: Not all EAs fully reported.	No	No	Yes; -PO -ID -MO -CO -PLD -IC -MON	-Public Involvement and Education (PO) -Pollution Control Activities - Effectiveness Discussion (MON/ PM)	PO-OL1,4 ID-OL1 MO-OL1,4 CO-OL1 PLD-OL1 IC-OL1,4 MON-OL1 PM-OL1		ID-OL1 CO-OL1 IC-OL1		PO-OL1	MON-OL1				PL-OL1 ID-OL1 MO-OL1 CO-OL1 PLD-OL1 IC-OL1 MON-OL1 PM-OL1	PL-OL1,4 ID-OL1 MO-OL1,4 CO-OL1 IC-OL1,4 MON-OL1				PO ID MO CO PLD IC MON PM	PO MON PM	MON PM	No
14	6	R6T-2011-101A1	El Dorado County	2013			2009	2013	Yes (2009 Lake Clarity Crediting Program (LRWQCB/ TRPA/ NDEP document) and 2013 Pollutant Load Reduction Plan). Focus is on OL4-6.	Yes (AR) Note: Not all EAs fully reported	No	No	Yes Pollutant Load Reduction (MO) Storm Water Facilities Inspection (MO) Construction Site Inspection (CO) Commercial, Industrial & Municipal Site Inspection (IC/ MO) Traction Abrasive and Deicing Material (MO) Storm Water Monitoring (MON) Illicit Discharge (ID) Education Component (PO) Fiscal Analysis (PM)	--	MO-OL1 CO-OL1 IC-OL1 ID-OL1 MON-OL1 PO-OL1,4 PM-OL1		CO-OL1			MO-OL1,4	MO-OL1,4			TMDL-OL1 MO-OL1 ID-OL1 MON-OL1 PO-OL1 PM-OL1	MO-OL1, 4	MO-OL4			MO		MO-OL4	No (AR and PLRP mention (annual) adaptive management, but specific modifications are not discussed in the AR)
15	7	R7-2013-0011	City of Coachella	12-13	2012				No	Yes (AR)	No	No	Yes -PO -MON	-ID/IC (ID) -Commercial/Industrial (IC) -Development Planning (PLD) -Construction (CO) -Facilities and Activities (MO) -Public Education (PO) -Monitoring Program (MON)	ID-OL1 IC-OL1 PLD-OL1 CO-OL1 MO-OL1 PO-OL1		ID-OL1 MO-OL1		PO-OL1	MON-OL1				ID-OL1 IC-OL1 PLD-OL1 CO-OL1 MO-OL1 PO-OL1 MON-OL1	PO-OL1 MON-OL1	MON-OL1			ID IC PLD CO MO PO MON		MON (ROWD)	Yes (ROWD)
16	8	R8-2010-0036	County of San Bernardino	12-13	2006		12-13		Yes (ROWD)	Yes (AR) Note: Not all EAs fully reported.	Yes-CASQA (AR)	No	Yes; -ID -IC -MO -PO -MON -CO	-Illicit Discharges/ Illegal Connections (ID) -Industrial Commercial Sources (IC) -New Development and Redevelopment (PLD) -Public Agency Activities (MO) -Residential Programs (PO) -Public Information and Participation (PO)	ID-OL1 IC-OL1 PLD-OL1 MO-OL1,4 PO-OL1,4 MON-OL1 CO-OL1		ID-OL1 IC-OL1 MO-OL1		PO-OL1,2	MON-OL1				ID-OL1 IC-OL1 PLD-OL1 MO-OL1 PO-OL1 MON-OL1 CO-OL1	ID-OL1 IC-OL1 MO-OL1,4 PO-OL1,4 MON-OL1 CO-OL1	PO-OL2	PO-OL2		ID IC PLD MO PO MON CO	ID IC PLD MO PO MON	MON PO	No
17	8	R8-2009-0030	County of Orange, and Unified	12-13	2013		10-11 LIP	2013	Yes (LIP 2010)	Yes (AR & ROWD for the County and Unified/Regional) Note: Not all EAs fully reported.	Yes-CASQA (AR & ROWD)	No	Yes -MO -PO -PLD -CO -IC -ID -MON	-Program Management (PM) -Plan Development (ID) -Municipal Activities (MO) -Public Education (PO) -New/Re Development (PLD) -Construction (CO) -Existing Development (IC) -ID/IC (ID) -Monitoring (MON)	PM-OL1,2 ID-OL1,2,4,5,6 MO-OL1,2,3,4,6 PO-OL1,4 PLD-OL1 CO-OL1 IC-OL1	ID-OL2	CO-OL1 IC-OL1		PM-OL2 MO-OL2 PO-OL2,3 PLD-OL2 CO-OL2 IC-OL2 ID-OL2	MON-OL6	MON-OL6			PM-OL1 PO-IC1 IC-OL1	ID-OL1,4,5 MO-OL1,3,4 PO-OL4 CO-OL1 IC-OL1	PM-OL2 ID-OL1,2,3 CO-OL3 MON-OL6	MO-OL3 MON-OL6		PM MO	IC	ID CO MO	Yes (AR & ROWD)
18	8	R8-2010-0033	City of Hemet	12-13	2007	11-12	2013 LIP		Yes (LIP 2013)	Yes (AR)	Yes-CASQA (referred to in regional AR)	No	Yes -PM -ID -PLD -CO -IC -PO -MO	-Program Management (PM) -Illegal Connection/Illicit Discharge (ID) -New Development (PLD) -Construction (CO) -Industrial/Commercial (IC) -Residential (PO) -Facilities and Activities (MO)	ID-OL1 PLD-OL1 CO-OL1 IC-OL1 PO-OL1 MO-OL1,4 PM-OL1		IC-OL2 MO-OL2,3		MO-OL2					ID-OL1 PLD-OL1 CO-OL1 IC-OL1 PO-OL1 MO-OL1,2	MO-OL4 PO-OL2	MO-OL3			ID PLD CO IC PO MO PM			Yes (AR & ROWD)
19	9	R9-2009-0002	City of Dana Point	12-13	2006		2010 LIP		Yes (LIP 2010)	Yes (AR) Note: Not all EAs fully reported.	Yes-CASQA (AR & ROWD)	Yes (MS4 Annual Report Matrix_FY12-13)	Yes -MO -PLD -CO -IC -ID	-Municipal (MO) -New Development (PLD) -Construction (CO) -Existing Development (IC) -ID/IC (ID)	MO-OL1,2,3 PLD-OL1,2,3 CO-OL1,2,3 IC-OL1,2,3 ID-OL1,2,3		MO-OL2,3 PLD-OL3 CO-OL1 IC-OL2,3 ID-OL2,3		CO-OL2	MO-OL4,6 IC-OL4				MO-OL1 PLD-OL1 CO-OL1 IC-OL1 ID-OL1	MO-OL2,3,4 PLD-OL2,3	CO-OL2,3 IC-OL2,3,4 ID-OL2,3	MO-OL4,6		MO PLD CO IC		MO PLD CO IC	Yes (AR)
20	9	R9-2010-0016	Riverside County Flood Control and Water Conservation District, SDR & Santa Margarita Watershed (monitoring report)	12-13	2009	12-13			No	Yes (AR)	Yes-CASQA (AR & ROWD)	Yes (monitoring report)	Yes -ID -MO -PLD -CO -IC -PO	-Illicit Discharge Detection (ID) -Municipal Areas (MO) -Development Planning (PLD) -Construction (CO) -Industrial and Commercial (IC) -Residential (PO) -Public Education (PO)	ID-OL1,4 MO-OL1,2,4 PLD-OL1 CO-OL1 IC-OL1 PO-OL1,2,4	PO-OL4			MO-OL2 CO-OL2 IC-OL2	MON-OL1,4,6				ID-OL1 MO-OL1 PLD-OL1 CO-OL1 IC-OL1 PO-OL1 MON-OL1	ID-OL4 MO-OL2,4 PO-OL2,4		MON-OL4,6	MON-OL1	ID MO PLD CO IC PO		MON	Yes (AR & ROWD)
21	9	R9-2013-0001	County of San Diego	12-13	2011	11-12	2011		Yes	No (only in 2010-11 regional AR)	No (CASQA only referenced in 2010-11 regional AR & ROWD)	No (only in 2011-12 AR)	Yes -Illicit Discharge Detection (ID) -Development Planning (PLD) -Construction (CO) -Existing Development (IC) -Public Education (PO) -Program Management (PM)	'--	ID-OL1 PLD-OL1 CO-OL1 IC-OL1 PO-OL1 PM-OL1		CO-OL1 IC-OL1												ID PLD CO IC PO PM			No (only in 2010-11 regional AR & ROWD)

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Ref No.[1]	Region	Order No.	Stormwater Program Reviewed	Available Sources					1. Does the Stormwater Program have its own EA Guidance/ Strategy?	2. Does the AR/ ROWD include explicit EAs?	3. Does the AR/ ROWD specifically reference the CASQA Guidance Manual and/or the SWRCB Guidance Manual?	4. Are management/ assessment questions used?	5. Are metrics (e.g., assessment data) used?	6. For which Program Elements/ Components does the AR/ ROWD include explicit EAs?	7. What are the program's data collection methods for EA?								8. What are the program's data analysis approaches?					9. On what timeframe are the EAs conducted?			10. Does the AR/ ROWD discuss program modifications based on the EAs?
				Annual Report	ROWD	Mon Report	Guidance	Other Reports							Internal Tracking by Stormwater Program	Reporting to Stormwater Program	Site Investigations	Interviews	Surveying and Testing	Monitoring and Sampling	Review of External Data Sources	Special Investigations	Other	Qualitative assessment	Descriptive statistics	Comparison to established reference points	Temporal change	Spatial analysis	Annual	Short Term (2-5 years)	Long Term (>5 years)	
22	All	2013-0001-DWQ	Napa Countywide Stormwater Pollution Prevention Program	12-13			(2015)		No (PEAIP will be required in 2015)	No	No	No	Yes -Municipal Operations (MO) -Construction (CO) -IC/ID (ID) -Public Education (PO)	'--	MO-OL1 CO-OL1 ID-OL1 PO-OL1		ID-OL1							MO-OL1 CO-OL1 ID-OL1 PO-OL1					MO CO ID PO			No
23	All	2012-0011-DWQ	Statewide Stormwater Permit - State of California, Department of Transportation	12-13			2003 SWMP		Yes (SWMP)	Yes (AR) Note: Not all EAs fully reported.	Yes-CASQA (AR)	Yes	Yes -PLD -CO -MO -PO -ID	-Program Management (PM) -Design (PLD) -Construction (CO) -Maintenance (MO) -Monitoring & Research (MON) -Training & Public Ed (PO) -Location-specific (ID)	PM-OL1 PLD-OL1 CO-OL1,3 MO-OL1,4 PO-OL1 MON-OL1 ID-OL1,4	CO-OL1	PLD-OL1,3 MO-OL1		PLD-OL1 CO-OL1,2 MO-OL1					PM-OL1 PLD-OL1 CO-OL1 MO-OL1 PO-OL1	PLD-OL1 CO-OL1,2 MO-OL1,4 PO-OL1	CO-OL2 MO-OL4	PLD-OL3 ID-OL4		PLD CO MO PO ID		PLD CO MO ID	Yes (AR)

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Ref No.[1]	Region	Order No.	6. For which Program Elements/ Components does the AR/ROWD include explicit EAs?	6a. Does the AR/ ROWD specifically reference Outcome Levels?	6b. For each Program Element/Component, at which Outcome Levels does the AR/ ROWD conduct EAs?[2]																																					
					PM						ID						PO						MO						IC						CO						PLD						MON					
					Program Management						Illicit Discharge						Public Outreach/ Residential Sources						Municipal Operations						Industrial/ Commercial						Construction						Planning & Land Development						Monitoring					
					6	5	4	3	2	1	6	5	4	3	2	1	6	5	4	3	2	1	6	5	4	3	2	1	6	5	4	3	2	1	6	5	4	3	2	1	6	5	4	3	2	1	6	5	4	3	2	1
1	1	R1-2009-0050	--	No						X						X						X						X												X						X
2	2	R2-2009-0074	--	No						X			X			X						X						X				X	X	X								X					
3	3	R3-2012-0005	-Municipal Maintenance (MO) -Commercial & Industrial (IC) -Residential (PO) -IC/ID (ID) -Development & Planning (PLD) -Construction Site Management (CO) -Public Education & Involvement (PO) -Trash Load Reduction (ID) -Monitoring (MON)	No												X						X						X					X	X								X				X			X
4	4	99-060	--	No						X									X		X	X																				X						X
5	4	R4-2012-0175	-Public Information and Participation Program, PIPP (PO) -Illicit Connection and Illicit Discharge (ID)	No						X						X			X		X	X			X			X														X						X
6	4	R4-2010-0108	-Program Management (PM) -Public Outreach (PO) -Industrial/Commercial Facilities (IC) -Planning and Land Development (PLD) -Development Construction (CO) -Public Agency Activities (MO) -Illicit Connections & Illicit Discharges Elimination (ID) -Water Quality Monitoring (MON)	Yes						X			X	X	X	X				X	X	X			X		X	X					X	X	X								X	X					X					X
7	5	R5-2008-0142	-Program Management (PM) -Construction (CO) -Commercial/ Industrial (IC) -Municipal Operations (MO) -Illicit Discharge (ID) -Public Outreach (PO) -New Development (PLD) -Monitoring and Target Pollutant Program (MON)	Yes						R			X	X	X	R,X			R		R,X	R,X			R,X	X	X	R,X					R	R	R,X					X	X	R,X					R,X		R				R

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2. X = Individual EA; R = Regional EA

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Ref No.[1]	Region	Order No.	6. For which Program Elements/ Components does the AR/ROWD include explicit EAs?	6a. Does the AR/ ROWD specifically reference Outcome Levels?	6b. For each Program Element/Component, at which Outcome Levels does the AR/ ROWD conduct EAs?[2]																																	
					PM						ID						PO						MO						IC						CO					
					Program Management						Illicit Discharge						Public Outreach/ Residential Sources						Municipal Operations						Industrial/ Commercial						Construction					
					6	5	4	3	2	1	6	5	4	3	2	1	6	5	4	3	2	1	6	5	4	3	2	1	6	5	4	3	2	1	6	5	4	3	2	1
8	5	R5-2010-0102	-Construction Site: Inspection Program (CO) -Public Information and Outreach: Public Outreach Events (PO) -Public Information and Outreach: Citizen Involvement Events (PO)	No											X	R,X			R,X		R	R,X			R,X			R,X						R,X						R,X
9	5	R5-2008-0092	-Illicit Discharges and Illegal Connections (ID) -Public Outreach, Education, and Participation (PO) -Municipal Operations (MO) -Industrial and Commercial Businesses (IC) -Construction (CO) -Planning and Land Development (PLD) -Water Quality-Based Program (MON) -Monitoring (MON)	Yes						X					X	X			X		X	X			X	X	X	X				X	X			X	X				X	X				X
10	5	R5-2007-0173	-Program Management (PM) -Illicit Discharges (ID) -Public Outreach (PO) -Municipal Operations (MO) -Industrial and Commercial (IC) -Construction (CO) -Planning and Land Development (PLD)	Yes						R				X	X	X			R,X	R,X	R,X	X			X	X		R,X				X	X	X			X	X	X				X					R
11	5	R5-2011-0005	-Construction (CO) -Industrial and Commercial (IC) -Municipal Operations (MO) -Illicit Discharges (ID) -Public Outreach (PO) -Planning and Land Development (PLD) -Water Quality-Based Program Element (MON) -Water Quality Monitoring (MON)	Yes									X	X	X	X			X	X		X			X	X	X	X				X	X	X			X	X	X	X			X	X				X
12	5	R5-2013-0153	--	No						R						R,X						R					R,X						X						X					R,X
13	5	R5-2013-0080	-Public Involvement and Education (PO) -Pollution Control Activities - Effectiveness Discussion (MON/ PM)	No						R						R,X			R,X			R,X			R			R,X			R						R,X						R,X					R,X
14	6	R6T-2011-101A1	--	No						X						X			X			X			X			X						X						X					R

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2. X = Individual EA; R = Regional EA

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Ref No.[1]	Region	Order No.	6. For which Program Elements/ Components does the AR/ROWD include explicit EAs?	6a. Does the AR/ ROWD specifically reference Outcome Levels?	6b. For each Program Element/Component, at which Outcome Levels does the AR/ ROWD conduct EAs?[2]																																	
					PM						ID						PO						MO						IC						CO					
					Program Management						Illicit Discharge						Public Outreach/ Residential Sources						Municipal Operations						Industrial/ Commercial						Construction					
					6	5	4	3	2	1	6	5	4	3	2	1	6	5	4	3	2	1	6	5	4	3	2	1	6	5	4	3	2	1	6	5	4	3	2	1
15	7	R7-2013-0011	-ID/IC (ID) -Commercial/Industrial (IC) -Development Planning (PLD) -Construction (CO) -Facilities and Activities (MO) -Public Education (PO) -Monitoring Program (MON)	No						X						X						X						X						X						X
16	8	R8-2010-0036	-Illicit Discharges/ Illegal Connections (ID) -Industrial Commercial Sources (IC) -New Development and Redevelopment (PLD) -Public Agency Activities (MO) -Residential Programs (PO) -Public Information and Participation (PO)	No												R			R		R	R			R			R						R						R
17	8	R8-2009-0030	-Program Management (PM) -Municipal Activities (MO) -Public Education (PO) -New/Re Development (PLD) -Construction (CO) -Existing Development (IC) -ID/IC (ID) -Monitoring (MON)	Yes					X	R,X			X	R	R,X	R,X			R,X	R,X	R,X	R,X			X	R	X	R,X				R,X	R,X				X	R,X	R,X		
18	8	R8-2010-0033	-Program Management (PM) -Illegal Connection/Illicit Discharge (ID) -New Development (PLD) -Construction (CO) -Industrial/Commercial (IC) -Residential (PO) -Facilities and Activities (MO)	No						X						X					X	X			X	X	X	X						X						X
19	9	R9-2009-0002	-Municipal (MO) -New Development (PLD) -Construction (CO) -Existing Development (IC) -ID/IC (ID)	Yes										X	X	X							X		X	X	X	X				X	X	X				X	X	X	
20	9	R9-2010-0016	-Illicit Discharge Detection (ID) -Municipal Areas (MO) -Development Planning (PLD) -Construction (CO) -Industrial and Commercial (IC) -Residential (PO) -Public Education (PO)	Yes (individual) No (regional)									X			X			X		X	X			X		X	X						X					R		R		R
21	9	R9-2013-0001	--	No (only in 2010-11 regional report)						X						X			R	R	R	R,X			R	R	R	R				R	R	R/X				R		R,X		

Notes:
1. Number corresponds to file numbering of Permit excerpts
2. X = Individual EA; R = Regional EA

Appendix B

California Stormwater Quality Association (CASQA)
Development of an Effectiveness Assessment Web Portal
Summary of Annual Report Effectiveness Assessments (Task 4.2)

Ref No.[1]	Region	Order No.	6. For which Program Elements/ Components does the AR/ROWD include explicit EAs?	6a. Does the AR/ ROWD specifically reference Outcome Levels?	6b. For each Program Element/Component, at which Outcome Levels does the AR/ ROWD conduct EAs?[2]																																					
					PM						ID						PO						MO						IC						CO						PLD						MON					
					Program Management						Illicit Discharge						Public Outreach/ Residential Sources						Municipal Operations						Industrial/ Commercial						Construction						Planning & Land Development						Monitoring					
					6	5	4	3	2	1	6	5	4	3	2	1	6	5	4	3	2	1	6	5	4	3	2	1	6	5	4	3	2	1	6	5	4	3	2	1	6	5	4	3	2	1	6	5	4	3	2	1
22	All	2013-0001-DWQ	--	No												X						X						X												X											
23	All	2012-0011-DWQ	-Program Management (PM) -Design (PLD) -Construction (CO) -Maintenance (MO) -Monitoring & Research (MON) -Training & Public Ed (PO) -Location-specific (ID)	Yes						X			X			X						X			X			X						X	X				X		X									X

Notes:
1. Number corresponds to file numbering of Permit excerpts
2. X = Individual EA; R = Regional EA

APPENDIX C

Stormwater Program Element Names Used in Baseline Report

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Appendix C: Stormwater Program Element Names Used in Baseline Report

Table 1. Variations on Program Element Names Used in Stormwater Programs Reviewed

Code	Program Element	Variation on Program Element Name
PM	Program Management	• Fiscal Analysis • Program Implementation and Evaluation
ID	Illicit Discharge	• Detection and Elimination of Illicit Connections and Illegal Discharges • IC/ID Elimination • ID/IC • Illegal Connection/Illicit Discharge; Litter, Debris and Trash Control • Illegal Dumping Controls • Illicit Connection and Illicit Discharges Elimination Program • Illicit Discharge Controls • Illicit Discharge Detection • Illicit Discharge Detection and Elimination • Illicit Discharges and Illegal Connections • Illicit Discharges and Illicit Connections • Illicit Discharges Elimination • Leaking Sanitary Sewage Controls • Location Specific Requirements • Plan Development • Spill Prevention, Containment, and Response Procedures • Trash Load Reduction
PO	Public Outreach/ Residential Sources	• Control for Pesticides, Herbicides and Fertilizer • Educating and Engaging the Public • Education and Public Information • Education Component • Public Education • Public Education and Public Involvement • Public Information and Outreach • Public Information and Participation • Public Involvement and Education • Public Outreach • Public Outreach and Education • Residential • Residential Programs • Training and Public Education Program

Code	Program Element	Variation on Program Element Name
MO	Municipal Operations	• Existing and Proposed Management Projects • Maintenance of Structural Controls • Maintenance Stormwater Program • Municipal • Municipal Activities • Municipal Maintenance • Operations and Maintenance • Operations and Maintenance of Roads, Streets, and Highways • Permittee Facilities and Operations • Permittee Facilities and Activities • Pollutant Load Reduction • Pollution Prevention and Good Housekeeping Practices • Public Agency Activities • Storm Drain System Inspection and Control Measure • Storm Water Facilities Inspection • Traction Abrasive and Deicing Material
IC	Industrial/ Commercial	• Commercial and Industrial • Commercial, Industrial & Municipal Site Inspection • Existing Development • Industrial and Commercial Businesses • Industrial and Commercial Site Controls • Industrial Commercial Sources • Industrial/Commercial Facilities • Monitoring Program of Industrial Activities • Retrofitting Existing Development
CO	Construction	• Construction Activities • Construction and Development • Construction and Post Construction Controls • Construction Site Controls • Construction Site Inspection • Construction Site Management • Construction Stormwater Program • Development Construction • Private Construction Activities
PLD	Planning & Land Development	• Design Stormwater Program • Development Planning • Development Planning and Construction • Development Planning and Permitting • Development Planning Program • New Development • New Development and Redevelopment • New Development and Significant Redevelopment Plan • Planning and Land Development Program, New Development/Redevelopment Integrate Water Quality/Resource Plan, Implementation of New Development/Redevelopment Post-Construction BMPs, State Statute Conformity, and Development Construction Program

Code	Program Element	Variation on Program Element Name
MON	Monitoring	• Data Analysis • Monitoring and Research Program • Monitoring and Target Pollutant Program • Program Analysis: Evaluation of Existing SWMP • Storm Water Monitoring • Water Quality Monitoring • Water Quality-Based Program

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APPENDIX D

Surveys

D-1: MS4 Manager Survey
D-2: Regulator Survey
D-3: NGO/Third Party Survey

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APPENDIX D-1

MS4 Manager Survey

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California Stormwater Quality Association (CASQA)
Task 4.3 - Stormwater Program Effectiveness Survey
MS4 Stormwater Program Managers

Introduction

The California Stormwater Quality Association (CASQA) is implementing a Proposition 84 Stormwater Grant Program project to develop a web portal focusing on effectiveness assessment of municipal stormwater programs. The web portal will be a central venue where users can obtain guidance, share data and information, and obtain planning and assessment support.

To help us focus our future efforts, we would like to understand the expectations and knowledge base of municipal stormwater program managers, regulators, and interested third parties. This survey will establish an informational baseline from which grant project tasks can be refined and evaluated.

Please take a few moments to answer the questions below. Your responses will be kept confidential (information provided in the final report will be grouped), and will assist us in designing a web portal interface that will serve as an invaluable asset to stormwater programs throughout California.

Please direct any questions to Karen Ashby at karena@lwa.com or (530) 753-6400 x232. Thank you in advance for your participation.

Participant Information

1. Participant Name
    a. Title
    b. Number of years involved in municipal stormwater management
    c. Phone Number
    d. Email
2. Name of Agency/Organization
3. Type of MS4 Program
    a. Phase I MS4
    b. Phase II MS4
    c. Number of years your stormwater program has been in place
        i. 0-5
        ii. 5-10
        iii. 10-20
        iv. > 20

Familiarity, Knowledge, and/or Current Usage of CASQA/State Water Board and/or Other Effectiveness Assessment Approaches

1. Please rate your use of the following documents:
    a. *Municipal Stormwater Program Effectiveness Assessment Guidance Document*, CASQA May 2007
        i. I refer to and use this frequently
        ii. I have read it or used it in the past
        iii. I have read it but not found it useful
        iv. I have heard about it at a conference or seen it on a website
        v. I have seen it somewhere
        vi. I am not familiar with it
    b. *Guidance for Assessing the Effectiveness of Municipal Storm Water Programs and Permits*, State Water Resources Control Board (SWRCB), 2011
        i. I refer to and use this frequently
        ii. I have read it or used it in the past
        iii. I have read it but not found it useful
        iv. I have heard about it at a conference or seen it on a website
        v. I have seen it somewhere
        vi. I am not familiar with it
2. If you are aware of and/or use the CASQA Guidance Document:
    a. What do you find most useful about the Guidance Document?
    b. What do you think needs to be improved the most?
3. If you are aware of and/or use the SWRCB Guidance Document:
    a. What do you find most useful about the Guidance Document?
    b. What do you think needs to be improved the most?
4. Have you seen or used any other documents (check all that you are aware of and/or have used):
    a. *Monitoring to Demonstrate Environmental Results: Guidance to Develop Local Stormwater Monitoring Studies,* Center for Watershed Protection, 2008
    b. *MS4 Program Evaluation Guidance Manual*, EPA, 2007
    c. *Other documents (please specify exact titles and provide links or specific references if available).*
5. Is there anything about any of the documents listed above or other documents you are aware of and/or used that you would like to share?

Strengths and Weaknesses of Current Assessment Efforts (What's Worked Well and What Hasn't)

6. The effectiveness assessment requirements in my current MS4 permit are (check all that apply):
    a. Vague
    b. Specific
    c. My permit does not require effectiveness assessment
    d. Helpful in improving my program
    e. Not helpful in improving my program
7. Have you developed a written strategy for assessing the effectiveness of your program?
    a. Yes
    b. No
    c. We don't have anything written down but we have an informal process that we use
    d. Not sure

8. Do you primarily report on the implementation of your stormwater program (# inspections, # enforcement actions, # brochures distributed) OR the impact that your stormwater program is having (results of surveys, results of inspections, water quality monitoring)?
    a. Not sure
    b. Primarily implementation
    c. Primarily Impact
    d. A mix of both
9. What outcome levels do you evaluate and report out on in the annual report (check all that apply)?
    a. All
    b. Outcome Level 6 – Receiving Water Quality
    c. Outcome Level 5 – Urban Runoff/Discharge Quality
    d. Outcome Level 4 – Source Load Reductions
    e. Outcome Level 3 – Target Audience Behavior
    f. Outcome Level 2 – Target Audience Knowledge or Awareness
    g. Outcome Level 1 – Program Implementation
    h. Not sure
10. How does your agency use the information obtained from conducting the effectiveness assessments (check all that apply)?
    a. To demonstrate/evaluate compliance via annual reporting
    b. To plan future activities
    c. To evaluate program efficiencies and identify modifications
    d. For annual reporting
    e. Don't really use the results
    f. Other (specify)
11. Do you have additional thoughts or comments on what is working or not working for your existing program effectiveness assessment efforts?

Priorities for Assessment (Program Areas, Target Audiences, Constituents, Outcome Types, etc.)

12. What are the highest priority areas that should be assessed for a stormwater program's effectiveness (check all that apply)?
    a. Changes in concentrations for key constituents in outfall discharges
    b. Changes in concentrations for key constituents in receiving waters
    c. Implementation of the program elements (Construction, New Development, etc.) as a whole
    d. Impacts of individual BMPs
    e. Changes in target audience behaviors and/or awareness
13. Guidance for conducting effectiveness assessments is needed most for which program areas [rank the items listed below in the order of most important (1) to least important (8)]?
    a. Water Quality Monitoring/Watershed Assessment
    b. Pollutant specific assessments
    c. Post-construction
    d. Construction
    e. Industrial/Commercial
    f. Public Education
    g. Illicit Discharges
    h. Municipal Operations
    i. Residential Areas

j. Not sure

14. Guidance for conducting effectiveness assessments is needed most for which Outcome Levels [rank the items listed below in the order of most important (1) to least important (6)]?
    a. Outcome Level 6 – Receiving Water Quality
    b. Outcome Level 5 – Urban Runoff/Discharge Quality
    c. Outcome Level 4 – Load Reductions
    d. Outcome Level 3 – Target Audience Behavior
    e. Outcome Level 2 – Target Audience Awareness
    f. Outcome Level 1 – Program Implementation
    g. Not sure
15. Do you have additional thoughts or comments regarding priorities for the assessment of stormwater management programs?

Key Data Deficits and Limitations of Current Methods (e.g., resources, methodologies, data collection, data availability, etc.)

16. The greatest limitations to conducting program effectiveness assessments (EAs) are (check all that apply):
    a. There is confusion about the approach and methodology for conducting EAs
    b. Not sure about the value of conducting an EA
    c. Unsure how to focus the EA on key areas
    d. Unclear about what methods should be used
    e. The data is not available
    f. The data is difficult to obtain
    g. Resources are not available to collect the data or conduct the EA
    h. Unsure how to use the data once the EA is conducted
17. Do you have anything else that you can share about what the key data deficits and/or limitations of current methods are for program effectiveness assessments?

Options for Web Portal Functionality and Content that have the Greatest Interest and Utility for Participants

18. What functions are <u>most critical</u> for the web portal (check all that apply)?
    Users should be able to:
    a. Obtain contact information for MS4 stormwater program managers in the state
    b. Share information or ask questions of other agencies/program managers through discussion groups
    c. Obtain information about permit requirements throughout the state (have permits available)
    d. Obtain EA-related documents to see how to develop and/or focus an EA for a stormwater program
    e. Obtain Annual Reports to see how MS4s are evaluating their stormwater programs
    f. Identify when EA-training opportunities are available
    g. Obtain step by step EA application guidance
    h. View online training sessions for EA
    i. I don't think that we need a web portal
19. Do you have anything else that you can share about what options should be incorporated as a part of the web portal functionality and/or content?

Training Priorities and Needs

20. What resources are most critical for the web portal (check all that apply)?
    a. Basic "101" type training on how to develop and conduct an EA
    b. Focused training on key aspects of developing/conducting an EA
    c. Webinar to highlight examples of key EAs conducted throughout the state
    d. Specific training for Phase II communities
    e. Other (specify)
    a. I don't think that we need a web portal

21. What is your preferred method of training (check all that apply)?
    a. Classroom type training (in person) that is held regionally or locally
    b. Classroom type training (in person) that is linked to the CASQA conference
    c. Webinars
    d. Archived modules that can be viewed as needed
    e. Other (specify)
    f. All are good methods

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APPENDIX D-2

Regulator Survey

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California Stormwater Quality Association (CASQA)
Task 4.3 - Stormwater Program Effectiveness Survey
Municipal Stormwater Regulators/Permitting Staff

Introduction

The California Stormwater Quality Association (CASQA) is implementing a Proposition 84 Stormwater Grant Program project to develop a web portal focusing on effectiveness assessment of municipal stormwater programs. The web portal will be a central venue where users can obtain guidance, share data and information, and obtain planning and assessment support.

To help us focus our future efforts, we would like to understand the expectations and knowledge base of municipal stormwater program managers, regulators, and interested third parties. This survey will establish an informational baseline from which grant project tasks can be refined and evaluated.

Please take a few moments to answer the questions below. Your responses will be kept confidential (information provided in the final report will be grouped), and will assist us in designing a web portal interface that will serve as an invaluable asset to stormwater programs throughout California.

Please direct any questions to Karen Ashby at karena@lwa.com or (530) 753-6400 x232. Thank you in advance for your participation.

Participant Information

1. Participant Name
    a. Title
    b. Number of years involved in municipal stormwater management
    c. Phone Number
    d. Email
2. Name of Agency/Organization
3. Type of State/Federal Regulatory Agency
    a. EPA
    b. SWRCB
    c. Regional Board
        i. Specify Region

California Stormwater Quality Association (CASQA)
Task 4.3 - Stormwater Program Effectiveness Survey
Municipal Stormwater Regulators/Permitting Staff

Familiarity, Knowledge, and/or Current Usage of CASQA/State Water Board and/or Other Effectiveness Assessment Approaches

1. Please rate your use of the following documents:
    a. *Municipal Stormwater Program Effectiveness Assessment Guidance Document*, CASQA May 2007
        i. I refer to and use this frequently
        ii. I have read it or used it in the past
        iii. I have read it but not found it useful
        iv. I have heard about it at a conference or seen it on a website
        v. I have seen it somewhere
        vi. I am not familiar with it
    b. *Guidance for Assessing the Effectiveness of Municipal Storm Water Programs and Permits*, State Water Resources Control Board (SWRCB), 2011
        i. I refer to and use this frequently
        ii. I have read it or used it in the past
        iii. I have read it but not found it useful
        iv. I have heard about it at a conference or seen it on a website
        v. I have seen it somewhere
        vi. I am not familiar with it
2. If you are aware of and/or use the CASQA Guidance Document:
    a. What do you find most useful about the Guidance Document?
    b. What do you think needs to be improved the most?
3. If you are aware of and/or use the SWRCB Guidance Document:
    a. What do you find most useful about the Guidance Document?
    b. What do you think needs to be improved the most?
4. Have you seen or used any other documents (check all that you are aware of and/or have used):
    a. *Monitoring to Demonstrate Environmental Results: Guidance to Develop Local Stormwater Monitoring Studies,* Center for Watershed Protection, 2008
    b. *MS4 Program Evaluation Guidance Manual*, EPA, 2007
    c. *Other documents (please specify exact titles and provide links or specific references if available).*
5. Is there anything about any of the documents listed above or other documents you are aware of and/or used that you would like to share?

Strengths and Weaknesses of Current Assessment Efforts (What's Worked Well and What Hasn't)

6. [For EPA and SWRCB Only] When thinking about your responses to questions #7 - #9, please identify the permit(s) in particular that you are thinking of (list the permit(s) that your responses apply to).

7. The effectiveness assessment requirements in my Region's MS4 permits are (check all that apply):
    a. Vague
    b. Specific
    c. The permits do not specifically require effectiveness assessments
    d. Helpful in improving the MS4 programs
    e. Not helpful in improving the MS4 programs

8. Do the MS4 stormwater programs assess the effectiveness of their programs in your Region (check all that apply)?
    a. Yes and the data is used to modify their programs
    b. Yes, but it is unclear how the information is used
    c. No
    d. Not sure

9. Do the MS4s primarily report on the implementation of the stormwater program (# inspections, # enforcement actions, # brochures distributed) OR the impact that the stormwater program is having (results of surveys, results of inspections, water quality monitoring)?
    a. Not sure
    b. Primarily implementation
    c. Primarily impact
    d. A mix of both

10. What outcome levels do you think should be evaluated and reported out on in the annual reports (check all that apply)?
    a. All
    b. Outcome Level 6 – Receiving Water Quality
    c. Outcome Level 5 – Urban Runoff/Discharge Quality
    d. Outcome Level 4 – Source Load Reductions
    e. Outcome Level 3 – Target Audience Behavior
    f. Outcome Level 2 – Target Audience Knowledge or Awareness
    g. Outcome Level 1 – Program Implementation
    h. Not sure

11. How does your Region use the information obtained from the effectiveness assessments that are conducted (check all that apply)?
    a. To evaluate compliance
    b. To evaluate program efficiencies and/or how effective the programs are
    c. As a part of the MS4 audits
    d. Don't really use the results
    e. Other (specify)

12. Do you have additional thoughts or comments on what is working or not working for existing program effectiveness assessment efforts?

Priorities for Assessment (Program Areas, Target Audiences, Constituents, Outcome Types, etc.)

13. What are the highest priority areas that should be assessed for a stormwater program's effectiveness (check all that apply)?
    a. Changes in concentrations for key constituents in outfall discharges
    b. Changes in concentrations for key constituents in receiving waters
    c. Implementation of the program elements (Construction, New Development, etc.) as a whole
    d. Impacts of individual BMPs
    e. Changes in target audience behaviors and/or awareness

14. Guidance for conducting effectiveness assessments is needed most for which program areas [rank the items listed below in the order of most important (1) to least important (8)]?
    a. Water Quality Monitoring/Watershed Assessment
    b. Pollutant specific assessments
    c. Post-construction

d. Construction
e. Industrial/Commercial
f. Public Education
g. Illicit Discharges
h. Municipal Operations
i. Residential Areas
j. Not sure

15. Guidance for conducting effectiveness assessments is needed most for which Outcome Levels [rank the items listed below in the order of most important (1) to least important (6)]?
    a. Outcome Level 6 – Receiving Water Quality
    b. Outcome Level 5 – Urban Runoff/Discharge Quality
    c. Outcome Level 4 – Load Reductions
    d. Outcome Level 3 – Target Audience Behavior
    e. Outcome Level 2 – Target Audience Awareness
    f. Outcome Level 1 – Program Implementation
    g. Not sure
16. Do you have additional thoughts or comments regarding priorities for the assessment of stormwater management programs?

Key Data Deficits and Limitations of Current Methods (e.g., resources, methodologies, data collection, data availability, etc.)

17. The greatest limitations for MS4s conducting program effectiveness assessments (EAs) are (check all that apply):
    a. There is confusion about the approach and methodology for conducting EAs
    b. Not sure about the value of conducting an EA
    c. Not sure that the MS4s know how to conduct an EA
    d. Not sure that the MS4s know how to use the data once an EA is conducted
    e. The data is not available
    f. The data is difficult to obtain
    g. The MS4s don't have the resources to collect the data or conduct the EA
18. Do you have anything else that you can share about what the key data deficits and/or limitations of current methods are for program effectiveness assessments?

Options for Web Portal Functionality and Content that have the Greatest Interest and Utility for Participants

19. What functions are <u>most critical</u> for the web portal (check all that apply)?
    Users should be able to:
    a. Obtain contact information for MS4 stormwater program managers in the state
    b. Share information or ask questions of other agencies through discussion groups
    c. Obtain information about permit requirements throughout the state (have permits available)
    d. Obtain EA-related documents to see how to develop and/or focus an EA for a stormwater program
    e. Obtain Annual Reports to see how MS4s are evaluating their stormwater programs
    f. Identify when EA-training opportunities are available
    g. Obtain step by step EA application guidance
    h. View online training sessions for EA
    i. I don't think that we need a web portal

20. Do you have anything else that you can share about what options should be incorporated as a part of the web portal functionality and/or content?

Training Priorities and Needs

21. What resources are most critical for the web portal (check all that apply)?
    a. Training on how to develop the permit language and/or considerations for EAs.
    b. Basic "101" type training on how to develop and conduct an EA
    c. Focused training on key aspects of developing/conducting an EA
    d. Webinar to highlight examples of key EAs conducted throughout the state
    e. Other (specify)
    a. I don't think that we need a web portal

22. What is your preferred method of training (check all that apply)?
    a. Classroom type training (in person) that is held regionally or locally
    b. Classroom type training (in person) that is linked to the CASQA conference
    c. Webinars
    d. Archived modules that can be viewed as needed
    e. Other (specify)
    f. All are good methods

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APPENDIX D-3

NGO/Third Party Survey

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California Stormwater Quality Association (CASQA)
Task 4.3 - Stormwater Program Effectiveness Survey
Non-Governmental Organization Staff

Introduction

The California Stormwater Quality Association (CASQA) is implementing a Proposition 84 Stormwater Grant Program project to develop a web portal focusing on effectiveness assessment of municipal stormwater programs. The web portal will be a central venue where users can obtain guidance, share data and information, and obtain planning and assessment support.

To help us focus our future efforts, we would like to understand the expectations and knowledge base of municipal stormwater program managers, regulators, and interested third parties. This survey will establish an informational baseline from which grant project tasks can be refined and evaluated.

Please take a few moments to answer the questions below. Your responses will be kept confidential (information provided in the final report will be grouped), and will assist us in designing a web portal interface that will serve as an invaluable asset to stormwater programs throughout California.

Please direct any questions to Karen Ashby at karena@lwa.com or (530) 753-6400 x232. Thank you in advance for your participation.

Participant Information

1. Participant Name
    a. Title
    b. Number of years involved in municipal stormwater management
    c. Phone Number
    d. Email
2. Name of Agency/Organization
3. Type of Non-Governmental Organization
    a. Name of Organization

California Stormwater Quality Association (CASQA)
Task 4.3 - Stormwater Program Effectiveness Survey
Non-Governmental Organization Staff

Familiarity, Knowledge, and/or Current Usage of CASQA/State Water Board and/or Other Effectiveness Assessment Approaches

1. Please rate your use of the following documents:
    a. *Municipal Stormwater Program Effectiveness Assessment Guidance Document*, CASQA May 2007
        i. I refer to and use this frequently
        ii. I have read it or used it in the past
        iii. I have read it but not found it useful
        iv. I have heard about it at a conference or seen it on a website
        v. I have seen it somewhere
        vi. I am not familiar with it
    b. *Guidance for Assessing the Effectiveness of Municipal Storm Water Programs and Permits*, State Water Resources Control Board (SWRCB), 2011
        i. I refer to and use this frequently
        ii. I have read it or used it in the past
        iii. I have read it but not found it useful
        iv. I have heard about it at a conference or seen it on a website
        v. I have seen it somewhere
        vi. I am not familiar with it
2. If you are aware of and/or use the CASQA Guidance Document:
    a. What do you find most useful about the Guidance Document?
    b. What do you think needs to be improved the most?
3. If you are aware of and/or use the SWRCB Guidance Document:
    a. What do you find most useful about the Guidance Document?
    b. What do you think needs to be improved the most?
4. Have you seen or used any other documents (check all that you are aware of and/or have used):
    a. *Monitoring to Demonstrate Environmental Results: Guidance to Develop Local Stormwater Monitoring Studies,* Center for Watershed Protection, 2008
    b. *MS4 Program Evaluation Guidance Manual*, EPA, 2007
    c. *Other documents (please specify exact titles and provide links or specific references if available).*
5. Is there anything about any of the documents listed above or other documents you are aware of and/or used that you would like to share?

Strengths and Weaknesses of Current Assessment Efforts (What's Worked Well and What Hasn't)

6. When thinking about your responses to questions #7 - #9, please identify the permit(s) in particular that you are thinking of (list the permit(s) that your responses apply to).

7. The effectiveness assessment requirements in the MS4 permit(s) are (check all that apply):
    a. Vague
    b. Specific
    c. The permits do not specifically require effectiveness assessments
    d. Helpful in improving the MS4 programs
    e. Not helpful in improving the MS4 programs
8. Do the MS4 stormwater programs assess the effectiveness of their programs (check all that apply)?
    a. Yes and the data is used to modify their programs

b. Yes, but it is unclear how the information is used
c. No
d. Not sure

9. Do the MS4s primarily report on the implementation of the stormwater program (# inspections, # enforcement actions, # brochures distributed) OR the impact that the stormwater program is having (results of surveys, results of inspections, water quality monitoring)?
    a. Not sure
    b. Primarily implementation
    c. Primarily impact
    d. A mix of both

10. What outcome levels do you think should be evaluated and reported out on in the annual reports (check all that apply)?
    a. All
    b. Outcome Level 6 – Receiving Water Quality
    c. Outcome Level 5 – Urban Runoff/Discharge Quality
    d. Outcome Level 4 – Source Load Reductions
    e. Outcome Level 3 – Target Audience Behavior
    f. Outcome Level 2 – Target Audience Knowledge or Awareness
    g. Outcome Level 1 – Program Implementation
    h. Not sure

11. How should the information obtained from the effectiveness assessments that are conducted be used (check all that apply)?
    a. To evaluate compliance
    b. To evaluate program efficiencies and/or how effective the programs are
    c. As a part of the MS4 audits
    d. Don't see the value of using the results
    e. Other (specify)

12. Do you have additional thoughts or comments on what is working or not working for existing program effectiveness assessment efforts?

Priorities for Assessment (Program Areas, Target Audiences, Constituents, Outcome Types, etc.)

13. What are the highest priority areas that should be assessed for a stormwater program's effectiveness (check all that apply)?
    a. Changes in concentrations for key constituents in outfall discharges
    b. Changes in concentrations for key constituents in receiving waters
    c. Implementation of the program elements (Construction, New Development, etc.) as a whole
    d. Impacts of individual BMPs
    e. Changes in target audience behaviors and/or awareness

14. Guidance for conducting effectiveness assessments is needed most for which program areas [rank the items listed below in the order of most important (1) to least important (8)]?
    a. Water Quality Monitoring/Watershed Assessment
    b. Pollutant specific assessments
    c. Post-construction
    d. Construction
    e. Industrial/Commercial
    f. Public Education

g. Illicit Discharges
h. Municipal Operations
i. Residential Areas
j. Not sure

15. Guidance for conducting effectiveness assessments is needed most for which Outcome Levels [rank the items listed below in the order of most important (1) to least important (6)]?
    a. Outcome Level 6 – Receiving Water Quality
    b. Outcome Level 5 – Urban Runoff/Discharge Quality
    c. Outcome Level 4 – Load Reductions
    d. Outcome Level 3 – Target Audience Behavior
    e. Outcome Level 2 – Target Audience Awareness
    f. Outcome Level 1 – Program Implementation
    g. Not sure
16. Do you have additional thoughts or comments regarding priorities for the assessment of stormwater management programs?

Key Data Deficits and Limitations of Current Methods (e.g., resources, methodologies, data collection, data availability, etc.)

17. The greatest limitations for MS4s conducting program effectiveness assessments (EAs) are (check all that apply):
    a. There is confusion about the approach and methodology for conducting EAs
    b. Not sure about the value of conducting an EA
    c. Not sure that the MS4s know how to conduct an EA
    d. Not sure that the MS4s know how to use the data once an EA is conducted
    e. The data is not available
    f. The data is difficult to obtain
    g. The MS4s don't have the resources to collect the data or conduct the EA
18. Do you have anything else that you can share about what the key data deficits and/or limitations of current methods are for program effectiveness assessments?

Options for Web Portal Functionality and Content that have the Greatest Interest and Utility for Participants

19. What functions are <u>most critical</u> for the web portal (check all that apply)?
    Users should be able to:
    a. Obtain contact information for MS4 stormwater program managers in the state
    b. Share information or ask questions of other agencies through discussion groups
    c. Obtain information about permit requirements throughout the state (have permits available)
    d. Obtain EA-related documents to see how to develop and/or focus an EA for a stormwater program
    e. Obtain Annual Reports to see how MS4s are evaluating their stormwater programs
    f. Identify when EA-training opportunities are available
    g. Obtain step by step EA application guidance
    h. View online training sessions for EA
    i. I don't think that we need a web portal
20. Do you have anything else that you can share about what options should be incorporated as a part of the web portal functionality and/or content?

Training Priorities and Needs

21. What resources are most critical for the web portal (check all that apply)?
    a. Training on how to develop the permit language and/or considerations for EAs
    b. Basic "101" type training on how to develop and conduct an EA
    c. Focused training on key aspects of developing/conducting an EA
    d. Webinar to highlight examples of key EAs conducted throughout the state
    e. Other (specify)
    a. I don't think that we need a web portal

22. What is your preferred method of training (check all that apply)?
    h. Classroom type training (in person) that is held regionally or locally
    i. Classroom type training (in person) that is linked to the CASQA conference
    j. Webinars
    k. Archived modules that can be viewed as needed
    l. Other (specify)
    m. All are good methods

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APPENDIX E

Survey Results

E-1: MS4 Manager Survey Results
E-2: Regulator Survey Results
E-3: NGO/Third Party Survey Results

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APPENDIX E-1

MS4 Manager Survey Results

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Appendix E-1. MS4 Survey Responses

Question	MS4-A	MS4-B	MS4-C	MS4-D	MS4-E	MS4-F	MS4-G	MS4-H	MS4-I	MS4-J	MS4-K	MS4-L	MS4-M	MS4-N	MS4-O	MS4-P	MS4-Q	MS4-R
Number of years involved in municipal stormwater management:																		
Years	25	9	20	6	3	3	5	15	2	18	17	15	24	20	10	8	11	12
Type of MS4 Program (Phase I MS4 or Phase II MS4):																		
	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	II	I	I
Number of years your stormwater program has been in place:																		
Years	> 20	> 20	> 20	5-10	10-20	> 20	10-20	10-20	> 20	> 20	> 20	> 20	> 20	> 20	10-20	5-10	5-10	10-20
1. Please rate your use of the following documents:																		
a. Municipal Stormwater Program Effectiveness Assessment Guidance Document, CASQA May 2007																		
i. I refer to and use this frequently						i											i	
ii. I have read it or used it in the past	ii			ii				ii		ii	ii	ii	ii		ii			
iii. I have read it but not found it useful														iii				
iv. I have heard about it at a conference or seen it on a website			iv				iv									iv		iv
v. I have seen it somewhere		v							v									
vi. I am not familiar with it					vi													
b. Guidance for Assessing the Effectiveness of Municipal Storm Water Programs and Permits, State Water Resources Control Board (SWRCB), 201																		
i. I refer to and use this frequently																		
ii. I have read it or used it in the past				ii				ii		ii					ii			
iii. I have read it but not found it useful													iii	iii				
iv. I have heard about it at a conference or seen it on a website							iv											iv
v. I have seen it somewhere		v							v									
vi. I am not familiar with it	vi		vi		vi	vi					vi	vi				vi	vi	
2. If you are aware of and/or use the CASQA Guidance Document: (Answers provided in Appendix E-1 Narratives)																		
3. If you are aware of and/or use the SWRCB Guidance Document: (Answers provided in Appendix E-1 Narratives)																		
4. Have you seen or used any other documents (check all that you are aware of and/or have used)																		
a. Monitoring to Demonstrate Environmental Results: Guidance to Develop Local Stormwater Monitoring Studies, Center for Watershed Protection, 2008				a				a		a					a	(a)		a
b. MS4 Program Evaluation Guidance Manual, EPA, 2007		b		b						b	b		b	b	b		b	
Other documents (Answers provided in Appendix E-1 Narratives)																		

Appendix E-1. MS4 Survey Responses

Question	MS4-A	MS4-B	MS4-C	MS4-D	MS4-E	MS4-F	MS4-G	MS4-H	MS4-I	MS4-J	MS4-K	MS4-L	MS4-M	MS4-N	MS4-O	MS4-P	MS4-Q	MS4-R
5. Is there anything about any of the documents listed above or other documents you are aware of and/or used that you would like to share? (Answers provided in Appendix E-1 Narratives)																		
6. The effectiveness assessment requirements in my current MS4 permit are:																		
a. Vague		a					a			a	a			a			a	a
b. Specific			b	b	b				b			b	b		b		b	
c. My permit does not require effectiveness assessment																c		
d. Helpful in improving my program				d			d											
e. Not helpful in improving my program	e					e		e	e	e	e						e	
7. Have you developed a written strategy for assessing the effectiveness of your program?																		
a. Yes	a			a				a	a		a		a					
b. No			b		b		b							b	b	b	b	
c. We don't have anything written down but we have an informal process that we use		c								c		c						c
d. Not sure						d												
8. Do you primarily report on the implementation of your stormwater program (# inspections, # enforcement actions, # brochures distributed) OR the impact that your stormwater program is having (results of surveys, results of inspections, water quality monitoring)?																		
b. Primarily implementation			b		b						b	b		b		b		
d. A mix of both	d	d		d		d	d	d	d	d			d		d		d	d
9. What outcome levels do you evaluate and report out on in the annual report:																		
a. All	a			a		a		a	a	a	a						a	
b. Outcome Level 6 – Receiving Water Quality		b			b		b				b		b	b	b		b	b
c. Outcome Level 5 – Urban Runoff/Discharge Quality		c			c		c				c				c		c	c
d. Outcome Level 4 – Source Load Reductions			d		d						d		d	d			d	d
e. Outcome Level 3 – Target Audience Behavior			e								e		e				e	
f. Outcome Level 2 – Target Audience Knowledge or Awareness			f				f				f		f	f	f		f	
g. Outcome Level 1 – Program Implementation			g		g		g				g	g	g	g	g	g	g	g
h. Not sure																		
10. How does your agency use the information obtained from conducting the effectiveness assessments?																		
a. To demonstrate/evaluate compliance via annual reporting	a		a	a		a		a	a	a	a		a	a	a		a	a
b. To plan future activities	b			b			b			b			b				b	b
c. To evaluate program efficiencies and identify modifications	c			c		c	c				c		c		c		c	c
d. For annual reporting	d	d	d	d	d		d			d	d	d	d	d	d		d	d

Appendix E-1. MS4 Survey Responses

Question	MS4-A	MS4-B	MS4-C	MS4-D	MS4-E	MS4-F	MS4-G	MS4-H	MS4-I	MS4-J	MS4-K	MS4-L	MS4-M	MS4-N	MS4-O	MS4-P	MS4-Q	MS4-R
e. Don't really use the results																e		
Other (Answers provided in Appendix E-1 Narratives)																		
11. Do you have additional thoughts or comments on what is working or not working for existing program effectiveness assessment efforts? (Answers provided in Appendix E-1 Narratives)																		
12. What are the highest priority areas that should be assessed for a stormwater program's effectiveness?																		
a. Changes in concentrations for key constituents in outfall discharges				a	a		a	a			a	a	a	a	a			a
b. Changes in concentrations for key constituents in receiving waters	b	b		b	b		b				b		b		b		b	b
c. Implementation of the program elements (Construction, New Development, etc.) as a whole			c		c	c	c					c		c		c	c	c
d. Impacts of individual BMPs			d		d	d	d				d		d	d	d			
e. Changes in target audience behaviors and/or awareness			e			e	e		e	e	e						e	
Other (Answers provided in Appendix E-1 Narratives)																		
13. Guidance for conducting effectiveness assessments is needed most for which program areas [rank the items listed below in the order of most important (1) to least important (10)]?																		
a. Water Quality	1	1	9	1	5	1	1	1	2	8	2	1	1	1	1	9	7	1
b. Pollutant specific assessments	2	2	7	2	8	2	2	2	3	5	1	2	3	2	2	8	6	2
c. Post-construction	4	8	3	5	6	9	3	7	8	4	5	6	2	3	3	2	8	3
d. Construction	9	7	2	7	3	6	5	6	6	6	6	7	6	6	5	1	5	4
e. Industrial/Commercial	5	5	1	6	2	5	6	3	4	3	4	4	5	7	6	4	3	5
f. Public Education	6	4	8	8	9	3	4	8	7	2	8	5	7	4	4	5	1	8
g. Illicit Discharges	7	3	4	4	4	4	7	4	5	9	3	3	4	5	8	3	9	7
h. Municipal Operations	8	9	6	3	1	7	8	5	9	7	7	8	8	8	9	6	4	6
i. Residential Areas	3	6	5	9	7	8	9	9	10	1	9	9	9	9	7	7	2	9
j. Not sure	10	10	10	10	10	10	10	10	1	10	10	10	10	10	10	10	10	10
14. Guidance for conducting effectiveness assessments is needed most for which Outcome Levels [rank the items listed below in the order of most important (1) to least important (7)]?																		
a. Outcome Level 6 – Receiving Water Quality	1	1	6	1	3	4	2	2	2	4	6	1	1	3	1	5	5	2
b. Outcome Level 5 – Urban Runoff/Discharge Quality	2	2	2	2	2	5	1	3	4	5	5	2	3	1	2	1	4	3
c. Outcome Level 4 – Load Reductions	3	3	3	3	4	1	3	4	5	1	1	3	2	2	3	4	3	4
d. Outcome Level 3 – Target Audience Behavior	4	4	4	4	6	3	5	5	7	2	2	4	5	4	6	3	1	5
e. Outcome Level 2 – Target Audience Awareness	5	5	5	5	5	2	4	6	6	3	4	5	4	5	4	2	2	6
f. Outcome Level 1 – Program Implementation	6	6	1	6	1	6	6	1	3	6	3	6	6	6	5	6	6	1
g. Not sure	7	7	7	7	7	7	7	7	1	7	7	7	7	7	7	7	7	7

Appendix E-1. MS4 Survey Responses

Question	MS4-A	MS4-B	MS4-C	MS4-D	MS4-E	MS4-F	MS4-G	MS4-H	MS4-I	MS4-J	MS4-K	MS4-L	MS4-M	MS4-N	MS4-O	MS4-P	MS4-Q	MS4-R
15. Do you have additional thoughts or comments regarding priorities for the assessment of stormwater management programs? (Answers provided in Appendix E-1 Narratives)																		
16. The greatest limitations to conducting program effectiveness assessments (EAs) are																		
a. There is confusion about the approach and methodology for conducting EAs		a	a	a	a	a	a	a	a	a				a	a	a		a
b. Not sure about the value of conducting an EA	b	b			b		b	b	b			b					b	b
c. Unsure how to focus the EA on key areas			c						c	c		c			c		c	
d. Unclear about what methods should be used			d						d	d				d	d	d	d	
e. The data are not available					e				e	e	e	e	e	e		e	e	e
f. The data are difficult to obtain	f				f				f	f	f	f	f	f	f	f	f	
g. Resources are not available to collect the data or conduct the EA		g	g		g		g		g		g	g	g	g	g	g	g	g
h. Unsure how to use the data once the EA is conducted									h				h		h	h	h	
Other (Answers provided in Appendix E-1 Narratives)																		
17. Do you have anything else that you can share about what the key data deficits and/or limitations of current methods are for program effectiveness assessments? (Answers provided in Appendix E-1 Narratives)																		
18. What functions are most critical for the web portal? Users should be able to:																		
a. Obtain contact information for MS4 stormwater program managers in the state	a		a		a		a		a				a	a	a			
b. Share information or ask questions of other agencies/program managers through discussion groups			b	b		b	b	b	b	b			b		b			
c. Obtain information about permit requirements throughout the state (have permits available)			c		c	c	c						c					
d. Obtain EA-related documents to see how to develop and/or focus an EA for a stormwater program			d		d				d	d	d	d	d	d	d		d	d
e. Obtain Annual Reports to see how MS4s are evaluating their stormwater programs	e						e			e	e		e		e			
f. Identify when EA-training opportunities are available			f	f	f					f	f	f	f		f			f
g. Obtain step by step EA application guidance			g			g				g	g	g	g	g	g	g	g	

Appendix E-1. MS4 Survey Responses

Question	MS4-A	MS4-B	MS4-C	MS4-D	MS4-E	MS4-F	MS4-G	MS4-H	MS4-I	MS4-J	MS4-K	MS4-L	MS4-M	MS4-N	MS4-O	MS4-P	MS4-Q	MS4-R
h. View online training sessions for EA	h		h	h	h					h	h	h	h	h	h	h	h	
i. I don't think that we need a web portal		i																
Other (Answers provided in Appendix E-1 Narratives)																		
19. Do you have anything else that you can share about what options should be incorporated as a part of the web portal functionality and/or content? (Answers provided in Appendix E-1 Narratives)																		
20. What resources are most critical for the web portal?																		
a. Basic "101" type training on how to develop and conduct an EA			a	a	a	a	a			a		a		a	a	a		a
b. Focused training on key aspects of developing/conducting an EA			b	b		b	b	b		b	b	b	b	b	b	b		b
c. Webinar to highlight examples of key EAs conducted throughout the state	c		c		c			c	c	c	c	c	c	c	c	c	c	c
d. Specific training for Phase II communities										d	d	d	d			d		d
e. I don't think that we need a web portal		e																
Other (Answers provided in Appendix E-1 Narratives)																		
21. What is your preferred method of training?																		
a. Classroom type training (in person) that is held regionally or locally	a	a	a		a		a						a		a			
b. Classroom type training (in person) that is linked to the CASQA conference	b	b	b		b	b							b		b			
c. Webinars			c	c			c	c		c		c	c	c	c		c	
d. Archived modules that can be viewed as needed				d		d		d		d	d		d	d	d			
e. All are good methods							e		e			e	e		e	e		e
Other (Answers provided in Appendix E-1 Narratives)																		

Appendix E-1 Narratives. MS4 Survey Responses

Question		MS4-A	MS4-B	MS4-C
2. If you are aware of and/or use the CASQA Guidance Document:	**What do you find most useful about the Guidance Document?**	Hierarchy of program and environmental outcomes	---	I have not referred to this guidance document for some time. Our existing permit is very prescriptive and all our efforts go into complying with its mandates.
	What do you think needs to be improved the most?	Expectations - I know that is not hugely helpful	---	My recollection of the guidance was that the concepts were very informative, but it lacked specificity and detailed guidance on how the concepts can be integrated into a stormwater program.
3. If you are aware of and/or use the SWRCB Guidance Document:	**What do you find most useful about the Guidance Document?**	N/A	---	It was a very effective document for outlining the issues and concepts for effective assessments.
	What do you think needs to be improved the most?	N/A	---	Again, I think it can be improved with more detailed guidance on effective assessment measures or indicators of effectiveness. The guidance must also strive to keep these measures and indicators simple and easy to use, track and report. We want to focus our limited resources on mitigation, and not effectiveness assessment.
4. Have you seen or used any other documents:		---	---	Our existing permit is so prescriptive, we have not had the opportunity to evaluate and use different measures of effectiveness. This is an area in our permit that needs attention and thought.
5. Is there anything about any of the documents listed above or other documents you are aware of and/or used that you would like to share?		---	---	---
10. How does your agency use the information obtained from conducting the effectiveness assessments? (Other)		---	---	---

Appendix E-1 Narratives. MS4 Survey Responses

Question	MS4-A	MS4-B	MS4-C
11. Do you have additional thoughts or comments on what is working or not working for existing program effectiveness assessment efforts?	---	---	Unfortunately I don't. This is a very important topic for which improvements would be most welcome in [location]. We do need practical guidance or indicators of program effectiveness. In [location], they are prescribed by the Water Board and more designed for evaluating compliance with prescribed activities. Our permit is heavy on reporting outputs. Audits seem to focus more on the organization and completeness of the tracking and reporting aspects than if the community has a good program.
12. What are the highest priority areas that should be assessed for a stormwater program's effectiveness? (Other)	---	---	---
15. Do you have additional thoughts or comments regarding priorities for the assessment of stormwater management programs?	---	---	---
16. The greatest limitations to conducting program effectiveness assessments (EAs) are: (Other)	---	---	---
17. Do you have anything else that you can share about what the key data deficits and/or limitations of current methods are for program effectiveness assessments?	Getting reliable programmatic data is an ongoing struggle	---	---

Appendix E-1 Narratives. MS4 Survey Responses

Question	MS4-A	MS4-B	MS4-C
18. What functions are most critical for the web portal? Users should be able to: (Other)	---	---	---
19. Do you have anything else that you can share about what options should be incorporated as a part of the web portal functionality and/or content?	---	---	---
20. What resources are most critical for the web portal? (Other)	---	---	---
21. What is your preferred method of training? (Other)	---	---	---

Appendix E-1 Narratives. MS4 Survey Responses

Question		MS4-D	MS4-E	MS4-F	MS4-G
2. If you are aware of and/or use the CASQA Guidance Document:	**What do you find most useful about the Guidance Document?**	Provides general guidance	N/A	It provides a basis of understanding between the assessor and reviewer of the amount of assessment that will be performed	---
	What do you think needs to be improved the most?	Some BMP's truly achieve level one, yet it is expected that agencies report on each to all levels. Thus, whatever approach or document is created needs to account for limitations.	N/A	One could make the argument that if you achieve L4 then you have achieved L5 and L6 (depending on how one defines and measures the water quality improvement). Please contact if you need an explanation or example.	---
3. If you are aware of and/or use the SWRCB Guidance Document:	**What do you find most useful about the Guidance Document?**	N/A	N/A	NA	---
	What do you think needs to be improved the most?	Needs to be promoted more.	N/A	NA	---
4. Have you seen or used any other documents:		Various other agency documents, mostly from the East Coast, such as Virgina.	California Stormwater Quality Association Stormwater Best Management Practice Handbook	---	---
5. Is there anything about any of the documents listed above or other documents you are aware of and/or used that you would like to share?		The documents themselves should be updated annually to reflect the itterative process.	No	While I'm new to the Program, the CASQA method works well-enough so I've not looked elsewhere.	---
10. How does your agency use the information obtained from conducting the effectiveness assessments? (Other)		---	---	Annual Reports: Because of the extremely limited ability to modify a task, annual assessments are nearly meaningless and result more in tweaks than mods. The LTEA is an actual eval that results in the ID/proposal of meaningful change.	---

Appendix E-1 Narratives. MS4 Survey Responses

Question	MS4-D	MS4-E	MS4-F	MS4-G
11. Do you have additional thoughts or comments on what is working or not working for existing program effectiveness assessment efforts?	The program is about improving water quality and thus, any true measure of effectiveness should be based upon water quality sampling accounting for population growth. However, the ag industry has a significant impact on water quality and thus they need to be brought into the mix. In addition, water quality impairment should be based upon upstream sampling versus downstream monitoring for an agency with an acceptable variance for the fact that humans pollutant to a certain level by our simple presence.	There is no real program in place at this time. We were recently issued an updated permit in [date] that required us to prepare an updated effectiveness assessment study. We are currently working on the preparation of that document.	In my opinion, Annual Reports should deal with All tasks as L1 assessments with the LTEA used to asses all tasks and determine which (if any) is achieving a higher Level. The current program seems backwards.	---
12. What are the highest priority areas that should be assessed for a stormwater program's effectiveness? (Other)	---	---	---	---
15. Do you have additional thoughts or comments regarding priorities for the assessment of stormwater management programs?	---	No	IMO, water quality data is too variable to be of any use (except very long term) in assessing a Program. Because receiving water data adds additional (out of Permit) sources, it is of even less use. Therefore, I think a standardized load assessment model needs to be created that is able to take into account the unaccountable (e.g. Public Outreach) and be a per capita concept.	---
16. The greatest limitations to conducting program effectiveness assessments (EAs) are: (Other)	The need for consistent application of the methodology and the methodology needs to refined.		The EA system is backwards: We define the EA Level for a task (and how we plan to measure if it met that EA Level) before performing the task instead of performing a task and assessing if it was effective; and if it was effective, how effective (L2?, L3...L6??).	---
17. Do you have anything else that you can share about what the key data deficits and/or limitations of current methods are for program effectiveness assessments?	---	No	Perhaps I'm continuing from 16 but.... One should assess task effectiveness to adaptively manage tasks - not demonstrate Program compliance. If a Program is comprised of all the tasks within its Permit and those tasks are well managed, then the Program should be deemed in-compliance - even if all the tasks are virtually ineffective. If this were to happen, the LTEA should reflect the need for significant changes in the tasks being performed.	---

Appendix E-1 Narratives. MS4 Survey Responses

Question	MS4-D	MS4-E	MS4-F	MS4-G
18. What functions are most critical for the web portal? Users should be able to: (Other)	---	---	---	---
19. Do you have anything else that you can share about what options should be incorporated as a part of the web portal functionality and/or content?	Every person who reads the EA document comes away with a slightly different perception on how to apply it. Thus, the need for well defined criteria is needed.	No	A BMP effectiveness for X (insert target pollutant) evaluation/rating area would be cool. Maybe have it set-up with 'reviews' so those that have used/installed/tested a BMP could provide pros and cons??	---
20. What resources are most critical for the web portal? (Other)	---	---	This could be two classes at the CASQA conference too :)	---
21. What is your preferred method of training? (Other)	---	---	---	---

Appendix E-1 Narratives. MS4 Survey Responses

Question		MS4-H	MS4-I	MS4-J	MS4-K
2. If you are aware of and/or use the CASQA Guidance Document:	**What do you find most useful about the Guidance Document?**	Have seen them in the past and read through them.	---	Structure of outcomes	Establishes a way to understand and discuss the outcomes from each program or BMP.
	What do you think needs to be improved the most?	Been a few years and the document wasn't relevant at the time	---	Lack of specific guidance for planning and assessing	To keep in the forefront of the discussion that the goal is to improve water quality, not "bean counting" to show effectiveness. What would also help, but a guidance document can't do, is provide incentives to improve measurements and record keeping to improve the ability to show program effectiveness.
3. If you are aware of and/or use the SWRCB Guidance Document:	**What do you find most useful about the Guidance Document?**	Useful in completing the SWMP	---	Provides some additional specificity to the May 2007 CASQA Guidance	---
	What do you think needs to be improved the most?	---	---	Does not provide detail; lacks an implementation perspective	---
4. Have you seen or used any other documents:		---	---	---	---
5. Is there anything about any of the documents listed above or other documents you are aware of and/or used that you would like to share?		---	---	Each provides useful information; none are designed to help users select and monitor outcomes	---
10. How does your agency use the information obtained from conducting the effectiveness assessments? (Other)		---	---	---	Prescriptive permit requirements limit the ability to modify programs based on effectiveness. (e.g. many hours spent screening storm drain yielded little reduction in illlicit discharges, but did provide a few good stories).

Appendix E-1 Narratives. MS4 Survey Responses

Question	MS4-H	MS4-I	MS4-J	MS4-K
11. Do you have additional thoughts or comments on what is working or not working for existing program effectiveness assessment efforts?	---	---	Assessment is a difficult endeavor and must adopt a long-term perspective. Their is a tendency to look for simple measures of effectiveness, which I don't believe exist. You need to look at a lot of things together over long periods.	As I mentioned - Permittees don't have a strong incentive to increase workload through measuring and record keeping, and our permit does not allow enough flexibility to manage the program for effectivess (other than do more than required)
12. What are the highest priority areas that should be assessed for a stormwater program's effectiveness? (Other)	---	Appropriate Beneficial Use designations and Water Quality Objectives	This is the primary focus of stormwater programs. All outcomes are important, but this is the most immediate indicator of program success.	The program elements will be done, how to prioritize resources so the most effective bmps are implemented is needed.
15. Do you have additional thoughts or comments regarding priorities for the assessment of stormwater management programs?	---	---	---	Assessing discharge quality can be done through MALs/NEL, but those in current permits have been developed from very old data that may not accurately reflect the current environment, or regional differences.
16. The greatest limitations to conducting program effectiveness assessments (EAs) are: (Other)	---	---	---	Permittees need to see the value in collecting extra information, they need to have the flexibility to react to what is learned.
17. Do you have anything else that you can share about what the key data deficits and/or limitations of current methods are for program effectiveness assessments?	Stop counting beans and get down to water quality which is the goal	---	---	A big challenge is create some consistency in how programs are reporting effectiveness statewaide. In our program there is a continual discussion on the interpretation of almost every annual report metric. (e.g. does "projects reviewed" mean every building permit granted, or only those that were reviewed because they could have a stormwater impact? And there is always a resistance to sharing any information that may reflect poorly upon a program.

Appendix E-1 Narratives. MS4 Survey Responses

Question	MS4-H	MS4-I	MS4-J	MS4-K
18. What functions are most critical for the web portal? Users should be able to: (Other)	---	---	---	Ideally, it will updated to stay on top of changing permit requirements and terminology
19. Do you have anything else that you can share about what options should be incorporated as a part of the web portal functionality and/or content?	---	---	---	pictures of kittens
20. What resources are most critical for the web portal? (Other)	---	---	---	---
21. What is your preferred method of training? (Other)	---	---	---	---

Appendix E-1 Narratives. MS4 Survey Responses

Question		MS4-L	MS4-M	MS4-N	MS4-O	MS4-P
2. If you are aware of and/or use the CASQA Guidance Document:	**What do you find most useful about the Guidance Document?**	Classification of outcome levels and how they apply to each program element / Fact Sheets for Program Elements	The section on Strategies for Assessing Effectiveness and the Fact Sheets for Program Elements, and let's forget the pretty pictures	---	Provides clear understanding of how to approach topic and conduct activities	---
	What do you think needs to be improved the most?	Nothing I can recommend at this time	More detailed information on COCs and moving towards having real life examples on pollutant loading from targeted sources	---	Updated to meet current SWRCB and RWQCB thinking, such as CBSM	---
3. If you are aware of and/or use the SWRCB Guidance Document:	**What do you find most useful about the Guidance Document?**	---	---	---	Haven't used this lately.	
	What do you think needs to be improved the most?	---	---	---	---	---
4. Have you seen or used any other documents:		---	---	---	---	None. FYI, I checked box "a" for this question even though I've never heard of it. The survey would not let me progress to the next page without making a selection of some kind.
5. Is there anything about any of the documents listed above or other documents you are aware of and/or used that you would like to share?		---	---	---	---	---
10. How does your agency use the information obtained from conducting the effectiveness assessments? (Other)		---	---	---	---	---

Appendix E-1 Narratives. MS4 Survey Responses

Question	MS4-L	MS4-M	MS4-N	MS4-O	MS4-P
11. Do you have additional thoughts or comments on what is working or not working for existing program effectiveness assessment efforts?	---	Too early to tell form new permit requirements	---	Resource constraints severely limit our ability to thoroughly conduct meaningful effectiveness assessments. This results in our giving too little time to this step which compromises our overall effectivenss.	---
12. What are the highest priority areas that should be assessed for a stormwater program's effectiveness? (Other)	---	Cost comparison between Regional [Treatment Control BMPs] versus individual lot LID practices	---	---	---
15. Do you have additional thoughts or comments regarding priorities for the assessment of stormwater management programs?	---	---	---	---	---
16. The greatest limitations to conducting program effectiveness assessments (EAs) are: (Other)	---	---	---	---	---
17. Do you have anything else that you can share about what the key data deficits and/or limitations of current methods are for program effectiveness assessments?	---	The major deficit is the lack of information on pollutant load from different sources and the expected load reduction after the implementation of BMPs	---	---	---

Appendix E-1 Narratives. MS4 Survey Responses

Question	MS4-L	MS4-M	MS4-N	MS4-O	MS4-P
18. What functions are most critical for the web portal? Users should be able to: (Other)	---	---	---	---	---
19. Do you have anything else that you can share about what options should be incorporated as a part of the web portal functionality and/or content?	---	---	---	---	---
20. What resources are most critical for the web portal? (Other)	---	---	---	---	---
21. What is your preferred method of training? (Other)	---	---	---	---	---

Appendix E-1 Narratives. MS4 Survey Responses

Question		MS4-Q	MS4-R
2. If you are aware of and/or use the CASQA Guidance Document:	**What do you find most useful about the Guidance Document?**	It is known and respected (the best out there, but not perfect), the number hierarchy approach is easy and clear to incorporate into assessments	---
	What do you think needs to be improved the most?	More examples on how it can be used, especially thinking outside the box, does not necessarily help with meeting numeric limits	---
3. If you are aware of and/or use the SWRCB Guidance Document:	**What do you find most useful about the Guidance Document?**	NA	---
	What do you think needs to be improved the most?	NA	---
4. Have you seen or used any other documents:		San Diego's 2011 Long-Term Effectiveness Assessment (LTEA) Final Report, http://www.projectcleanwater.org/index.php?option=com_content&view=article&id=80&Itemid=91), has some interesting metrics (amount of bacteria in dog poop, etc.) that may sounds crazy and sometimes don't seem to be practical, but are/will/may be needed to comply with NELs and/or TMDLs.	---
5. Is there anything about any of the documents listed above or other documents you are aware of and/or used that you would like to share?		no	---
10. How does your agency use the information obtained from conducting the effectiveness assessments? (Other)		I try to do all of the above, but it is very challenging. Many times I really have to take a leap and try to make some connection with an action and what it means. I also feel that some of these types of exercises are overwhelming and can be very, very time consuming and sometimes one has to make a decisions to actaully implement programs or spend time trying to evaluate them.... most times implementation wins.	---

Appendix E-1 Narratives. MS4 Survey Responses

Question	MS4-Q	MS4-R
11. Do you have additional thoughts or comments on what is working or not working for existing program effectiveness assessment efforts?	Deciding what data to capture and how to effectively capture it in a useful form and obtaining the volume of data to be scientifically valid are other challenges. Also the cost to obtian accurate flow and pollutant data is usually prohibitive. and human behavior, and the nature of humans, in general. which is turning out to be a significant component of nonpoint source pollution important is hard/impossible to control and equally hard to evaluate objectively.	---
12. What are the highest priority areas that should be assessed for a stormwater program's effectiveness? (Other)	---	---
15. Do you have additional thoughts or comments regarding priorities for the assessment of stormwater management programs?	No, but it would be nice for permittees to sit down with regulators and candidly disucss their thoughts on what they want to see as EAs, including TMDL compliance, in a venue where we can discuss candidly whether or not what they are looking for is even feasible and/or explain challenges with it. For example, I have heard RWQCB complain about their personal HOA Board and how their irrigation system causes runoff..... if that is happening in their own backyard, there needs to be an understanding of the challenges that MS4s face trying to address this same issue from 100s of HOAs - if they pay fees to an HOA and there is still no behavior change, how are MS4s supposed to be responsible for the behavior change?	---
16. The greatest limitations to conducting program effectiveness assessments (EAs) are: (Other)	---	---
17. Do you have anything else that you can share about what the key data deficits and/or limitations of current methods are for program effectiveness assessments?	---	---

Appendix E-1 Narratives. MS4 Survey Responses

Question	MS4-Q	MS4-R
18. What functions are most critical for the web portal? Users should be able to: (Other)	Being able to use data that was developed through an "accepted" EA would be very helpful so a single MS4 would not have to redudantly go through the same exercise (i.e. come up with some standard load reductions per activity) For example, if someone was able to quantify the fecal indicator bacteria load reduction per dog poop bag dispensed at a public trail..... or per sign posted - all these activities need to have some sort of credit - but what makes sense, obviously some people always pick up after their pet and always have, so a 1:1 ratio does not make sense, and obviously the billions of bacteria per dog dropping should equate to a billion load reduction, but there are the people that only do pick up their dog waste when a free bag is available .... so what is the right answer??? I don't know, but we have to start somewhere and we can't do a hundred thousand dollar monitoring study over several years to find out.	---
19. Do you have anything else that you can share about what options should be incorporated as a part of the web portal functionality and/or content?	Search by pollutant load reduction, obtain support or acceptance / stakeholdership by state and RWQCB for the data that will be available, to the extent practical (don't expect them to approve everything, but at least consider it)	---
20. What resources are most critical for the web portal? (Other)	---	---
21. What is your preferred method of training? (Other)	With ability to ask questions via phone or email	---

APPENDIX E-2

Regulator Survey Results

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Appendix E-2. Regulator Survey Responses

Question	Reg-A	Reg-B	Reg-C	Reg-D	Reg-E	Reg-F	Reg-G	Reg-H
Number of years involved in municipal stormwater management								
Years	15	32	20	14	25	6	11	15
Type of State/Federal Regulatory Agency (EPA, SWRCB, Regional Board)								
	RB 2	RB 5	RB 6	RB 4	EPA	RB 3	RB 8	SWRCB
1. Please rate your use of the following documents:								
a. Municipal Stormwater Program Effectiveness Assessment Guidance Document, CASQA May 2007								
i. I refer to and use this frequently								
ii. I have read it or used it in the past		ii		ii	ii	ii		ii
iii. I have read it but not found it useful	iii						iii	
iv. I have heard about it at a conference or seen it on a website			iv					
b. Guidance for Assessing the Effectiveness of Municipal Storm Water Programs and Permits, State Water Resources Control Board (SWRCB), 2011								
i. I refer to and use this frequently						i		
ii. I have read it or used it in the past		ii		ii			ii	ii
iii. I have read it but not found it useful	iii							
iv. I have heard about it at a conference or seen it on a website			iv		iv			
2. If you are aware of and/or use the CASQA Guidance Document: (Answers provided in Appendix E-2 Narratives)								
3. If you are aware of and/or use the SWRCB Guidance Document: (Answers provided in Appendix E-2 Narratives)								
4. Have you seen or used any other documents (check all that you are aware of and/or have used):								
a. Monitoring to Demonstrate Environmental Results: Guidance to Develop Local Stormwater Monitoring Studies, Center for Watershed Protection, 2008		a		a		a		a
b. MS4 Program Evaluation Guidance Manual, EPA, 2007		b		b	b	b	b	b
c. Other documents (Answers provided in Appendix E-2 Narratives)								

Appendix E-2. Regulator Survey Responses

Question	Reg-A	Reg-B	Reg-C	Reg-D	Reg-E	Reg-F	Reg-G	Reg-H
5. Is there anything about any of the documents listed above or other documents you are aware of and/or used that you would like to share? (Answers provided in Appendix E-2 Narratives)								
6. The effectiveness assessment requirements in my Region's MS4 permits are:								
a. Vague			a				a	
b. Specific		b	b	b		b		
c. The permits do not specifically require effectiveness assessments	c							
d. Helpful in improving the MS4 programs			d		d			
e. Not helpful in improving the MS4 programs		e	e				e	
7. Do the MS4 stormwater programs assess the effectiveness of their programs in your Region?								
a. Yes and the data are used to modify their programs	a			a	a			
b. Yes, but it is unclear how the information is used		b	b			b	b	
c. No								
d. Not sure								
8. Do the MS4s primarily report on the implementation of the stormwater program (# inspections, # enforcement actions, # brochures distributed) OR the impact that the stormwater program is having (results of surveys, results of inspections, water quality monitoring)?								
implementation	b	b	b			b		
d. A mix of both				d	d		d	
9. What outcome levels do you think should be evaluated and reported out on in the annual reports?								
a. All		a		a	a		a	
b. Outcome Level 6 – Receiving Water Quality	b		b					
c. Outcome Level 5 – Urban Runoff/Discharge Quality	c		c			c		
d. Outcome Level 4 – Source Load Reductions	d					d		
e. Outcome Level 3 – Target Audience Behavior			e					

Appendix E-2. Regulator Survey Responses

Question	Reg-A	Reg-B	Reg-C	Reg-D	Reg-E	Reg-F	Reg-G	Reg-H
f. Outcome Level 2 – Target Audience Knowledge or Awareness								
g. Outcome Level 1 – Program Implementation	g		g			g		
h. Not sure								
10. How does your Region use the information obtained from the effectiveness assessments that are conducted?								
a. To evaluate compliance	a		a		a		a	
b. To evaluate program efficiencies and/or how effective the programs are		b		b	b		b	
c. As a part of the MS4 audits		c				c	c	
d. Don't really use the results	d		d					
Other								
11. Do you have additional thoughts or comments on what is working or not working for existing program effectiveness assessment efforts? (Answers provided in Appendix E-2 Narratives)								
12. What are the highest priority areas that should be assessed for a stormwater program's effectiveness?								
a. Changes in concentrations for key constituents in outfall discharges				a	a	a	a	
b. Changes in concentrations for key constituents in receiving waters	b	b	b	b	b		b	
c. Implementation of the program elements (Construction, New Development, etc.) as a whole	c		c	c	c	c	c	
d. Impacts of individual BMPs	d			d		d	d	
e. Changes in target audience behaviors and/or awareness		e		e			e	
Other (Answers provided in Appendix E-2 Narratives)								

Appendix E-2. Regulator Survey Responses

Question	Reg-A	Reg-B	Reg-C	Reg-D	Reg-E	Reg-F	Reg-G	Reg-H
13. Guidance for conducting effectiveness assessments is needed most for which program areas [rank the items listed below in the order of most important (1) to least important (10)]?								
a. Water Quality Monitoring/Watershed Assessment	4	1	1	1	7	8	1	
b. Pollutant specific assessments	2	2	2	2	9	1	2	
c. Post-construction	6	5	5	3	2	2	3	
d. Construction	7	4	7	6	4	7	4	
e. Industrial/Commercial	1	3	6	4	3	3	5	
f. Public Education	3	8	8	7	1	9	6	
g. Illicit Discharges	9	6	9	5	6	6	7	
h. Municipal Operations	5	7	3	8	5	4	8	
i. Residential Areas	8	9	4	9	8	5	9	
j. Not sure	10	10	10	10	10	10	10	
14. Guidance for conducting effectiveness assessments is needed most for which Outcome Levels [rank the items listed below in the order of most important (1) to least important (7)]?								
a. Outcome Level 6 – Receiving Water Quality	2	1	1	1	2	4	1	
b. Outcome Level 5 – Urban Runoff/Discharge Quality	4	2	2	2	3	2	2	
c. Outcome Level 4 – Load Reductions	1	3	4	3	4	1	3	
d. Outcome Level 3 – Target Audience Behavior	5	4	5	5	1	5	4	
e. Outcome Level 2 – Target Audience Awareness	6	5	6	6	5	6	5	
f. Outcome Level 1 – Program Implementation	3	6	3	4	6	3	6	
g. Not sure	7	7	7	7	7	7	7	
15. Do you have additional thoughts or comments regarding priorities for the assessment of stormwater management programs? (Answers provided in Appendix E-2 Narratives)								
16. The greatest limitations for MS4s conducting program effectiveness assessments (EAs) are:								

Appendix E-2. Regulator Survey Responses

Question	Reg-A	Reg-B	Reg-C	Reg-D	Reg-E	Reg-F	Reg-G	Reg-H
a. There is confusion about the approach and methodology for conducting EAs	a	a	a	a		a	a	
b. Not sure about the value of conducting an EA	b					b		
c. Not sure that the MS4s know how to conduct an EA		c	c			c	c	
d. Not sure that the MS4s know how to use the data once an EA is conducted		d		d		d		
e. The data are not available	e	e						
f. The data are difficult to obtain	f	f		f	f	f		
g. The MS4s don't have the resources to collect the data or conduct the EA		g	g			g		
Other					Uncertainties in BMP effectiveness			
17. Do you have anything else that you can share about what the key data deficits and/or limitations of current methods are for program effectiveness assessments? (Answers provided in Appendix E-2 Narratives)								
18. What functions are most critical for the web portal? Users should be able to:								
a. Obtain contact information for MS4 stormwater program managers in the state	a	a						
b. Share information or ask questions of other agencies through discussion groups	b	b		b		b	b	
c. Obtain information about permit requirements throughout the state (have permits available)	c	c	c	c				

Appendix E-2. Regulator Survey Responses

Question	Reg-A	Reg-B	Reg-C	Reg-D	Reg-E	Reg-F	Reg-G	Reg-H
d. Obtain EA-related documents to see how to develop and/or focus an EA for a stormwater program	d	d	d	d	d	d	d	
e. Obtain Annual Reports to see how MS4s are evaluating their stormwater programs	e	e	e		e			
f. Identify when EA-training opportunities are available	f	f		f		f	f	
g. Obtain step by step EA application guidance	g	g	g		g	g		
h. View online training sessions for EA	h	h		h		h	h	
i. I don't think that we need a web portal								
Other (Answers provided in Appendix E-2 Narratives)								
19. Do you have anything else that you can share about what options should be incorporated as a part of the web portal functionality and/or content?								
	---	---	---	---	---	---	---	---
20. What resources are most critical for the web portal?								
a. Training on how to develop the permit language and/or considerations for EAs.	a	a	a					
b. Basic "101" type training on how to develop and conduct an EA	b	b	b	b	b		b	
c. Focused training on key aspects of developing/ conducting an EA	c	c		c		c		
d. Webinar to highlight examples of key EAs conducted throughout the state	d	d			d	d	d	
e. I don't think that we need a web portal								

Appendix E-2. Regulator Survey Responses

Question	Reg-A	Reg-B	Reg-C	Reg-D	Reg-E	Reg-F	Reg-G	Reg-H
Other					Downloadable examples of key EAs conducted throughout the state.	Item (a) seems to have no place in a portal.		
21. What is your preferred method of training?								
a. Classroom type training (in person) that is held regionally or locally			a	a			a	
b. Classroom type training (in person) that is linked to the CASQA conference				b				
c. Webinars			c	c				
d. Archived modules that can be viewed as needed			d	d				
e. All are good methods	e	e		e	e	e		
Other			Enforcement might be worth a try for egregious cases.					

Appendix E-2 Narratives. Regulator Survey Responses

Question		Reg-A	Reg-B	Reg-C	Reg-D	Reg-E
2. If you are aware of and/or use the CASQA Guidance Document:	**What do you find most useful about the Guidance Document?**	Little	The specific information to look for when looking at different elements of an MS4 program	---	It provides a format to allow municipal operators to quickly assess their program.	the systematic approach to addressing the issue, and the goal of clear, measurable assessments
	What do you think needs to be improved the most?	I think the document mixes several complex topics in a simplistic way - Not sure it can be fixed.	Not much, Update to address current MS4 phase II permit	---	Some of the elements should require a more detailed assesment commensurate with the increased regulatory requirements in some MS4 Permits.	more examples of successful use to serve as models.
3. If you are aware of and/or use the SWRCB Guidance Document:	**What do you find most useful about the Guidance Document?**	Little	Always helpful	---	It's a sound basic document.	I have never actually looked at it.
	What do you think needs to be improved the most?	I think the document mixes several complex topics in a simplistic way - Not sure it can be fixed.	---	---	Some of the elements should require a more detailed assesment commensurate with the increased regulatory requirements in some MS4 Permits	---

Appendix E-2 Narratives. Regulator Survey Responses

Question	Reg-A	Reg-B	Reg-C	Reg-D	Reg-E
4. Have you seen or used any other documents:	---	---	I cannot quickly provide specific references. The National Academy of Science reviewed the national storm water programs a few years ago and that was informative. I mainly spend time in permit development and studying relevant case law and policy issues. Interests include LID, TMDLs, climate change, CA "megastorms" and other references I could find with more time. Please call me to discuss if you like	---	Environmental indicators to assess stormwater control programs and practices (1996), old but still useful. http://search.library.wisc.edu/catalog/ocm36242115 - Center for Watershed Protection EPA's measurable goals guidance available at: http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm
5. Is there anything about any of the documents listed above or other documents you are aware of and/or used that you would like to share?	---	---	See http://www.nap.edu/catalog.php?record_id=10146 concerning TMDLs from the National Research Council review. Notably, storm water is barely a topic as you will see from searching the pdf for MS4, etc. Integrating (municipal) storm water in the TMDL programs is a significant challenge, largely unaddressed.	The EPA document was partly based on audits conducted in our Region. Some of the content was based on institutional knowledge within our Agency.	There's a lot of documents/guides out there that address the issue - too many to list. MS4 annual reports often have effectiveness assessments that provide helpful practical insights.
11. Do you have additional thoughts or comments on what is working or not working for existing program effectiveness assessment efforts?	---	---	We are just moving into effectiveness assessments in our region. Load reduction requirements for the [location] TMDL, for example, seem to set targets easily met based on developed estimates, at least initially. Thus, they may delay needed actions or reduce incentives to fund additional improvements. It is my overall assessment that compliance in [one of our two Basins] among Phase Is and IIs is proactive and appropriate, whereas it has been a more difficult process to obtain compliance with the Phase IIs in our [other Basin] and engage them in active management, though more recent trends are encouraging.	In my opinion the ultimate effectiveness assessment is monitoring results derived from a sound comprehensive monitoring program.	---

Appendix E-2 Narratives. Regulator Survey Responses

Question	Reg-A	Reg-B	Reg-C	Reg-D	Reg-E
12. What are the highest priority areas that should be assessed for a stormwater program's effectiveness?	---	---	Our basins largely lack water quality monitoring to understand the outcomes of management actions with respect to storm water. Thus, there is (over) reliance on and difficulty with assessing implementation activity, especially where the applicable standard is a poorly-defined "maximum extent practicable."	---	---
15. Do you have additional thoughts or comments regarding priorities for the assessment of stormwater management programs?	---	---	Local programs need to take on oversight of within-jurisdiction developments such as construction and industrial activities. The state is poorly positioned/staffed to assure compliance and should focus more on working with local municipalities to implement appropriate control programs and monitoring on an integrated basis in all sectors.	---	---
17. Do you have anything else that you can share about what the key data deficits and/or limitations of current methods are for program effectiveness assessments?	---	---	Data collection should be to answer specific management questions. This is often difficult to acheive in the current general-permit context.	A greater understanding on the impacts of MS4 discharges on receiving water quality is needed. To foster this more outfall monitoring needs to occur and better receiving water models need to be developed.	---

Appendix E-2 Narratives. Regulator Survey Responses

Question	Reg-A	Reg-B	Reg-C	Reg-D	Reg-E
18. What functions are most critical for the web portal? Users should be able to:	---	---	---	---	We don't necessarily need the whole MS4 annual report - just the effectiveness section.

Appendix E-2 Narratives. Regulator Survey Responses

Question		Reg-F	Reg-G	Reg-H
2. If you are aware of and/or use the CASQA Guidance Document:	**What do you find most useful about the Guidance Document?**	It provides a structured approach and covers the range of effectiveness assessment measures	It is an introduction to using performance metrics.	Emphasis on larger framework / outcomes.
	What do you think needs to be improved the most?	It, and the pending update, provide a good basic overview, but can't provide the detail permittees need. More guidance on load quantification would be an improvement.	disjointed: appears to have been written by several authors with significantly different understanding of the material; creates unnecessary terminology for an established business practice; distracting "levels"; assumed validity of measures	Details and mechanics of how to actually specify effectiveness in permits and programs and integrate across many interests and MS4 platforms.
3. If you are aware of and/or use the SWRCB Guidance Document:	**What do you find most useful about the Guidance Document?**	It provides a structured approach and covers the range of effectiveness assessment measures	It is an introduction to using performance metrics.	N/A (seemed to be DFA and grant driven, not much connection to regulatory, sadly)
	What do you think needs to be improved the most?	It, and the pending update, provide a good basic overview, but can't provide the detail permittees need.	See 2.d. above.; not as disjointed	N/A

Appendix E-2 Narratives. Regulator Survey Responses

Question	Reg-F	Reg-G	Reg-H
4. Have you seen or used any other documents:	Urban Stormwater BMP Performance Monitoring, USEPA, October 2009 International BMP Database	ISO 14000 series <www.iso.org/iso/home/standards/management-standards/iso14000.htm> ISO 19011 audit protocol , see link above	---
5. Is there anything about any of the documents listed above or other documents you are aware of and/or used that you would like to share?	Permittees are asking for templates for PEAIPs (required by Phase II permit). The above documents don't provide one, but they could possibly.	---	Not real familiar with them.
11. Do you have additional thoughts or comments on what is working or not working for existing program effectiveness assessment efforts?	It's not working to evaluate program effectiveness almost exclusively in non-quantitative, non-water quality-related terms. We have a huge gap in our knowledge of how much pollution is coming from urban runoff and what the localized effects of it are on beneficial uses. Until we quantify the pollutant loading and effectiveness of BMPs in reducing loads, program effectiveness assessment is unlikely to result in meaningful adjustments to management actions.	Permittees are overly fixated on identifying outcome levels (if they do so at all); this is silly, assigning terminology has little to do with the effectiveness of the actions or group of actions being evaluated.	---

Appendix E-2 Narratives. Regulator Survey Responses

Question	Reg-F	Reg-G	Reg-H
12. What are the highest priority areas that should be assessed for a stormwater program's effectiveness?	---	This is a strange question because it assumes one already has information about the correlations/effectiveness of program elements to set priorities. Priorities need to be set based on effectiveness. Information and assessment needs to come first. Then prioritize RESOURCES based on effectiveness: not the assessment process.	---
15. Do you have additional thoughts or comments regarding priorities for the assessment of stormwater management programs?	Assessments would benefit if they are related to specific catchments within the urban area. Defining a unit of analysis based on hydrology is paramount in producing assessment data that are to be used to modify implementation; all things being equal, the drainage area geometry and size will have significant implications for the effectiveness of implementing and management measure.	Outcome levels are an unneccesary categorization process. A program activity can have outcomes that fall into multiple outcome levels: must I only monitor one? Why can't I just identify the outcome that I'm looking for? The outcome level only decribes the directness of the effect on receiving water quality. I answered Qs 13 and 14 but they presume that the underlying prioritization method is valid and that the outcome level concept is useful. The option to answer "none" was not provided (Interestingly, this is an example of how the measurement method affects the outcome!).	---
17. Do you have anything else that you can share about what the key data deficits and/or limitations of current methods are for program effectiveness assessments?	The better methods are just more costly to apply: better load quantification models; better monitoring methods (e.g., flow-weighted composite sampling). Data analysis is non-trivial and requires expertise permittees do not posess.	---	---

Appendix E-2 Narratives. Regulator Survey Responses

Question	Reg-F	Reg-G	Reg-H
18. What functions are most critical for the web portal? Users should be able to:	I'm conceiving of the web portal as mostly serving permittees who need to conduct EA. Keeping the focus on them, versus the broader interested public (of which there isn't any besides a few environmnetal NGOs), is the only way to succeed I think.	---	---

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APPENDIX E-3

NGO/Third Party Survey Results

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Appendix E-3. NGO Survey Responses

Question	NGO-A	NGO-B
1. Please rate your use of the following documents:		
Municipal Stormwater Program Effectiveness Assessment Guidance Document, CASQA May 2007 - Rating	v. I have seen it somewhere	iv. I have heard about it at a conference or seen it on a website
Guidance for Assessing the Effectiveness of Municipal Storm Water Programs and Permits, State Water Resources Control Board (SWRCB), 2011 - Rating	ii. I have read it or used it in the past	ii. I have read it or used it in the past
2. If you are aware of and/or use the CASQA Guidance Document:		
a. What do you find most useful about the Guidance Document?	---	---
b. What do you think needs to be improved the most?	---	---
3. If you are aware of and/or use the SWRCB Guidance Document:		
a. What do you find most useful about the Guidance Document?	---	Monitoring outcomes, measures, and methods. Used to determine whether proper monitoring and assessment is occurring.
b. What do you think needs to be improved the most?	---	More specificity if possible regarding receiving water monitoring measures, assessments, outcomes
4. Have you seen or used any other documents (check all that you are aware of and/or have used):		
a. Monitoring to Demonstrate Environmental Results: Guidance to Develop Local Stormwater Monitoring Studies, Center for Watershed Protection, 2008		a
b. MS4 Program Evaluation Guidance Manual, EPA, 2007		
c. Other documents		
5. Is there anything about any of the documents listed above or other documents you are aware of and/or used that you would like to share?		
	---	---
6. The effectiveness assessment requirements in the MS4 permit(s) are (check all that apply):		
a. Vague	a	
b. Specific		b
c. The permits do not specifically require effectiveness assessments		
d. Helpful in improving the MS4 programs		d
e. Not helpful in improving the MS4 programs		

Appendix E-3. NGO Survey Responses

Question	NGO-A	NGO-B
7. Do the MS4 stormwater programs assess the effectiveness of their programs (check all that apply)?		
a. Yes and the data are used to modify their programs		
b. Yes, but it is unclear how the information is used		b
c. No		
d. Not sure	d	
8. Do the MS4s primarily report on the implementation of the stormwater program (# inspections, # enforcement actions, # brochures distributed) OR the impact that the stormwater program is having (results of surveys, results of inspections, water quality monitoring)?		
b. Primarily implementation	b	
c. Primarily impact		c
9. What outcome levels do you think should be evaluated and reported out on in the annual reports (check all that apply)?		
a. All	a	
b. Outcome Level 6 – Receiving Water Quality		b
c. Outcome Level 5 – Urban Runoff/Discharge Quality		c
d. Outcome Level 4 – Source Load Reductions		d
e. Outcome Level 3 – Target Audience Behavior		e
f. Outcome Level 2 – Target Audience Knowledge or Awareness		
g. Outcome Level 1 – Program Implementation		
h. Not sure		
10. How should the information obtained from the effectiveness assessments that are conducted be used (check all that apply)?		
a. To evaluate compliance	a	a
b. To evaluate program efficiencies and/or how effective the programs are	b	b
c. As a part of the MS4 audits	c	c
d. Don't see the value of using the results		
Other (please specify)		

Appendix E-3. NGO Survey Responses

Question	NGO-A	NGO-B
11. Do you have additional thoughts or comments on what is working or not working for existing program effectiveness assessment efforts?	---	As this is a new permit in [location], it remains to be seen whether responsible agencies will effectively monitor and assess the effectiveness of their actions. The new assessment efforts appear to be headed in the right direction through chemical, biological, and physical monitoring and assessment requirements.
12. What are the highest priority areas that should be assessed for a stormwater program's effectiveness (check all that apply)?		
a. Changes in concentrations for key constituents in outfall discharges	a	a
b. Changes in concentrations for key constituents in receiving waters	b	b
c. Implementation of the program elements (Construction, New Development, etc.) as a whole	c	c
d. Impacts of individual BMPs		d
e. Changes in target audience behaviors and/or awareness	e	
Other (please specify)		
13. Guidance for conducting effectiveness assessments is needed most for which program areas [rank the items listed below in the order of most important (1) to least important (10)]?		
a. Water Quality Monitoring/Watershed Assessment	1	1
b. Pollutant specific assessments	4	2
c. Post-construction	3	6
d. Construction	2	5
e. Industrial/Commercial	6	4
f. Public Education	7	9
g. Illicit Discharges	5	7
h. Municipal Operations	8	8
i. Residential Areas	9	3
j. Not sure	10	10
14. Guidance for conducting effectiveness assessments is needed most for which Outcome Levels [rank the items listed below in the order of most important (1) to least important (7)]?		
a. Outcome Level 6 – Receiving Water Quality	2	1
b. Outcome Level 5 – Urban Runoff/Discharge Quality	3	2

Appendix E-3. NGO Survey Responses

Question	NGO-A	NGO-B
c. Outcome Level 4 – Load Reductions	1	3
d. Outcome Level 3 – Target Audience Behavior	5	5
e. Outcome Level 2 – Target Audience Awareness	6	6
f. Outcome Level 1 – Program Implementation	4	4
g. Not sure	7	7
15. Do you have additional thoughts or comments regarding priorities for the assessment of stormwater management programs?		
	---	---
16. The greatest limitations for MS4s conducting program effectiveness assessments (EAs) are (check all that apply):		
a. There is confusion about the approach and methodology for conducting EAs		a
b. Not sure about the value of conducting an EA		
c. Not sure that the MS4s know how to conduct an EA	c	c
d. Not sure that the MS4s know how to use the data once an EA is conducted	d	d
e. The data are not available		
f. The data are difficult to obtain		
g. The MS4s don't have the resources to collect the data or conduct the EA		g
Other (please specify)		
17. Do you have anything else that you can share about what the key data deficits and/or limitations of current methods are for program effectiveness assessments?		
	---	---
18. What functions are most critical for the web portal (check all that apply)? Users should be able to:		
a. Obtain contact information for MS4 stormwater program managers in the state		
b. Share information or ask questions of other agencies through discussion groups	b	
c. Obtain information about permit requirements throughout the state (have permits available)		c
d. Obtain EA-related documents to see how to develop and/or focus an EA for a stormwater program	d	d
e. Obtain Annual Reports to see how MS4s are evaluating their stormwater programs		e
f. Identify when EA-training opportunities are available		
g. Obtain step by step EA application guidance	g	g
h. View online training sessions for EA	h	

Appendix E-3. NGO Survey Responses

Question	NGO-A	NGO-B
i. I don't think that we need a web portal		
Other (please specify)		
19. Do you have anything else that you can share about what options should be incorporated as a part of the web portal functionality and/or content?		
	---	---
20. What resources are most critical for the web portal (check all that apply)?		
a. Training on how to develop the permit language and/or considerations for EAs		
b. Basic "101" type training on how to develop and conduct an EA		b
c. Focused training on key aspects of developing/conducting an EA	c	c
d. Webinar to highlight examples of key EAs conducted throughout the state		d
e. I don't think that we need a web portal		
Other (please specify)		
21. What is your preferred method of training (check all that apply)?		
a. Classroom type training (in person) that is held regionally or locally		
b. Classroom type training (in person) that is linked to the CASQA conference		
c. Webinars	c	
d. Archived modules that can be viewed as needed		
e. All are good methods		e
Other (please specify)		

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APPENDIX F

List of Resources

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Appendix F: Effectiveness Assessment Resources

Effectiveness assessment-related documents of value to stormwater managers and other individuals involved in municipal stormwater programs were identified. The materials are summarized in the following tables:

- Table F-1. Summary of Stormwater Program (SP) Documents: Annual Reports
- Table F-2. Summary of Stormwater Program (SP) Documents: Monitoring Reports
- Table F-3. Summary of Stormwater Program (SP) Documents: Long-Term Effectiveness Assessment (LTEA)/ Guidance
- Table F-4. Summary of Regulatory (REG) Resources
- Table F-5. Summary of Available Research and Literature (RL)

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Table F-1. Summary of Stormwater Program (SP) Documents: Annual Reports

No.	Subtask 4.2 No.[1]	Agency	Title	Description
SP-01	12	Bakersfield, City of	2012-2013 Joint Annual Report (with Kern County)	(2)
SP-02	15	Coachella, City of	2012-2013 Annual Report	(2)
SP-03	8	Contra Costa Clean Water Program	2012-2013 Group Annual Report and Individual Annual Reports	(2)
SP-04	19	Dana Point, City of	2012-2013 Annual Report	(2)
SP-05	14	El Dorado County	2013 Annual Report	(2)
SP-06	13	Fresno Metropolitan Flood Control District	2012-2013 Annual Report	(2)
SP-07	18	Hemet, City of	2012-2013 Annual Report	(2)
SP-08	4	Long Beach, City of	2013 Annual Report	(2)
SP-09	5	Los Angeles, County of	2012-2013 Annual Report	(2)
SP-10	9	Modesto, City of	2012-2013 Annual Report	(2)
SP-11	22	Napa Countywide Stormwater Pollution Prevention Program	2012-2013 Annual Report	(2)
SP-12	17	Orange, County of; and Unified Orange County	2012-2013 Unified Annual Report	(2)
SP-13	20	Riverside County Flood Control and Water Conservation District	2012-2013 Annual Report	(2)
SP-14	7	Sacramento, County of	2012-2013 Annual Report	(2)
SP-15	3	Salinas, City of	2012-2013 Annual Report (Volumes 1-2)	(2)
SP-16	16	San Bernardino, County of	2012-2013 Annual Report	(2)
SP-17	21	San Diego, County of	2012-2013 Annual Report	(2)
SP-18	2	San Ramon, City of	2012-2013 Annual Report	(2)

No.	Subtask 4.2 No.[1]	Agency	Title	Description
SP-19	1	Santa Rosa, City of	2012-2013 Annual Report	(2)
SP-20	23	Statewide Stormwater Permit - State of California, Department of Transportation	2012-2013 Annual Report	(2)
SP-21	10	Stockton, City of	2011-2012 and 2012-2013 Annual Report	(2)
SP-22	11	Stockton, Port of	2012-2013 Annual Report	(2)
SP-23	6	Ventura County Watershed Protection District	2013 Annual Report	(2)

Note:
1. Original numbering (#) used in Subtask 4.2
2. These Annual Reports provide an evaluation of agency stormwater management programs and include a summary of the activities that occurred during the reporting period, effectiveness assessment of program components, and planned activities for the next reporting period.

Table F-2. Summary of Stormwater Program (SP) Documents: Monitoring Reports

No.	Subtask 4.2 No.[1]	Agency	Title	Description
SP-24	8	Contra Costa Clean Water Program	2012-2013 Integrated Monitoring Report (Parts A-C)	[2]
SP-25	18	Hemet, City of	2011-2012 Regional Monitoring Report	[2]
SP-26	4	Long Beach, City of	2006-2007 Monitoring Report	[2]
SP-27	N/A	Portland, City of	Effectiveness Evaluation of Best Management Practices for Stormwater Management in Portland, Oregon. Version 1, September 2006	This resource is an effectiveness evaluation of the management of stormwater quality and quantity in the City of Portland, and includes effectiveness ranges and preferred or default values for all best management practices (BMPs) either currently in use or anticipated for use in the City. City of Portland monitoring data ranged from 2001 to 2006. Both structural and non-structural BMPs are covered in the evaluation. This document also includes an assessment spreadsheet for all types of BMPs and discusses key issues in assigning effectiveness values to these BMPs.
SP-28	20	Riverside County Flood Control and Water Conservation District	2012-2013 Regional Monitoring Report	[2]
SP-29	21	San Diego, County of	Section 11 of the 2011-2012 Unified Annual Report	[2]
SP-30	10	Stockton, City of	(See Section 8 of the 2011-2012 & 2012-2013 Annual Report)	[2]
SP-31	6	Ventura County Watershed Protection District	(See Section 9 of the 2012-2013 Annual Report)	[2]

Note:
1. Original numbering (#) used in Subtask 4.2
2. These monitoring reports present the results of stormwater monitoring efforts that occurred during the reporting period, in addition to analyses of the results, any interpretations or conclusions drawn from the results, and recommendations and further actions.

Table F-3. Summary of Stormwater Program (SP) Documents: Long-Term Effectiveness Assessment (LTEA)/ Guidance

No.	Subtask 4.2 No.1	Agency	Title	Description
SP-32	14	El Dorado County	2009 Pollutant Load Reduction Model (PLRM) User's Manual	(2)
SP-33	13	Fresno Metropolitan Flood Control District	2013 LTEA Strategy	(2)
SP-34	7	Sacramento, County of	2013 Report of Waste Discharge (ROWD) and LTEA	(2)
SP-35	21	San Diego County Copermittees	2011 LTEA Final Report, San Diego Copermittees, Urban Runoff Management Programs, Final Report	(2)

Note:

1. Original numbering (#) used in Subtask 4.2
2. These LTEA/guidance documents provide guidance and/or strategies for conducting effectiveness assessments of stormwater management program components. These documents may also include program management questions that are intended to help provide valuable feedback for the stormwater program components.

Table F-4. Summary of Regulatory (REG) Resources

No.	Agency	Title	Description
REG-01	California State Water Resources Control Board	Guidance for Assessing the Effectiveness of Municipal Storm Water Programs and Permits, 2011	This resource presents a framework for assessing the effectiveness of MS4 program implementation as a whole, rather than looking at individual programmatic elements, in order to better understand the relationships between implementation and water quality. Although assessment of a program as a whole and linking activities conducted with water quality improvement may not be immediately possible, this resource emphasizes that it is possible to begin developing assessment tools that use a system of tiers or levels that eventually lead to a full program assessment.
REG-02	U.S. EPA, Region III	Evaluating the Effectiveness of Municipal Stormwater Programs (factsheet), January 2008	This six-page resource provides an overview of stormwater program effectiveness evaluation, and recommendations and explanations that MS4s may consider in determining how to comply with Clean Water Act (CWA) requirements and NPDES permit requirements. Also included are a list of additional resources and a crib sheet detailing "useful water quality monitoring approaches for evaluations of SWMPs."
REG-03	U.S. EPA	Measurable Goals Guidance for Phase II Small MS4s	Designed to assist operators of small MS4s in complying with the measurable goals of storm water permitting requirements, this guidance document presents an approach for developing measureable goals as part of a stormwater management plan. Topics covered include background and regulatory context, a process for developing measureable goals, example BMPs and associated goals, a process for developing an SWMP, and environmental indicators.
REG-04	U.S. EPA	Urban Stormwater BMP Performance Monitoring October 2009 manual and webpage	The manual provides targeted practical assistance in conducting water quality monitoring and reporting data that are useful for assessing effectiveness of stormwater BMPs. It was developed by integrating experience gleaned from field monitoring activities conducted by members of the American Society of Civil Engineers (ASCE) Urban Water Resources Research Council and through the development of the International Stormwater BMP Database.
REG-05	U.S. EPA, Office of Wastewater Management	MS4 Program Evaluation Guidance, January 2007	This guidance document is intended to assist State and NPDES permitting authority staff in assessing the compliance and effectiveness of Phase I and Phase II MS4 programs, developing Phase II Storm Water Management Programs (SWMPs), assessing pollutants of concern, and providing technical assistance. The questions and issues addressed in this document are intended to be used as a reference during an MS4 program evaluation, not as a script or checklist during the review.

Table F-5. Summary of Available Research and Literature (RL)

No.	Agency/Author	Title	Description
RL-01	Brosseau, Geoff; Van Rhyn, Jon; Ashby, Karen	A California Perspective on the Assessment of Municipal Stormwater Programs: Methods and Activities to Gauge Effectiveness and Make Improvements, September 2010	This article provides an overview of municipal stormwater program effectiveness assessment, and includes a discussion of challenges, key issues and concepts shaping the development of effectiveness assessment approaches in California, as well as the CASQA assessment approach.
RL-02	CASQA	An Introduction to Stormwater Program Effectiveness Assessment, August 2005	This paper describes the key concepts of stormwater management program effectiveness assessment, provides a standardized terminology related to the development of a comprehensive framework for such assessment, and discusses the needs of program managers with respect to assessment. This paper was intended to act as the basis for more detailed guidance to be developed by CASQA during 2005-2006.
RL-03	CASQA	Municipal Stormwater Program Effectiveness Assessment Guidance, May 2007	This guidance document was developed to fulfill the need for a well-conceived, integrated approach for assessing stormwater program effectiveness, and is intended to assist stormwater program managers in designing and conducting program effectiveness assessments using a range of assessment methods. This document describes how to use the assessment methods that are presented, based on program-specific desired Outcomes and goals.
RL-04	CASQA	Stormwater Program Effectiveness Assessment Survey, July 2005	Conducted in preparation for the Guidance document (listed above), CASQ developed and conducted a web-based survey to compile information on how agencies were measuring effectiveness, and to identify stormwater program needs for conducting future assessments. This report describes the survey methods, results, and conclusions.
RL-05	CASQA	A Strategic Approach to Planning for and Assessing the Effectiveness of Stormwater Programs, May 2014	This document introduces and describes a strategic approach to planning and assessing MS4 programs; provides background on the development and use of strategic planning methods; and describes how planning results may be used to direct program resources, establish measurability, and assess program effectiveness.

No.	Agency/Author	Title	Description
RL-06	Center for Watershed Protection	Environmental indicators to assess stormwater control programs and practices,1996[1]	This handbook describes the use of 26 environmental indicators within 6 general categories (i.e., water quality, physical/hydrological, biological, social, programmatic and site-specific) to measure the success of stormwater programs. Additionally, the handbook suggests a methodology for using the indicators to identify problems within local watersheds and for assessing, reevaluating and improving stormwater management programs.
RL-07	Center for Watershed Protection	Monitoring to Demonstrate Environmental Results: Guidance to Develop Local Stormwater Monitoring Studies Using Six Example Study Designs, August 2008	The main purpose of the manual is to provide guidance to MS4 communities on developing monitoring studies, so that the study results can help inform and improve the pollutant reduction efforts of their local stormwater programs. As such, this manual presents six monitoring study designs that can be used by MS4 communities to assess their local stormwater programs.
RL-08	Center for Watershed Protection	Watershed Treatment Model, 2013	The Watershed Treatment Model (WTM) is a spreadsheet-based tool designed for municipal or watershed managers that estimates the benefits of a wide range of management practices in urban watersheds. The current version of the WTM 2013 is able to track sediment, nutrients, bacteria and runoff volume on an annual basis. The most recent updates to the WTM also updates the methodologies used to calculate BMP efficiencies and runoff from urban turf.
RL-09	Urbonas, Ben; Olson, Christopher C.	Assessment of Stormwater BMP Cost Effectiveness: A new model for decision makers, February 2011	This technical article describes a spreadsheet-based computer model that provides life-cycle costs for stormwater treatment BMPs and may allow stormwater managers to assess the economic effectiveness of a BMP by comparing performance, capital costs, and long-term operational costs. Developed at the Colorado State University, the model is relatively open source and easy to use; permits the user to assess and adjust various program parameters as needed; and accounts for inflation, cost of money, and the regional and temporal variations of construction and maintenance costs.

[1] Updated resource to be located and added: "The Practice of Watershed Protection," Article 141.

No.	Agency/Author	Title	Description
RL-10	U.S. EPA	Assessing the Effectiveness of Your Municipal Stormwater Program, Webcast, June 2008	Originally broadcast in 2008, this webcast presents the original CASQA Municipal Stormwater Program Effectiveness Assessment Guidance, which describes a range of assessment methods that municipalities can use to assess all aspects of their stormwater management program. Additionally, the webcast describes U.S. EPA for expected Phase II stormwater program progress after five years of implementation.
RL-11	Water Environment Research Foundation (WERF)	Controlling Pollution at Its Source: Wastewater and Stormwater Demonstration Projects, 2001	This document identifies and develops evaluation tools applicable to a range of commercial and residential source control projects. It includes a model framework for incorporating effectiveness measurement into source control programs, as well as stormwater demonstration projects that use the effectiveness measurement tools that were developed.
RL-12	Water Environment Research Foundation (WERF)	Tools to Measure Source Control Program Effectiveness, 2000	Provides information on effectiveness measurement for stormwater and wastewater pollution prevention and public education projects. Includes cost information to implement pollution prevention programs and to measure program effectiveness. Factors and participation rates can be used to identify control strategies and plan programs. A process/ framework for developing an effective pollution prevention or source control program is described.