

9. PROGRAM EFFECTIVENESS STRATEGY

In order for a plan to be successful, clear goals and objectives must first be established, agreed to and implemented by the Copermitees. Otherwise, program activities and tasks are adopted without an understandable purpose or clear direction. As discussed in Chapter 1, and echoed throughout the body of the document, the Copermitees have identified a program goal and four underlying objectives that will guide decision-making as the Copermitee develop and implement the Watershed URMP.

GOAL: POSITIVELY IMPACT THE WATER QUALITY IN THE RECEIVING WATERS OF THE CARLSBAD WATERSHED

Objective #1: Develop and expand methods to assess and improve water quality in the Carlsbad Watershed (Hydrologic Unit).

Objective #2: Integrate watershed principles into land use planning among jurisdictions within the watershed.

Objective #3: Increase and enhance public understanding of watershed issues and pollution prevention through a watershed-based education program.

Objective #4: Increase opportunities for public and stakeholder involvement within the watershed.

This chapter establishes an evaluation strategy to determine the effectiveness of these objectives.

9.a. Evaluation Strategy

The strategy to evaluate the effectiveness of the Watershed URMP includes developing objectives that are measurable, have an expected outcome, and an established preliminary performance standard as an indicator of meeting or exceeding expectations. This process is supported by the EPA, whose literature indicates that “*for a watershed management plan to be effective, it should have measurable goals describing desired outcomes and methods for achieving those goals*” (EPA 1993).

On an annual basis, results from the water quality assessment will be integrated into the Watershed URMP objectives and the program effectiveness evaluation where practical. This will provide meaningful feedback to the Copermitees as to whether or not programmatic activities are useful in meeting the overriding goal of the Permit – to improve water quality in the region (The term “Water Quality” is defined as including the triad characteristics identified by the Copermitees, including the benthic community assessment, toxicity levels, and water chemistry [chemical and physical data]).

Annually, the program effectiveness evaluation strategy will consider linkages between water quality and programmatic activities, and the results will be used to alter program delivery, operations, goals, objectives, expected outcomes or other programmatic actions where possible. As the water quality assessment is expanded, the results will be used to develop targeted mitigation activities where and when appropriate, which may also alter the stated objectives. Therefore, the objectives outlined herein are considered to be dynamic, and will likely be updated each year. It must be noted that the ability of the Copermitees within this

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watershed to meet or exceed stated objectives, activities, and performance indicators does not itself suggest that the program is effective. Rather, the question that must ultimately be answered in evaluating the effectiveness of the program is *“Are program activities an effective method to improve water quality?”*

In order to answer that question, water quality monitoring data must be collected over a long period of time; longer than the life of the Municipal Permit. Although the stated purpose of the program effectiveness evaluation strategy is to address the long-term effectiveness of selected program activities and elements; intermediate, or short-term measures will also be tracked and assessed. This will provide important feedback on more frequent intervals, allowing the Copermittees to make adjustments each year. For this reason, both short-term and long-term measures are discussed together throughout the remainder of this section.

The long-term objective of the program effectiveness evaluation will be to develop and refine programmatic activities that have a positive affect on improving water quality. However, the first few years of the program effectiveness evaluation strategy will examine several key “first steps” (short-term measures) toward meeting this long-term goal. Thereafter, objectives and activities will be assessed annually and modified when linkages to water quality are developed or when modification is appropriate.

The short-term measures will be addressed in each annual report and will answer the following questions:

1. Are the Copermittees able to implement new methods for working together as a watershed group?
2. Are the Copermittees able to implement a community outreach program and provide a mechanism for community participation?
3. Are the Copermittees able to determine the effect, if any, of programmatic activities on water quality?

The answers to these questions, coupled with the water quality assessment, will provide a means to assess the program through a continuous feedback-loop of implementation, assessment, and evaluation.

To develop a meaningful program effectiveness strategy; (1) a needs assessment, (2) baseline data collection to measure “pre-implementation” levels, (3) the formation of program elements targeting the needs identified in the assessment, and (4) “post-implementation” data collection to ultimately determine the affect of programmatic activities on changes in water quality are typically required – this process is also a means for using direct measurements of program activities. Effectiveness assessment measures are generally divided into two types, direct and indirect, which are discussed below:

- **Direct measures.** Direct measures focus on characterizing the quality of water bodies receiving discharges from Copermittee MS4s or on assessing other parameters with an immediate or well-established nexus to changes in the quality of those waters. Examples of direct measurement include receiving waters monitoring, estimation of pollutant loadings from specified areas (catchments, municipalities, watersheds, etc.), and focused evaluations of structural BMPs. Direct measures generally include actual measurement or quantification of pollutants (e.g., reductions in concentrations of

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chemicals of concern, etc.) or of the amount of materials extracted or diverted by a BMP (e.g, through household hazardous waste collection, etc.).

- **Indirect measures.** Because direct measures can be difficult and expensive to obtain, and because they often require long assessment periods to fully assess, a variety of indirect measures are generally used to evaluate storm water program effectiveness. Indirect measures are based on the assumption that the use of specific program activities is effective in decreasing storm water pollution and therefore in protecting water quality. They are typically used to assess the performance of non-structural source control BMPs such as storm drain stenciling and public education programs. Indirect measures typically focus on degrees of implementation or comparison to standards or goals rather than actual water quality assessment or measures of pollutant loading. By measuring the degree or success of implementation of BMPs, it may therefore be possible to make *inferences* about water quality benefits. Inferences, however, are assumptions and should not be given the same weight as direct measures, which provide *direct-impact data*. Indirect measures should be pursued in combination with more broadly focused direct measures to allow Copermittees to prioritize limited resources, conduct meaningful assessments on intermediate time frames, and focus their efforts on particular BMPs and program elements.

Whether using direct or indirect measures of effectiveness, baseline conditions must be defined. Future comparisons showing improvements could then be made relative to these baseline conditions. In the absence of a well-defined baseline, these improvements cannot be adequately measured and/or attributed to particular actions or activities. A suite of measures that allows for assessment on a variety of levels and time frames will be developed if resources and time permit.

It should be noted that program requirements are being implemented and the effectiveness strategies formulated prior to a developed nexus between expected outcome (improved water quality) and program activities. As a result, the effectiveness of “permit compliance” may be the measured outcome during the first few years of program implementation rather than “effectiveness of program activities on water quality.” Basically, the process is the reverse of the best practices for program-impact evaluation. There is some concern to the Copermittees that measuring the objectives, implementing program components and evaluating permit compliance will require extensive resources including staff time and financial commitment and yet may not have the desired affect to improve water quality. Therefore, in an effort to reduce measurement deficiencies in the program effectiveness strategy due to the flaws in the evaluation process, the goals and objectives will be evaluated and modified as linkages to improved water quality are developed, which may or may not correlate to “permit compliance” activities. In other words, once a program activity is established as having a link to improved water quality, the Copermittees will work towards implementing those types of programmatic changes, when possible.

Therefore, it is expected that the program objectives and activities will change as each annual evaluation and assessment is conducted. The objectives outlined in this section are the Copermittees first attempt to establish a feedback-loop program evaluation process that addresses both permit-compliance and water quality impacts at this very early stage of program evaluation. The feedback loop is illustrated in Figure 9-1 and demonstrates the estimated time frame for achieving each goal, the expected time frame to before the impact on water quality will

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be available (2012) and the annual feedback process for assessing linkages between activities and water quality impacts.

In summary, the best measure of program effectiveness is improvement in the quality of receiving waters. Where possible, measurement of such changes will be pursued. However, three important limitations should be acknowledged here.

1. Measuring the “quality” of any receiving water is not a straightforward exercise. In many cases, baseline conditions have yet to be reliably established, and considerably more time may be required to do so;
2. Water quality changes in response to program implementation are likely to be very slow and not measurable within this or other near-term Permit cycles (as shown on the program effectiveness strategy illustration); and,
3. Establishing a nexus between targeted program activities and water quality improvement is difficult, if not often impossible.

Because storm water programs are still in their infancy, strategies for assessing effectiveness are still somewhat rudimentary. It is expected that better measures will be established over time.

The following sections describe the objectives, activities, and expected outcomes for the first annual program effectiveness strategy in an effort to evaluate the effectiveness of their program on water quality within the Watershed.

9.b. Review of Watershed URMP Objective and Activities

Each objective, the justification for selecting the objective, how the objective ties back to the program goal and the expected outcome are discussed in more detail below.

Annually, each objective and the ability of the Copermittees to meet the stated activities/tasks that were assigned to each objective will be evaluated for effectiveness in terms of impact on water quality when data for the assessment is available and reliable. This will allow a mechanism for modifications to the program. It must be stressed that this is a living document and the objectives, activities and tasks proposed may need to be modified in the coming years.

The process for assessing program effectiveness will be a multivariate approach integrating direct and in-direct measures, jurisdictional activities, statistical analysis (when available) and performance measures. The overall effectiveness of the entire program will be addressed in the annual narrative report to the RWQCB using all relevant information and examining the ability of the Copermittees to meet or exceed the stated goals and performance indicators. It is not likely that *program effectiveness on water quality* will be available within the life of this permit cycle; however the Copermittees remain hopeful that the goals as presented will move the evaluation a step closer with each annual assessment.

**OBJECTIVE #1: Develop and expand methods to assess and improve water quality
in the Carlsbad Watershed (Hydrologic Unit).**

Justification

The justification for this objective is obvious in that the purpose of a jurisdictional or watershed storm water program is to ultimately improve the quality of the water in the watershed. In order to accomplish this, we must expand upon existing methods or develop new methods to improve our understanding of the problems and ultimately the water quality within the watershed. By developing and expanding methods to improve water quality, stakeholders will be able to validate preliminary water quality concerns and possibly find new constituents of concern (COCs) within the watershed. As more information becomes available, it is anticipated that people's actions (behavior) will change in an effort to minimize impacts to water quality.

Expected Outcome

The expected outcome of this objective will be multi-faceted:

- 1) Develop an understanding (characterization) of the water bodies within the Watershed;
- 2) Develop and/or verify a list of COCs for the Watershed;
- 3) Prioritize the COCs for potential improvement;
- 4) Develop an action plan to mitigate harmful effects of COCs;
- 5) Transition to watershed-based monitoring program; and,
- 6) Using the triad of benthic community assessment, toxicity levels, and water chemistry, measure changes on water quality; however water quality changes are not expected to be statistically significant within the life of this permit.

Performance Measure

It cannot be overstated that direct measures are the most definitive way of determining an objective's (as well as program's) overall effectiveness. However, as echoed throughout this document, establishing useful direct measures are not only costly, but time consuming.

As stated in the Copermittees' respective Jurisdictional URMPs, the jurisdictions are required to gather water quality information. However, this process has just recently been expanded and unified for consistency among all Copermittees and thus, all relevant water quality information has yet to be analyzed and shared. In fact, in some cases, the COCs identified in the Watershed URMPs are based on only one year's worth of water quality data. The Copermittees and governing political bodies are reluctant to expend public funds to implement costly treatment control BMPs targeted at specific constituents of concern until additional data validates these COCs. As stated in Chapter 5 of the Watershed URMP, several activities are proposed to obtain this additional water quality data and validate COCs. Once this information is collected and a baseline can be established, then a targeted COC treatment and/or elimination strategy can be developed and implemented which will act as the measure for all future activities and tasks.

OBJECTIVE #2: Integrate watershed principles into land use planning among jurisdictions within the watershed.

Justification

Urban runoff does not follow jurisdictional boundaries, and often travels through many jurisdictions while flowing to receiving waters. However, cities and counties have traditionally exercised their land use authority independently, with limited consideration of the chemical, biological, and physical processes that govern the generation, transport, and fate of contaminants and stressors at the watershed scale. Land use policies of individual municipalities have the potential to affect water quality in water bodies well beyond jurisdictional boundaries. One of the overriding purposes of the Watershed URMP is to expand the city/county's mindset (or behavior) and move from an individual jurisdictional decision-making process regarding land-use to a Watershed-based process.

Expected Outcome

The expected outcome of this objective and related tasks is to improve collaborative efforts among watershed Copermittees. This outcome is not expected to impact water quality, directly, at least not in a manner that is identifiably measurable at this time. However, the Copermittees expect that this objective is advantageous to reducing urban runoff pollution through altering practices and procedures within jurisdictions where and when practical, possible, and when agreement among elected officials is realized.

Performance Measure

In order to measure the effectiveness of this objective, an inference must be made that an increase or improvement in collaborative efforts will indirectly impact water quality. Once this inference is made, the next step is to establish a baseline to which all other activities will be measured. Prior to issuance of the Permit, little jurisdictional collaboration existed as it related to watershed planning. As such, this baseline is limited to the following programs: Project Clean Water and Discretionary Project Review Process. Under this approach, the Copermittees assume that any increase in the number of additional efforts or expansion of existing efforts will result in an effective program objective.

As discussed in Chapter 6, several activities and tasks have been established for this objective. However, trying to measure program effectiveness on activities or tasks that are not easily quantifiable is virtually impossible. As such, an inference must be made that completing the activities and tasks will indirectly impact water quality within the watershed. The Copermittees will track, and report to the RWQCB as part of the annual report, the various activities/tasks that have been identified for this objective. The performance measure for these tasks may be a simple response (task completion? Yes/No) to something more tangible (tracking shared document).

OBJECTIVE #3: Increase and enhance public understanding of watershed issues and pollution prevention through a watershed-based education program.

Justification

Education is the foundation of an effective urban runoff management program and the basis for changes in behavior at the individual and societal levels. Storm water quality topics can be very focused (identification of the types of source control BMPs) or general (answering the question: What is a watershed?) and can target many audiences to inform them of how individual actions impact water quality and how these impacts can be avoided.

Expected Outcome

The long-term outcome expected from this objective is to improve water quality through an increased knowledge among the community and a change in human behavior. Measurable changes in water quality may not be realized during the life of this permit. In the interim, the short-term outcome is that a consistent message regarding watershed concepts, urban runoff and pollutant-causing activities will be developed with the assumption that (over time) the educational program will produce a change in human behavior which improves the quality of water and thus the beneficial use/and quality of life.

Performance Measure

Surveys are an effective performance measure to determine a population's knowledge or understanding of water quality issues. Under this approach, however, an inference must be made that an increase in awareness translates into a change in public behavior. Through the use of surveys, the effectiveness of program activities can be assessed within a shorter period of time (2-3 years), allowing the Copermittees to adjust the activities/tasks accordingly to maximize program effectiveness. As the first step in measuring the effectiveness of this objective, the Copermittees will establish a baseline of public knowledge on issues relating to water pollution within the watershed. It is anticipated that this first measure will be conducted within the first year of program adoption and will provide the foundation or starting point for measuring program effectiveness. Subject to available funding and staffing, subsequent surveys will be conducted over the lifetime of the permit.

The Copermittees have also established an extensive list of activities/tasks that are to be completed as part of this objective. As stated in previous sections, measuring specific task/activity effectiveness is virtually impossible to tie to improved water quality. As such, an inference must be made that completing the activities/tasks will indirectly impact water quality within the watershed. The Copermittees will track, and report to the RWQCB as part of the annual report, the various activities/tasks that have been identified for this objective. The performance measure for these tasks may be a simple response (task completion? Yes/No) to something more tangible (was an educational brochure created and distributed?).

OBJECTIVE #4: Increase opportunities for public and stakeholder involvement within the watershed.

Justification

The objectives and activities found in watershed management plans ultimately impact current as well as proposed land uses. In order to develop an effective plan, the importance of stakeholder input cannot be overstated. There are three important reasons for the need of stakeholder involvement.

1. Stakeholders can provide jurisdictions with a different perspective on watershed issues. Because stakeholders have varying backgrounds and experience levels, they are sometimes able to identify issues and solutions not previously identified by jurisdictions.
2. Water quality data is collected by a number of different stakeholders for a number of different reasons. Copermittees can work with stakeholders to pull their data together in an attempt to develop a useful water quality database that helps identify and validate water quality problems as well as possible solutions.
3. It is a prudent planning principle to involve the public in comprehensive plan development as a watershed plan ultimately impacts stakeholders. As such, it is imperative that stakeholders are clear on the intent and purpose of the plan as well as the activities being identified.

Expected Outcome

The short-term expected outcome is to increase the amount of current stakeholder involvement in watershed related issues. It is assumed that an increase in stakeholder involvement will ultimately lead to improved water quality, which is the long-term expected outcome for this objective. While we will be able to measure the short-term outcomes, the long-term outcome will be difficult, as measurable changes in water quality are not expected within the life of the Permit.

Performance Measure

In order to measure the effectiveness of this objective, a presumption must be made that an increase in stakeholder involvement equates to improved water quality. Once this inference is made, the next step is to establish a baseline to which all other activities will be measured. However, trying to identify the number of stakeholder groups that have had involvement in watershed plans and how they related to this particular water quality, regulatory-based plan prior to the issuance of the Permit will be difficult. As such, it is assumed for this evaluation that there was no previous stakeholder involvement in the development of this Watershed URMP and the issuance of the Permit represents the starting point for this effort. Under this approach, the Copermittees assume that increases in stakeholder involvement will result in an effective program objective.

As discussed in Chapter 7, several activities and tasks have been established for this objective. However, trying to measure program effectiveness on individual activities is difficult. As such,

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an inference must be made that completing the activities and tasks will indirectly impact water quality within the watershed. The Copermittees will track, and report to the regional board as part of the annual report, the various activities/tasks that have been identified for this objective. The performance measure for these tasks may be a simple response (task completion? Yes/No) to something more tangible (copy of meeting agendas).

9.c. Performance Indicators

Standard performance indicators for achieving the objectives would commonly include measurable changes in pollutant loading, water quality, community knowledge, etc. Performance indicators are typically established based upon baseline level data, which is not available at this time (as discussed in the Chapter 1, Introduction). Without baseline data, it would be premature to set the performance markers at this time. However, the Copermittees have agreed on the following standard performance indicators:

By the end of the Year 2003:

- Completion of the Water Quality Assessment and Prioritization – initial (2002) and comparative data in 2003;
- Development of the list of COCs with linkage to potential contributors; and,
- Implementation of each of the activities for 2003 as presented (efforts will also be evaluated among Copermittees regarding collaboration and cooperation).

Year 2003 and on-going:

- Ability to utilize a feedback-loop method for modification of goals and objectives;
- Continued watershed workgroup meetings; and,
- A measurably and statistically significant change over the life of the Municipal Permit regarding the community's general watershed knowledge and storm water pollution prevention will indicate that the Copermittees have been effective at 1) communicating a cohesive message, 2) communicating information about activities that contribute to water pollution, and 3) being able to transition from jurisdictional approaches to a Watershed-based approach.

Performance of objectives are predicated on the ability of the individual jurisdictions to provide wet and dry weather monitoring data, follow jurisdictional protocols, obtain jurisdictional support, cooperate together to find solutions, opportunities and methods for change. The inability to achieve objectives is **not** indicative of "program ineffectiveness," but discussion and assessment will be included in the annual reports to the RWQCB; the program is adaptive in nature to accommodate increased knowledge about the linkages between program activities and water quality.

9.d. Data Collection and Reporting

9.d.1 Data Collection

At this time, it is expected that data to support direct measures will be collected mostly through wet and dry weather monitoring both regionally and within each jurisdiction (including coastal). Specific water quality data collection is discussed in Chapter 4 and will be included in the annual reporting.

Data to measure pre-post BMP and/or program implementation will be collected by the best available means, which may include site-specific testing, monitoring data, pollutant loading, or any other means that is available. More specific measures will be developed as the program becomes more defined. Again, because the program evaluation is required to be submitted at the same time that program activities are being developed, some specifics are not known at the time of this writing.

9.b.2 Reporting

The first annual report to the RWQCB will address the following questions:

1. Are the Copermittees able to implement new methods for working together as a watershed group?
2. Are the Copermittees able to implement a community outreach program and provide a mechanism for community participation?
3. Are the Copermittees able to determine the effect, if any, of programmatic activities on water quality?

In addition, the first annual report will address the ability of the Copermittees to implement the various tasks described in each objective and achieve first-year performance indicator; modifications to policies and or tasks as deemed prudent to move closer toward the ultimate Goal of improving water quality.

Thereafter, each annual report will include modifications that have been identified, processes and practices that have been altered as the transition to a Watershed-based approach is realized. The reports will include comments from Copermittee storm water program managers as to the efficacy of the program and its related policies, an assessment of the ability to develop linkages between activities and water quality impacts, and any other relevant information that is deemed necessary and helpful to the RWQCB, other Watersheds, and other Copermittees to share information to drive future development of Water Quality Permits, program requirements, and practices.