

# TECHNICAL ANALYSIS & PLAN PERFORMANCE



*Photo by Greg Filbrandt*

## 8. TECHNICAL ANALYSIS

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### & PLAN PERFORMANCE

**STATE IRWM REQUIREMENTS: I. Technical Analysis & Plan Performance.** Include a discussion of data, technical methods, and analyses used in development of the Plan. Include a discussion of measures that will be used to evaluate Project/Plan performance, monitoring systems that will be used to gather performance data, and mechanisms to adapt project operations and Plan implementation based on performance data collected.

#### 8-1 ICWMP DEVELOPMENT



The key goals in development of the Tomales Bay ICWMP are:

- Review and assess water supply and operations demands and needs within the planning area's critical coastal areas, and develop information necessary for integration into an Integrated Coastal Watershed Management Plan.
- Identify mutually agreeable solutions to address issues including water supply, water quality, flood control, and ecosystem and habitat concerns.
- Develop narrative describing the background, existing data, and identification of data gaps/needs for ASBS and CCAs.
- Develop an ICWMP that addresses impacts on ASBS and CCA sites in the region.
- Evaluate municipal stormwater management networks and assess source area and condition of extensive stormwater facilities.
- Implement a septic outreach and education program and include public discussions regarding the development of maintenance and monitoring programs to identify community-based septic management solutions.

A significant amount of existing data and technical analyses already exist for the Tomales Bay watershed and region, much of which has been included the *Tomales Bay Watershed Stewardship Plan*,

which was used as a starting point for development of the ICWMP. The intent of the ICWMP was: (1) to review, synthesize and summarize existing reports, plans and data into one planning document, including incorporation of more information about water supply (which had been addressed only indirectly in the Stewardship Plan); and (2) to use the ICWMP plan development process to facilitate identification of a) data gaps, local resource management concerns, projects and other avenues to address those concerns; and b) opportunities for collaboration for funding and implementation, thus benefiting the long-term health of the Tomales Bay region. It was not the intention to conduct extensive additional data collection or technical analyses as part of ICWMP plan development; however, some additional technical data was developed through the ASBS watershed assessments and stormwater monitoring efforts that were conducted as part of this process.

The development of the Tomales Bay ICWMP was initiated with a review of over 100 technical reports, studies, and agency and regional plans prepared to date in the region. A list of all documents and data reviewed is included in Chapter 15. Upon review of existing data, summary papers were provided to the TBWC and TAC that included a summary of findings, known recommendations, key identified management issues, and data gaps for each of the following topical areas:

- Areas of Special Biological Significance,
- Water Supply,
- Ecosystems, Habitat and Biological Resources,
- Water Quality,
- Onsite Wastewater Management, and
- Stormwater Management.

Through a series of meetings, Technical Advisory Committee members used the information provided through this data review to identify key management issues and local objectives for the Tomales Bay watershed and region (see Chapter 3). The existing programs in the area, known recommendations and data gaps also were used in identifying and defining management strategies. The following subsections describe the data review and technical analyses reviewed and/or conducted as part of the ICWMP.

## TECHNICAL ANALYSES REVIEWED AS PART OF ICWMP DEVELOPMENT

As indicated above, it was the intent of the ICWMP planning effort to bring together in one document the extensive amount of technical analysis already performed in earlier studies and programs in the planning area. New technical analyses were conducted as part of the ASBS and stormwater assessment. The technical analyses and data reviewed or conducted for the ICWMP are summarized below.

Following are examples of existing technical analyses reviewed and summarized for this ICWMP plan; the full listing of documents reviewed and incorporated into the ICWMP planning process are included in Chapter 15. Chapter 2 includes a summary of the findings of many of these studies as part of the description of the region and planning area.

- **Water Quality.** The State's *Watershed Management Initiative* (2004) identifies top priorities related to municipal stormwater/urban runoff, TMDLs, wetlands and stream protection, rural nonpoint source controls, watershed management, watershed monitoring and assessment, groundwater protection and toxics cleanup, NPDES surface water protection, and planning activities, as further described in Chapter 4. The Pathogen and Mercury TMDL reports (2005 and 2006, respectively) cite and summarize water quality monitoring efforts, data and results for these constituents, which led to the development of specific target TMDL levels for pathogens and mercury. In addition, water quality monitoring data has been collected and reported over the years by various entities, including the SFBRWQCB, DHS, USNPS, SPAWN, the County of Marin, and UCCE, which also were reviewed. (See Appendix E for summary.) The *Tomales Bay Watershed Stewardship Plan* provides a thorough review and compilation of water quality monitoring efforts conducted to 2003. Additionally, a number of technical studies related to alternative sewage disposal and sediment reduction were reviewed. The key technical studies related to water quality that were reviewed as part of the development of the ICWMP include:

  - Pathogens in Tomales Bay Watershed TMDL Report, SFBRWQCB, July 2005.
  - TMDL for Mercury in the Walker Creek Watershed Report. SFBRWQCB, November 2006.
  - WATER QUALITY MONITORING STUDIES: National Park Service (November 2001), "Point Reyes National Seashore Water Quality Monitoring Report, May 1999-May 2001"; SPAWN's Lagunitas Creek Watershed Citizen Water Quality Monitoring Program reports for 2004/05 and 2005/06; University of California Tomales Bay Water Quality Project, (December 2004); "Water Quality in the Tomales Bay Watershed: Conflict and Response to On-farm Water Quality Management"; University of California Cooperative Extension studies: "Water Quality in the Tomales Bay Watershed: Conflict and Response to On-farm Water Quality Management" (December 2004) and "Characterizing Freshwater Inflows and Sediment Reservoirs of Fecal Coliforms and E. Coli at Five Estuaries in Northern California" (May 2007);
  - SEDIMENT STUDIES: *Geomorphology of the Walker Creek Watershed* (Prunuske Chatham, Inc., 2005); "Sedimentation from Unpaved Roads in the San-Geronimo sub-Watershed" (SPAWN 2002); *San Geronimo Creek Watershed Sediment Source Sites and Assessment* (Stetson Engineers, 2002); *Lagunitas Creek Sediment and Riparian Management Plan* (Marin Municipal Water District, 1997)
  - San Geronimo Creek Sediment Assessment. Stetson Engineers, March 2002.
  - County of Marin Alternative Sewage Disposal Systems Seventh Annual Performance Review. October 2005
  - Questa Engineering. May 10, 2006. Draft Feasibility Report, East Shore Wastewater Improvement Project (without appendices). Prepared for Marin County community Development Agency Environmental Health Services Division.
- **Water Supply and Groundwater.** Water supply and infrastructure studies were reviewed. SRWCB orders and legal agreements also were reviewed, including SRWCB Order WR95-17 that affects MMWD and NMWD as described in Chapter 2, and historical legal rulings related to BCPUD's imposition of the water moratorium in the early 1970s. Water supply plans included the MMWD's *Urban Water Management Plan* (2006), and supply and facility studies for NMWD and IPUD. Most of the water supply plans included water use and demand projections. These were reviewed and updated as needed, with each of the four water suppliers in the region to develop a 20-year water demand projection to be included in the ICWMP. There is a limited area of State-designated groundwater basins in the Tomales Bay region, and existing information was largely drawn from the California Department of Water

Resources' "California's Groundwater: Bulletin 118. Individual Basin Descriptions" (February 2007).

- **Ecosystem Restoration and Habitat Improvement.** Fishery studies and fish monitoring surveys are among the key technical studies reviewed as part of the ICWMP. The State's 2004 "Recovery Strategy for California Coho Salmon" report sets forth the key management strategies for the Tomales Bay area (see Chapter 2). The "Lagunitas Limiting Factors Analysis, Limiting Factors for Coho Salmon and Steelhead" (Stillwater Sciences, February 2007) was prepared in two phases to help fill information gaps related to the physical and biological factors controlling salmonid population dynamics within the watershed, and preparation of this study was one of the recommendations in CDFG's Coho Recovery Strategy. Fish monitoring is and/or has been conducted by MMWD, SPAWN and PRNS. Existing watershed and County plans provided some information on other terrestrial and aquatic habitats. Wetland and riparian habitat information was found in some of the area watershed plans and data developed as part of the National Park Service's Giacomini Wetland Restoration Project. The key technical studies related to ecosystem restoration and habitat improvement that were reviewed as part of the development of the ICWMP include:
  - CDFG Coho Salmon Recovery Plan (February 2004)
  - "Lagunitas Limiting Factors Analysis, Limiting Factors for Coho Salmon and Steelhead" (Stillwater Sciences, February 2007 and February 2004)
  - Lagunitas Creek Salmon Surveys and Reports (MMWD and SPAWN)
  - Marin County Stream Crossing Inventory and Fish Passage Report (Ross Taylor and Associates, June 2003)
  - SWRCB Order WR95-17
  - TBWC Compilation of Data on Coho Salmon and Steelhead Trout Between 1994 and 2003 (February 2004)
  - The Klamath Resource Information System (KRIS) database that pulls together maps, data tables, charts, photographs and bibliographic resources relevant to fisheries and water quality for designated watershed, which includes Lagunitas and Walker Creeks.

General and project-specific recommendations for habitat improvement are included in:

- CDFG "Recovery Strategy for California Coho Salmon" (2004)
  - TBWC Stewardship Plan (July 2003)
  - Marin County Watershed Management Plan (2004)
  - Walker Creek Watershed Enhancement Plan (2001)
  - Lagunitas Creek Sediment and Riparian Management Plan (1997)
  - Marin Coastal Watersheds Enhancement Project
- **Stormwater and Flood Management.** Technical analyses related to stormwater and flood management are limited. Technical studies related to Flooding and Hydrology that were prepared as part of the Marin Countywide Plan (Clearwater Hydrology and Nichols Berman, November 2005) provided some general background information. The Marin County Stormwater Pollution Prevention Program's (MCSPPP) *Action Plan 2010* and annual reports also were reviewed.
  - **Local Plans.** A number of watershed and resource management plans prepared in the last 10 years provided key data regarding watershed and sub-watershed characteristics, including

habitat, water quality and sedimentation data and issues, as well as specific key management and/or specific project recommendations. The key plans include: *Tomales Bay Watershed Stewardship Plan* (2003), *Marin County Watershed Management* (2004), *Lagunitas Creek Sediment and Riparian Management Plan* (1997), *Walker Creek Watershed Enhancement Plan* (1981), *The Marin Countywide Plan, Public Review Draft* (2005), and Marin County area plans for San Geronimo Valley, Bolinas, Inverness, Point Reyes Station and the coastal zone. As part of the Marin County Countywide Plan Update, a number of technical and background studies were prepared, and the hydrology, flooding and biological resource reports were reviewed as part of the ICWMP preparation.

**TECHNICAL ANALYSES CONDUCTED AS PART OF ICWMP**

The ICWMP planning efforts included additional technical analyses and watershed assessments for the Areas of Special Biological Significance (ASBS) and stormwater quality monitoring and review. The methodologies for each of these data collection efforts are summarized below. The ASBS watershed assessment is included in Appendix K. The stormwater quality monitoring was implemented through the County of Marin Public Works Department, and data management efforts are detailed in Chapter 9. A draft “Stormwater Assessment” that outlines methodologies, results to date and preliminary findings is included in Appendix M.

**ASBS Watershed Assessments**



The watershed assessments conducted for each of the four ASBS areas included field and “desktop” assessments. The assessments addressed the elements outlined in “California’s Critical Coastal Areas NPS Watershed Assessment & Action Plan Outline” (July 23, 2005). Prior to completing the fieldwork, the consultant team reviewed available reports documenting conditions in each of the ASBS watersheds. In addition, available GIS layers were collected to generate field maps and the ASBS watershed boundaries were delineated prior to starting the fieldwork. Available GIS data included aerial photography, land use,

parcel data, ASBS discharge locations, and watershed boundaries.

The objectives of the field assessment were to: (1) investigate and document existing conditions, (2) identify potential impairments to water quality and aquatic life and habitat, and (3) identify potential restoration opportunities and projects within each of the four watershed areas. Three field assessment methods were used: the Unified Stream Assessment (USA), Unified Subwatershed and Site Reconnaissance (USSR), and the Stormwater Retrofit Inventory (SRI). These methods have been modified slightly to include conditions likely to be expected within the ASBS watersheds, specifically stream

access by cattle and trails. The Unified Stream Assessment (USA) is a comprehensive stream walk protocol used to systematically evaluate conditions and identify restoration opportunities within the stream corridor of small watersheds (Center for Watershed Protection, March 2004). The Unified Subwatershed and Site Reconnaissance (USSR) is a rapid field survey to evaluate potential pollution sources and restoration opportunities within urban sub-watersheds (Center for Watershed Protection, February 2005). The Stormwater Retrofit Inventory (SRI) is a method for identifying potential stormwater improvements at existing sites. The methods are further described in Appendix K.

The “desktop assessment” consisted of delineation of the ASBS watersheds with GIS software using the following data resources:

- 10- and 5-foot topographic contour data available from County of Marin
- ASBS resource boundaries available from the State Water Resources Control Board
- 2004 Aerial Photography available from County of Marin
- The Point Reyes National Seashore watershed boundary available from County of Marin

### **Stormwater Quality Monitoring and Analysis**

Under the Tomales Bay Pathogen TMDL, municipal runoff is identified as a potential non-point source pollutants to surface waters, contributing pathogens to the bay. In the unincorporated areas within the Tomales Bay planning area, municipal stormwater runoff management is primarily accomplished through ditches and limited storm drains, but little data exists regarding the condition and performance of these underground facilities. As a supplement to the ICWMP effort, the County documented the location of drainage facilities, including ditches and culvert inlets and outlets in the communities of Bolinas, Woodacre, Point Reyes Station, and Tomales. Stormwater quality monitoring was initiated in the winter of 2007 to determine existing baseline conditions and to help determine if and to what extent contaminants are transported through selected West Marin County community stormwater systems.

Stormwater sampling is being conducted through the stormwater systems in the communities of Point Reyes Station, Woodacre and Tomales. (Locations are shown in the Stormwater Assessment in Appendix M.) Sampling storm –event-based with samples collected during three to four storms, spanning the storm season, per subshed and community. One sample per storm event per sampling location are being collected and submitted for analysis. In addition to storm sampling, samples will be collected from each sample location two to three days following storm event sampling. This base flow sampling will be conducting three to four times across the rainfall season at each sample location that has sufficient streamflow for sampling. (Due to the low rainfall winter season in 2006-2007, only limited sampling was obtained during that period. It is expected that sampling will continue in winter 2007-2008 to provide a full season of data.)

The measured parameters were organized into a group that will be run on every sample and a group that will be selectively studied and in particular requested for early season storm samples or based upon hydrologic pathways and their likelihood to be detected in storm flow. The combination of *E. coli*, MBAS, Nitrate, and Ammonia provide a suite of constituents to assess wastewater delivery and transport to stormwater systems. Total suspended solids and turbidity are constituents for which design specifications of management practices are developed and written. Generating these results

will potentially facilitate comparison of pre- and post-remediation conditions, contributing to the determination of practical effectiveness. The suite of metals, oil and grease, and Total Hydrocarbons will provide an initial assessment of the presence and transport of these contaminants through the studied stormwater networks.

Measurement and collection of field parameter values was in accordance with approved protocols, including those in the State Water Resources Control Board’s Surface Water Ambient Monitoring Program (SWAMP) and the National Park Service’s SFANI&M WQ Program. A Quality Assurance Performance Plan (QAPP) provides the detailed measures to ensure data collection accuracy, precision and repeatability. These are further detailed in Appendix M.

**DATA GAPS**

As a result of the technical reviews, analyses and data collection, a number of key data gaps were identified in existing reports and studies or were identified during preparation of the ICWMP. Generally, these include the following topics (see Appendix H for further details).

- Water quality studies identified in the *Tomales Bay Watershed Stewardship Plan* (see list in Chapter 9), and coordinated water quality sampling among the various entities conducting monitoring, which will in part be facilitated by a recent grant to the TBWC in which this coordination will be initiated. A key action of the TBWC’s Tomales Bay Watershed Stewardship Plan calls for the development of a coordinated and comprehensive water quality monitoring plan for Tomales Bay and tributary streams to document baseline conditions and identify trends for pollutants of concern. Monitoring would provide the information needed to evaluate water quality in the bay and its tributaries, as well as the efficacy of projects to reduce nonpoint sources of pollution, management practices intended to improve water quality, and educational programs. In conjunction with this effort is the need for standard sampling and reporting procedures and a database where data collected by entities can be stored and accessed.
- Water quality sampling and monitoring for ASBS areas.
- Data on baseline conditions and effects of onsite wastewater systems on surface and ground waters with water quality monitoring.
- Groundwater studies.
- Fishery salmonid population and habitat data and studies identified in the Limiting Factors Analysis and development of standard monitoring methods among monitoring agencies and entities.
- Sediment budgets and transport studies, i.e. those identified in the *Tomales Bay Watershed Stewardship Plan*.
- Additional species and habitat surveys, including Tomales Bay east and west shore mapping; other aquatic and terrestrial species assessments; assessments; Pacific flyway;

“Species of Local Interest” (SOLI); mapping of quantity and quality of riparian habitat; monitoring of other special status species; and extent of invasive species.

- Effects of global climate change have not been taken into account in water supply or watershed management studies.

## 8-2 PERFORMANCE EVALUATION MEASURES

Generally, there are two types of performance measures: measures by which ICWMP implementation will be evaluated, and measures applied to individual projects. Performance evaluation criteria were developed for the ICWMP activities discussed above and will be further developed to assess project activities and progressive Plan performance.

### PROJECT PERFORMANCE MEASURES

As described in Chapter 6, Implementation, each project proponent will be responsible for overseeing project implementation, and the TBWC will be responsible for administering the overall program. Each project proponent will be responsible for developing project-specific monitoring systems to evaluate the performance of their projects in terms of meeting the stated project goals and achieving the desired benefits.

In conjunction with the TAC, all project proponents currently are developing project-specific performance measures, and TAC will be reviewing these measures to ensure consistency of approach and methodology for projects. These performance measures will be used in both monitoring project outcomes and progressive refinement of the ICWMP over time. The goal of the effort is to establish a set of performance measures which: 1) are quantifiable wherever possible, 2) allow for ongoing evaluation of the effects of funded projects, 3) enable the development of new projects over time as the successes and problems of implemented projects become known, and 4) allow for the progressive refinement of management strategies and plan objectives.

Results of data developed or collected as part of a specific project will be put into the TBWC’s database so that data is available and can be used to refine other future projects. The TAC currently proposes to use the revised DWR SAB framework (see discussion below).

Project performance data will be brought forward to the TBWC or selected subcommittee on a quarterly basis. The Council or selected subcommittee will assess project monitoring and performance data to determine the degree to which any given project’s implementation contributes toward achievement of the ICWMP objectives. Additional progress and/or performance oversight committees may be established by the TBWC as necessary for certain projects or for groupings of projects (i.e., water supply, water quality, etc.).

It is envisioned that all unfunded projects and their proponents and sponsors would meet as a committee at least twice a year to discuss project implementation status, as well as the monitored

effects of implemented projects. Where relevant, these discussions would lead to project descriptions being further refined for any projects that have not yet been implemented.

## PLAN PERFORMANCE MEASURES

In order to assess effects of plan implementation and the degree to which plan objectives are being met, the TBWC will devise an ongoing performance evaluation process. The TBWC TAC has determined that the development of performance measures will be an interactive process between the stakeholders and the committee, and that performance evaluation will include an annual review that will address both quantitative and qualitative measures.

The TAC has begun the process of identifying possible frameworks to apply to the evaluation of project and plan implementation outcomes. One framework that is under active consideration in the USEPA Ecological Reporting Framework for Monitoring Watershed Health. In 2006, DWR adopted the USEPA Ecological Reporting Framework for Monitoring Watershed Health in California, developed in conjunction with EPA's Science Advisory Board (SAB). This framework relates the goals and objectives of watershed programs and management efforts to ecological conditions. Information from specific measurements is aggregated into indicators which describe the condition of ecosystem characteristics or "Essential Ecological Attributes." These attributes are interdependent and, taken together, describe the condition of an ecosystem. Program goals and objectives can then be evaluated in light of the ecological conditions described by the attributes. From this, specific monitoring measures/benchmarks can be developed for variables requiring field monitoring. This framework provides a scientifically defensible approach for aggregating and assessing a multitude of environmental data, and for evaluating a variety of environmental management goals.

The framework has identified seven Essential Watershed Attributes (or indicators) for use in assessing watershed health and which form the basis for evaluating plan and project performance:

Landscape condition. The extent, composition and pattern or structure of the landscape (an area composed of a mosaic of interacting ecosystems or habitat patches).

Biotic condition. The structure and composition of the biota below the landscape level (i.e., ecosystems or communities, species/populations, individual organisms, and genes).

Chemical and physical characteristics, which include measures of physical parameters and concentrations of chemical substances that are naturally present in the environment.

Ecological processes, defined as the metabolic functions of ecosystems at the ecosystem or landscape level, including energy flow, elemental cycling, and the production, consumption and decomposition of organic matter.

Hydrology/Geomorphology, including characteristics that reflect the dynamic interplay of water flow and landforms.

Natural disturbance regimes, which are discrete and recurrent disturbances that may be physical, chemical, or biological in nature.

Socio-economic condition. A working definition of this seventh attribute and a list of possible indicators have not yet been developed.

Utilizing this framework, specific indicators and measures will be developed to assess ICWMP performance. The overall Plan performance also will be evaluated in terms of achieving or contributing to ICWMP objectives. The evaluation will consider individual projects as well as the cumulative effect of implementation of multiple projects. Some examples of performance criteria and/or indicators (with measurable benchmarks where possible) that will be developed for each local goal and objective are outlined below (see Chapter 3 for complete goals and objectives). It is expected that measurable benchmarks and targets can be developed and utilized in conjunction with existing and future water quality and fish monitoring efforts. The list below is a preliminary outline of the types of criteria that will be used and defined. For each objective, the desired outcome will be defined by indicators or measurable targets, where appropriate, with identification of the methods or monitoring for measurement.

**Water Quality Goal: Ensure water quality in Tomales Bay and tributary streams is sufficient to support natural resources and sustain beneficial uses.**

- Contribution to reduction of pathogens, sediment, mercury and nutrients to impaired waters.
- Contribution to reduction of nonpoint source pollutants in all critical coastal areas.
- Level of contribution to meeting TMDL stated limits.
- Contribution to coordinated water quality monitoring program.
- Improved water quality measurements—i.e., levels of specified constituents are reduced at target locations.

A key objective of this goal is to improve water quality in Tomales Bay and tributary streams through reductions in sediment, pathogens, mercury and nutrient loading, with the specific objectives of protecting all beneficial uses and removing Tomales Bay from the 303(d) list of impaired waterbodies by attaining state and federal water quality standards. A benchmark for success in reducing pathogen levels will be a reduction in shellfish harvest closures by increasing the rainfall threshold and reducing the minimum duration of shellfish harvest closures. Benchmarks for sediment, nutrients and mercury will be developed as regulatory agencies further develop reduction plans for these pollutants.

**Ecosystem Restoration and Habitat Improvement Goal: Restore and preserve the integrity of natural habitats and native communities.**

- Number of improved or restored habitat acres.
- Number of acres of improved habitat or linear feet of improved stream habitat.
- Protection of amount and number of listed species.
- Level of contribution to coho recovery.
- Species population levels.
- Number of acres of non-native vegetation removed.

**Water Supply and Reliability Goal: Support adequate and improved water supplies to meet community needs and to improve reliability, consistent with ecosystem management and state and federal regulations, including aquatic ecosystems and stream geomorphology. Maintain and promote sound water resource management practices. Promote efforts that can provide solutions for balancing instream flow requirements with the needs of domestic, agriculture, and commercial water users, as well as fish and wildlife habitat needs, and that contribute to habitat protection and restoration and the continuation of economic and cultural values in the region.**

- Level of improved treated drinking water.
- Contribution to water use conservation and change in demand.
- Reduction in water supply system vulnerability to natural disasters.

**Stormwater and Flood Management Goal: Promote sound and environmentally sensitive stormwater and flood management programs and measures.**

- Contribution to floodplain restoration.
- Level of reduction of stormwater peak flows.

**Groundwater Management Goal: Protect groundwater quality and supplies.**

- Number of acres of rangeland with improved practices relative to groundwater infiltration.
- Quality and amount of data relative to groundwater resources, e.g., impacts of salinity on groundwater wells, impacts of impervious surfaces and increased groundwater pumping on creeks; reduced groundwater contamination due to onsite wastewater disposal systems.

Water quality and fish monitoring are examples of monitoring efforts that will play a key role in determining progress relative to attaining resource goals and objectives. The TBWC was recently awarded a grant to develop comprehensive water quality data collection and analysis that would include coordination with other ongoing monitoring efforts. In addition, land use practices and other human influences on tributaries to the bay, uplands, riparian corridors, wetlands and along the bay shores will be monitored and evaluated. Voluntary landowner monitoring will provide important information about the effectiveness of projects on private lands. Together, these monitoring activities will provide the framework for adaptive management, which will increase the effectiveness of actions taken to improve water quality.

### **8-3 ADAPTIVE MANAGEMENT**

As project and plan performance evaluations are completed, and additional monitoring information and other data become available, the performance evaluation criteria and processes will be modified to reflect changing conditions and the outcomes of project and ICWMP implementation. This will also help inform the development and selection of future priority projects. In addition, project performance will be assessed periodically with respect to established performance measures.