

## Chapter 8 Measuring Performance and Success



As the Laguna Creek Watershed Management Action Plan is implemented, it will be critical to monitor the various attributes or “indicators” of the watershed to determine the system response, measure the overall performance and success of the actions, and modify the actions and approach as necessary. This chapter describes the watershed indicators and targets, monitoring and reporting, and project tracking and Plan updating process that is integral to the adaptive management component (i.e., the learning cycle) of the Laguna Creek Watershed Management Action Plan.

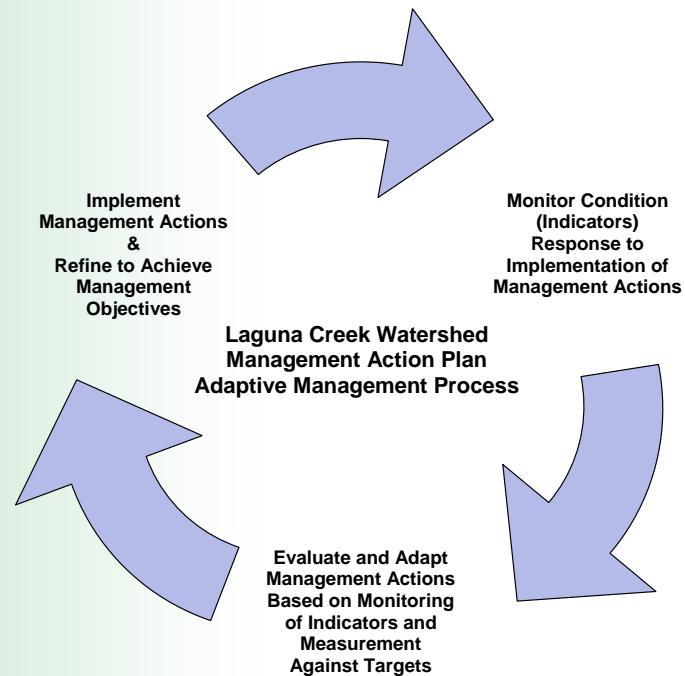
### **8.1 Adaptive Management Process**

Uncertainty is an unavoidable component of managing natural systems and implementing projects. Adaptive management was introduced as an approach and process that incorporates monitoring, research, and evaluation to allow projects and activities, including watershed management actions, to go forward in the face of some uncertainty regarding consequences (Holling 1978; Walters 1986; Shilling et al. 2005). Adaptive management is typically presented as a stepwise framework composed of actions that are evaluated periodically, with subsequent management decisions and actions implemented to achieve the objectives. An adaptive



management program encourages and includes stakeholder participation and recognizes that science, management, and stakeholder coordination are essential to the overall accomplishment of watershed protection objectives. General features of adaptive management are:

- selecting indicators for each of the watershed protection objectives;
- setting measurable or observable targets or criteria (numerical or descriptive) for the indicators;
- monitoring the indicators;
- documenting and tracking management practices;
- using monitoring results to evaluate management actions and report on achieving progress toward targets for each indicator (i.e., indicator report); and



- revising management actions, as necessary, to achieve objectives in response to monitoring and evaluation of indicators.

## 8.2 Watershed Indicators, Targets, and Monitoring

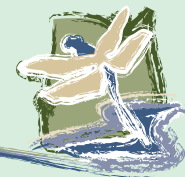
### Indicators and Targets

Watershed indicators are developed for management plans to provide a clear metric or measure that can be monitored to determine if watershed objectives are being met. Performance criteria or “targets” are assigned for each indicator to evaluate monitoring results against and determine if an action was successful at achieving the stated objective. A total of 17 indicators and associated targets have been developed for the purpose of measuring the success (i.e., achieving objectives) of the Laguna Creek Watershed Management Action Plan. These indicators and associated targets were developed to be consistent with the Laguna Creek Watershed Grant Project’s *Project Assessment and Evaluation Plan* (PAEP), which outlined how the scope of the grant project was developed to achieve CALFED Bay-Delta Program and the State and Regional Water Board goals and priorities (Brown 2005). The Laguna Creek watershed indicators and targets are presented in Table 8-1.

### Monitoring

Adaptive management decisions rely on an effective monitoring system. The goals for the Laguna Creek watershed monitoring programs are to:

- ensure logistical feasibility;
- embrace citizen-based monitoring;



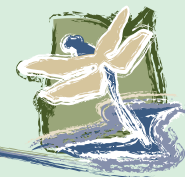
**Table 8-1  
Laguna Creek Watershed Objectives, Indicators, Targets, and Monitoring Procedures**

Watershed Objectives	Indicators	Targets	Monitoring Procedures/Responsibilities
Flood Control	Floodwater conveyance	Adequate floodwater conveyance capacity and flood protection for surrounding communities	Periodic reviews to ensure that flood protection standards are being met – LCWC, appropriate jurisdictional agencies
	Channel maintenance	Reduced long-term maintenance requirements	Periodic reviews to determine if pro-active program planning results in reduced maintenance requirements – LCWC, appropriate jurisdictional agencies
Water quality	Nutrients and contaminants	Reduced concentrations over time; meet standards and objectives identified in Basin Plan	Water quality monitoring throughout the watershed (see Appendix G) – LCWC, Sacramento Stormwater Quality Partnership, Sacramento Regional County Sanitation District, volunteer monitors
	Temperature	Reduced water temperatures	Water quality monitoring throughout the watershed – LCWC, Sacramento Stormwater Quality Partnership, Sacramento Regional County Sanitation District, volunteer monitors
	Dissolved oxygen	Increased dissolved oxygen concentrations	Water quality monitoring throughout the watershed – LCWC, Sacramento Stormwater Quality Partnership, Sacramento Regional County Sanitation District, volunteer monitors
Habitat	Sensitive habitats	Increased protection of sensitive habitats (e.g., vernal pools, riparian forest, wetlands, etc.)	Periodic review and GIS-based tracking of new development planning and implementation, conservation easement establishment, open space dedication, etc. – LCWC, jurisdictional agencies
	Habitat connectivity	Improve habitat connectivity throughout watershed (i.e., increased corridors and contiguous areas)	Periodic review and GIS-based tracking of new development planning and implementation, conservation easement establishment, open space dedication, etc. – LCWC, jurisdictional agencies
	Biological diversity	Increase diversity and abundance of native plants, wildlife, and fish	Periodic review and GIS-based tracking of California Department of Fish and Game, California Natural Diversity Database, California Native Plant Society Database, and periodic field surveys – LCWC, volunteers, jurisdictional agencies, others
	Invasive weeds	Reduced invasive weeds throughout watershed	Periodic review and GIS-based tracking of weed removal and management projects and areas with new introduction/colonization – LCWC, volunteers, jurisdictional agencies, others



**Table 8-1  
Laguna Creek Watershed Objectives, Indicators, Targets, and Monitoring Procedures**

Watershed Objectives	Indicators	Targets	Monitoring Procedures/Responsibilities
Ecosystem processes	Floodplain connectivity	Increased floodplain connectivity (relatively frequent inundation and overbanking events (e.g., 2-5 year reoccurrence interval))	Periodic review and tracking of stormwater management implementation (new developments and retrofits), use of BMPs, LID techniques, flow controls – LCWC, jurisdictional agencies
	Native plant recruitment	Increased natural recruitment of native plant species (e.g., riparian recruitment)	Periodic review and GIS-based tracking of native plant recruitment along the creek corridor – LCWC, volunteers, jurisdictional agencies, others
	Bioassessment metrics	Positive trend in physical, chemical, and biological metrics compared to baseline and similar creek in the region	Bioassessment monitoring throughout the watershed – LCWC, Sacramento Stormwater Quality Partnership, Sacramento Regional County Sanitation District, volunteer monitors
Recreation	Trails	Increased trail network with improved connectivity	Periodic review and GIS-based tracking of corridor establishment, trail planning, and implementation – LCWC, jurisdictional agencies, Sacramento Valley Conservancy, others
	Open space	Increased open space areas available for passive outdoor recreation (e.g., wildlife viewing, photography, etc.)	Periodic review and GIS-based tracking of conservation easement establishment, open space dedication, etc. – LCWC, jurisdictional agencies, Sacramento Valley Conservancy, others
Environmental stewardship	Stewardship activities	Increased activities for watershed volunteers	Periodic review and tracking of stewardship activity implementation – LCWC, Parks Districts, volunteers
	Education programs	Increased educational programs for the watershed community	Periodic review and tracking of program implementation – LCWC, EGUSD
	Interpretive displays / programs	Increased interpretive displays and programs throughout the watershed	Periodic review and tracking of interpretive display installation and program implementation – LCWC, Parks Districts, others



- maximize efficiency in observation, measurement, and learning;
- fill knowledge and data gaps;
- provide information sufficient to support adaptive management decisions; and
- summarize and interpret what has been learned in a appropriate manner that is responsive to management needs and supports future use of the information.

To fulfill these goals, the Laguna Creek Watershed Council will coordinate with participating individuals and organizations to ensure that project- and watershed-wide monitoring plans include descriptions of:

- indicators to be monitored,
- protocols for monitoring the indicators, and
- content and frequency of reports summarizing monitoring information.

Table 8-1 describes proposed monitoring efforts for the Laguna Creek Watershed. While procedures for monitoring each of the indicators are outlined below, the Plan allows flexibility for potential future monitoring conducted by participating volunteers and others (e.g., local organizations and agencies).

### 8.3 Project Tracking and Reporting

Documenting and tracking management actions and reporting on monitoring results are critical components of the adaptive management and monitoring framework. Together, these efforts will provide feedback regarding the success of the overall watershed protection and stewardship effort. An evaluation and review of the achievement of the objectives of the Plan should be prepared every 5 years following the date of completion of the Plan. This effort should be conducted in the form of an “indicator report.” The indicator report should be developed to clearly document actions and describe the status (i.e., health) of

Laguna Creek Watershed and watershed protection efforts (through the evaluation of the indicators) and should, at a minimum, include:

- documentation or tracking of the implementation and/or completion of the recommended actions contained in the Plan;
- fiscal evaluation of the Plan (e.g., funding of individual actions, etc.);
- evaluation of the effectiveness of the Watershed Council’s coordination efforts with local governments, other property management and regulatory agencies, and private landowners in the watershed;
- evaluation of the achievement of the objectives through the evaluation of the indicators;
- notation of important new scientific or policy-related information that has bearing on the management of resources in the watershed; and
- recommendations for updates to the Plan to incorporate new information and improve its effectiveness.

The indicator report should be submitted to the Watershed Council and current stakeholder group for review and comment, then should be approved by the Council. The indicator report should serve as a basis for minor updates of this Plan and appropriate adjustment to ongoing stewardship practices.

Information on indicators and example indicator reports can be found at:

- California Watershed Assessment Manual and Guide: <http://cwam.ucdavis.edu/>
- EPA Environmental Indicators Gateway: <http://www.epa.gov/indicators/>
- Pollution Scorecard: <http://www.scorecard.org/env-releases/water/iwi-report-descriptions.tcl>



*Assessments of aquatic macroinvertebrate communities, also referred to as bioassessments, are a tool for aquatic ecosystem monitoring.*

- San Joaquin River:  
<http://www.sfei.org/watersheds/reports/556indicators-report-finalFINAL.pdf>
- Santa Clara Valley Water District:  
[http://www.svep.org/2004/Dev\\_Watershed\\_Indicators.pdf](http://www.svep.org/2004/Dev_Watershed_Indicators.pdf)
- Chesapeake Bay:  
<http://www.chesapeakebay.net>
- Inland Bays:  
[http://www.inlandbays.org/cib\\_pm/comments.php?id=370170C](http://www.inlandbays.org/cib_pm/comments.php?id=370170C)

#### 8.4 Future Updates to the Plan

All planning documents eventually become dated and require updates so that they can continue to provide practical direction for watershed stewardship activities. A common and unfortunate situation is that the update of planning documents is often neglected due to budgetary or personnel constraints, waning stakeholder involvement, or other reasons. To address this problem, this section incorporates a suggested hierarchy of update procedures in which the level of process and required involvement is proportionate to the level of change that is proposed.

This plan reflects the best information available during the planning process, but it is understood that new information will become available over time and adjustments will be required to keep this plan “living” and current. Such new information may include:

- feedback generated by adaptive management in the Laguna Creek Watershed,
- other scientific research that directs improved techniques of resource management,
- documented threats to fish and wildlife species and their habitats,

- future development in the Watershed,
- management and expansion of infrastructure in the watershed (e.g., roads, sewer collector lines), or
- new legislative or policy direction.

When the new information dictates a change to this plan, it is important that there is an appropriate process established. Public outreach and input will be necessary in proportion to the proposed policy change established by this Plan, and unless a reasonable and clear update process exists, this Plan could become outdated and irrelevant. If the appropriate procedure for a particular, proposed update is not apparent, the determination of which of the following procedures to use shall be made by the Watershed Council.

#### Minor Updates

A process is required to accommodate minor updates to this plan. Minor updates may include the adoption of limited changes to the recommended policies and/or actions through adaptive management, based on other scientific information, or local policy/legislative direction. This procedure will be applicable to updates that meet the following criteria:

- no change is proposed to the overall purposes and/or objectives of this Plan,
- appropriate consultation occurs within the Watershed Council,
- appropriate consultation with other stakeholders occurs, and
- an informational presentation regarding the proposed update is made to the current stakeholder group.

The minor update may be prepared by the Watershed Coordinator and requires approval by the Watershed Council. The minor update could be attached to the plan as an addendum or documented in the regular indicator reports.



## Major Updates

A major update or a new Plan requires a procedure comparable to the initial Plan development process, but also proportionate to the level of recommended change that is proposed. This procedure will be applicable to updates that meet the following criteria:

- substantial update and/or a new policy direction is proposed to this Plan or the development of a completely new plan is proposed,
- appropriate consultation occurs throughout the Watershed Council,
- appropriate coordination and consultation with current stakeholders occurs,
- a stakeholder/public outreach program is conducted that is proportional to the level of the proposed update, and
- an information presentation regarding the proposed update or plan is made to the current stakeholder group and Watershed Council.

The major update or new Plan may be prepared using grant funding or other resources that may be available. The major update or new Plan requires approval by the Watershed Council. If the appropriate procedure for a particular, proposed update is not apparent, the determination of which of these procedures to use shall be made by the Watershed Council.

## 8.5 Bibliography

Holling, C.S. 1978. *Adaptive Environmental Assessment and Management*. Sponsored by the United Nations Environmental Program: International Institute for Applied Systems Analysis, Chichester, NY.

Brown. 2005. *2005-2008 Project Assessment and Evaluation Plan [for the Laguna Creek Watershed Grant Project]*. Prepared by CKB Environmental Consulting, Inc. for the Laguna Creek Watershed Council. Grant Agreement 04-177-555-0.

Shilling, F., S. Sommarstrom, R. Kattelmann, B. Washburn, J. Florsheim, and R. Henly. 2005 (May). *California Watershed Assessment Manual*. Prepared for the California Resources Agency and the California Bay-Delta Authority (<http://cwam.ucdavis.edu>).

Walters, C. 1986. *Adaptive Management of Renewable Resources*. Macmillan Press. New York, NY.