

CHAPTER 6. MONITORING

Key Points

- There are several different types of monitoring, including implementation monitoring, upslope effectiveness monitoring, instream effectiveness monitoring, and compliance and trend monitoring.
- Monitoring may be required in conjunction with existing and/or proposed human activities that will likely result in sediment waste discharges or elevated water temperatures.
- Regional Water Board staff shall develop a compliance and trend monitoring plan within one year of the date the Scott River TMDL Action Plan takes effect.
- Monitoring requirements are specifically incorporated into the proposed Memoranda of Understanding with the County of Siskiyou, the U.S. Forest Service, and the U.S. Bureau of Land Management.

The purpose of this chapter is to describe the types of monitoring applicable to the Scott River watershed and describe the monitoring requirements of the Scott River TMDL Action Plan.

6.1 TYPES OF MONITORING

Monitoring can take several different forms, have different objectives, and yet be called, ubiquitously, monitoring. Consistent nomenclature is necessary for clarity. Different types of monitoring are described in this section.

6.1.1 Implementation Monitoring

Implementation monitoring assesses whether activities and control practices were carried out as planned. This type of monitoring can be as simple as photographic documentation, provided that the photographs are adequate to represent and substantiate the implementation of control practices. Implementation monitoring is a cost-effective type of monitoring because its purpose is to demonstrate that sediment control practices were properly installed and operated. On its own, however, implementation monitoring cannot directly link management activities to water quality, as no water quality measurements are made.

6.1.2 Upslope Effectiveness Monitoring

Upslope effectiveness monitoring is intended to determine, by assessing upslope conditions, if control practices are effective at keeping the pollutant from being discharged to a water body. In

other words, it is “. . . used to evaluate whether the specified activities had the desired effect” (Solomon, 1989, as cited in MacDonald, 1991, p. 7). This type of monitoring can be as simple as photographic documentation, provided that the photographs are adequate to represent and substantiate that the control practices are effective.

6.1.3 Instream Effectiveness Monitoring

Instream effectiveness monitoring is intended to determine, by assessing instream conditions, if control practices are effective at keeping the pollutant from being discharged to a water body. In regards to sediment waste discharges, for example, this type of monitoring may involve the use of visual observations, limited instream habitat monitoring of salmonid freshwater habitat parameters, and/or grab samples for turbidity and suspended sediment in the water column. Instream effectiveness monitoring may be conducted upstream and downstream of the discharge point or before, during, and after the implementation of control practices. Development of an instream effectiveness monitoring program is site-specific and may include, where appropriate, partnerships between landowners and state and federal agencies.

6.1.4 Compliance & Trend Monitoring

Compliance and trend monitoring is intended to determine, on a watershed scale, if water quality objectives are being met, if TMDLs are being met, and if beneficial uses are being protected from the adverse effects of one or more pollutants.

Different sources refer to this type of monitoring as either compliance monitoring or trend monitoring. For example, MacDonald et al. (1991) states that compliance monitoring is “. . . the monitoring used to determine whether specified water quality criteria are being met” (p. 7). The California Department of Forestry (CDF) and the Regional Water Boards across the State have developed general water quality monitoring conditions that use trend monitoring for monitoring “typically applied at a watershed scale, focusing on the combined effects of all watershed management activities for multiple years. Examples of Trend Monitoring objectives include . . . [determining] whether Basin Plan water quality standards are achieved and maintained over time” (Fitzgerald, 2004). In reality, monitoring for compliance with water quality objectives, TMDLs, and beneficial uses will produce data that is useful for analyzing trends in water quality. Therefore, Regional Water Board staff call this monitoring requirement “Compliance & Trend Monitoring.”

The extent and degree of compliance monitoring will vary depending on the site, local conditions, land ownership patterns, and the extent of land management activities in an area. In regards to sediment waste discharges, for example, compliance monitoring may involve the use of (1) wet weather turbidity, suspended sediment, and stream flow monitoring using a near-constant reading turbidimeter (sample taken once every fifteen minutes) and suspended sediment grab samples; and (2) salmonid freshwater habitat monitoring.

6.2 MONITORING REQUIREMENTS

6.2.1 General Monitoring Requirements

Each of the above types of monitoring is important for determining the overall success of the TMDL Action Plan in achieving sediment and temperature water quality standards. Therefore, monitoring shall be conducted upon the request of the Regional Water Board's Executive Officer in conjunction with existing and/or proposed human activities that will result or likely result in sediment waste discharges and/or elevated water temperatures within the Scott River watershed. Monitoring may involve implementation, upslope effectiveness, instream effectiveness, and/or compliance and trend monitoring. The authority for such requirements is contained in Section 13267 of the California Water Code, which states that the Regional Water Board may require any discharger, suspected discharger, or future discharger to furnish monitoring program reports.

The Executive Officer will base the decision to require monitoring on site specific conditions, the size and location of the discharger's ownership, and/or the type and intensity of land uses being conducted or proposed by the discharger. The decision will also be based on the control practices selected by the discharger. For example, if a discharger selects proven, established control practices, then instream effectiveness monitoring is less likely to be required. Conversely, if a discharger selects control practices that are not proven and are not known to provide protection against discharges, then there is a higher likelihood that instream effectiveness will be required.

If monitoring is required, the Executive Officer may direct the discharger to develop a monitoring plan and may describe specific monitoring requirements to include in the plan. Such requirements may include:

- parameter(s) to monitor (e.g., turbidity, sediment substrate composition, water temperature, percent shade, etc.);
- procedure (e.g., visual observations, grab samples, near-constant sampling, etc.);
- technique (e.g., sample upstream and downstream of the discharge point, sample before, during, and after the implementation of a control practice, etc.);
- location(s);
- frequency (i.e., how often will a sample be collected);
- duration (i.e., how long will the sampling occur);
- quality control and quality assurance protocols; and/or
- reporting requirements.

Monitoring parameters may include any of the instream or watershed indicators presented in Chapter 2, as appropriate. With all types of monitoring, Regional Water Board staff will provide technical assistance as staff resources allow. Additionally, monitoring data collected by the Regional Water Board or by responsible parties as required by the Executive Officer shall be made publicly available. Where staff resources allow, data and analysis results should be organized and assembled in an easily accessible and understandable manner, perhaps through use of existing databases such as the Klamath Resource Information System.

6.2.2 Compliance and Trend Monitoring Requirements

Compliance and trend monitoring is a valuable and necessary element of any strategy to restore and attain water quality standards. The data gathered from compliance and trend monitoring provides dischargers and the Regional Water Board with the information needed to determine if the requirements of the TMDL Action Plan are improving the quality and quantity of instream salmonid habitat, and thusly, if the TMDL Action Plan as a whole, is effective at achieving water quality objectives, achieving the TMDLs, and protecting the beneficial uses.

In order to gather adequate instream monitoring data and draw valid conclusions, it is necessary for instream monitoring to be well planned for and thought out. Therefore, Regional Water Board staff shall develop a compliance and trend monitoring plan designed to provide feedback on the effectiveness of the TMDL Action Plan. Regional Water Board staff shall complete the monitoring plan within one year from the date the Scott River TMDL Action Plan takes effect.

The compliance and trend monitoring plan should include a detailed description of:

- monitoring goals and objectives,
- the parameters to be monitored,
- monitoring procedures and techniques,
- the locations of trend monitoring stations,
- monitoring frequency and duration,
- quality control and quality assurance protocols,
- benchmark conditions where available,
- data management procedures,
- data and analysis distribution procedures,
- measurable milestones, and
- specific due dates for monitoring and data analysis.

Monitoring parameters may include any of the instream or watershed indicators presented in Chapter 2, as appropriate. Due to the complexity and expense of compliance and trend monitoring, Regional Water Board staff shall attempt to work cooperatively with other agencies and organizations to develop the plan and conduct monitoring. In particular, Regional Water Board staff shall attempt to coordinate efforts with the Scott River Watershed Council (SRWC), the USFS, USFWS, DWR, and any other agencies or organizations already collecting data in the watershed. The SRWC, as described in the Strategic Action Plan (SRWC, 2004), is engaged in a pro-active monitoring effort designed to establish baseline information in the Scott River watershed by describing current conditions both quantitatively and qualitatively so that restoration needs can be identified and projects prioritized. Although the SRWC's objective is different from the compliance and trend monitoring objectives desired by Regional Water Board staff, it is possible to coordinate the two monitoring efforts. For example, where appropriate, the same monitoring sites can be used for both efforts, the same parameters and protocols can be employed, and data may be applicable to both efforts.

The Scott River Watershed Council Monitoring Plan (SRWC, 2004, Appendix M) provides definitions, methods, and protocols for various monitoring efforts. Methodologies have been

established for the monitoring of fish habitat; fish populations; channel conditions through bank stability surveys and channel typing; water temperature; flow; instream sediment levels through V*, McNeil sampling, pebble counts, and turbidity sampling; macroinvertebrate populations; riparian conditions through photo-point monitoring; and restoration project effectiveness through photo-point monitoring. The SRWC also intends to establish and carry out quality assurance and quality control procedures, establish a monitoring database, analyze data, and report on conditions.

6.2.3 Monitoring Requirements Specific to the County of Siskiyou, USFS, and BLM

Monitoring requirements are specifically addressed and incorporated into the proposed Memorandum of Understanding for the County of Siskiyou in regards to county roads (Section 5.1.4), for the USFS (Section 5.1.11), and for the BLM (Section 5.1.12). For each of these entities, the requirements are primarily for implementation monitoring and upslope effectiveness monitoring.

6.2.4 Monitoring Requirements Specific to the Erosion Control Plans and Grazing and Riparian Management Plans

Implementation monitoring and upslope effectiveness monitoring will also likely be required of those landowners/dischargers who are required to develop and implement an Erosion Control Plan (Section 5.1.2) and/or a Grazing and Riparian Management Plan (Section 5.1.13). Implementation and upslope effectiveness monitoring in such instances will generally involve photographic documentation over time (i.e., photo-point monitoring) of sediment discharge sites, riparian vegetation conditions, and/or control practices.