

## 6. SURVEILLANCE AND MONITORING

### 6.1 STATEWIDE MONITORING PROGRAMS

The effectiveness of a water quality control plan cannot be judged without the information supplied by a strong and systematic surveillance and monitoring program. The overall objectives of an adequate water quality surveillance and monitoring program are:

1. To measure achievement of the plan's water quality objectives.
2. To measure effects of water quality changes on beneficial uses.
3. To measure water quality background conditions and long-term trends.
4. To locate and identify sources of water pollution that pose a threat to the environment.
5. To help relate receiving water quality to mass emissions of pollutants by waste dischargers.
6. To provide data for determining waste discharger compliance with permit conditions.
7. To measure waste loads discharged to a receiving water body and identify the limits of their effect as a necessary step in the development of waste load allocations.
8. To provide documentation to support enforcement of permit conditions required of waste dischargers.
9. To provide data needed to carry on the continuing planning process.
10. To measure the effects of water rights decisions on water quality to guide the State Water Board in its responsibility to regulate unappropriated water for the control of quality.
11. To provide a clearinghouse for water quality data gathered by other agencies and private parties cooperating in the program.
12. To report on water quality conditions as required by federal and state regulations or requested by others.

#### 6.1.1 Toxic Substances Monitoring Program

The Toxic Substances Monitoring Program (TSMP) was initiated in 1976 by the State Water Board to provide a uniform statewide approach to the detection and evaluation of toxic substances in organisms found in fresh, estuarine, and marine waters of the State. The California Department of Fish and Game (DFG) carries out the statewide TSMP for the State Water Board under an interagency agreement by collecting and analyzing fish and other aquatic organisms from selected sampling stations. Station selection is based primarily on requests from the regional water boards, but requests from other agencies are also considered. In many instances, the regional water boards request that stations be monitored to meet specific monitoring needs. If no problems are found, or if a problem has been sufficiently studied, that station is dropped to make way for new stations elsewhere. In this way the program can monitor as many locations as possible over time. In addition, a number of stations are sampled on a regular basis to monitor trends or changes in the levels of toxic substances over time.

In the North Coast Region, sampling under TSMP has led to information indicating potential threats to human health and wildlife. Sampling priorities are directed towards areas of immediate concern.

#### 6.1.2 State Mussel Watch Program

The California State Mussel Watch (SMW) Program is a long-term monitoring program administered by the State Water Board. Actual sampling and analysis are performed by the Department of Fish and Game. SMW provides the State Water Board and the six coastal regional water boards with an indication of geographical and temporal (year-to-year) trends in toxic pollutants along the California coast.

Mussels (the common bay mussel, *Mytilus edulis*, and the California mussel, *M. californianus*) have been shown to be efficient bioaccumulators of many toxic substances in their water environment. Further, the sedentary nature of mussels, whether native or transplanted, permits a time integrated sampling of toxic pollutants at one location. The merits of employing mussels as water quality indicators are well established

in the scientific literature, previous SMW reports, and other scientific publications. The North Coast Region will continue to participate in existing SMW monitoring and the development of freshwater applications.

The North Coast Region has been involved in developing freshwater applications of SMW methodology, using freshwater clams, *Corbicula sp.* The North Coast Region has required that some discharges be monitored using these techniques. There are current plans to expand the use of these organisms as indicators in sensitive areas.

In the North Coast Region sampling under the SMW program has led to the detection and mitigation of controllable releases of toxic substances. Sampling priorities are directed toward areas of immediate concern.

### **6.1.3 Bay Protection and Toxic Cleanup Program**

The Bay Protection and Toxic Cleanup Program (BPTCP) is a statewide program for the investigation of coastal waters. Specific goals of the BPTCP include: (1) protection of existing and future beneficial uses of bay and estuarine waters; (2) identification and characterization of toxic hot spots; (3) planning for the prevention of further pollution and the remediation of existing hot spots; and (4) development and maintenance of a comprehensive information source (database) to provide for future assessment and regulatory efforts, accessible public information, and to facilitate management decisions.

In the North Coast Region, monitoring under BPTCP is directed toward areas of known or potential contamination.

### **6.1.4 Water Quality Assessment**

The Water Quality Assessment (WQA) is a catalog of the state's water bodies and their water quality condition. The WQA identifies the water quality condition as good, intermediate, impaired, or unknown. The data used to categorize water bodies in the WQA are obtained from the various monitoring programs described in this section. All regional water boards adopt their regional WQA at public meetings and submit them to the State Water Board for inclusion in the state WQA. In addition, for impaired and high priority waters, fact sheets are prepared to provide additional detail. The State Water Board intends the WQA to be updated on a regular basis, generally every two years.

The WQA serves many different purposes. The WQA, a public document, reports the condition of the state's water bodies in a summary format. The lists of impaired water bodies included in the WQA satisfy several Clean Water Act listing requirements.

### **6.1.5 Water Quality Inventory**

The 305(b) Report, also known as the National Water Quality Inventory Report, is a summary of all states' water quality reports compiled by the U.S. Environmental Protection Agency. The report is prepared biennially from information the states are required to submit pursuant to Section 305(b)(1) of the Clean Water Act.

The State Water Board prepares the state report using information taken from the WQA. The state 305(b) Report includes: (a) a description of the water quality of major navigable waters in the state during the preceding years; (b) an analysis of the extent to which significant navigable waters provide for the protection and propagation of a balanced population of shellfish, fish, and wildlife, and allow recreational activities in and on the water; (c) an analysis of the extent to which elimination of the discharge of pollutants has been achieved; and (d) an estimate of the environmental impact, the economic and social costs necessary to achieve the "no pollutant discharge" objective of the CWA, the economic and social benefits of such achievement, and the date of such achievement; and (e) a description of the nature and extent of nonpoint sources of pollutants and recommendations as to the programs which must be taken to control them, with estimates of cost.

### **6.1.6 Inland Surface Waters Toxicity Testing Program**

This program was started in 1990, the most recent program to be initiated by the State Water Board. The goal of the program is to evaluate the extent, magnitude, nature, and sources of toxicity in surface waters.

Emphasis is on those waters where toxicity is associated with unregulated discharges such as runoff from agriculture, mining, or urban areas. As part of this program a toxicity testing facility at the University of California, Davis, was established to conduct State and Regional Water Board studies. The Regional Water Board performs the sampling of the water bodies in the Region and supplies the testing facility with the samples.

The toxicity testing measures the combined effects of toxicants in the water and is not used to separate and identify a specific toxic substance. Toxicity is determined by using water column samples from a waterbody under lab conditions. Appropriate test organisms are observed for their response by using growth, reproduction, or mortality as indicators in both acute and chronic tests.

### **6.2 REGIONAL MONITORING PROGRAMS**

#### **6.2.1 Surface Water Monitoring**

The Surface Water Monitoring Network was a program of surface water monitoring at selected locations throughout the Region. It included analyses for physical, chemical, and biological parameters such as minerals, heavy metals, turbidity, coliform bacteria, phytoplankton, zooplankton, and biochemical oxygen demand. The results of the sampling provided the basis for data summaries and baseline information which was coordinated by the State Water Resources Control Board to comply with federal regulations.

The State Water Board and the Monitoring Coordinating Committee (MCC) have discontinued the Surface Water Monitoring Network as a formal program. However, the North Coast Region is committed to the development of a comprehensive and rigorous surface water monitoring program, concentrating especially on investigations and monitoring of water bodies with important or threatened beneficial uses, and where data is not sufficient for sound regulatory decision making.

#### **6.2.2 Discharger Self-Monitoring**

All self-monitoring information generated as a result of National Pollutant Discharge Elimination System (NPDES) permits and waste discharge requirements is collected and screened for overall assessment of operations and instances of compliance and noncompliance. Self-monitoring reports are submitted by the discharger as required by the permit conditions.

#### **6.2.3 Compliance Monitoring**

Compliance monitoring is carried out by the Regional Water Board staff to check the discharger self-monitoring work and to provide data for enforcement actions. Its scope depends on the number and complexity of waste discharge requirements (NPDES and other permits) issued by the Regional Water Board. Waste discharge requirements may or may not include specific discharger self-monitoring and reporting requirements. Each discharger is periodically visited by Regional Water Board personnel on both announced and unannounced "facility inspections". The intent of announced visits is to work with the discharger through personal contact and communication to review his procedures in order to assure quality control. The intent of the unannounced inspections is to survey the operation, inspect the waste facilities, discharge area, and collect check or reference samples.

#### **6.2.4 Complaint Investigations**

Complaint investigations are carried out by Regional Water Board staff in response to complaints of citizens and public or governmental agencies regarding the discharge of pollutants or creation of nuisance conditions. Regional Water Board responsibilities may include field and telephone investigations, documentation of observed conditions (reports, letters, photographs), and enforcement actions as appropriate.

#### **6.2.5 Special Studies/Intensive Surveys**

Special studies and intensive surveys are usually performed to obtain detailed information about a specific water quality problem. They usually involve localized, intermittent sampling at a higher than normal frequency. Special situations requiring intensive monitoring range from studies of industrial discharges to watershed-wide inventories to characterize water quality conditions. Special studies and intensive surveys

are conducted on an as-needed basis and often involve coordination with other regulatory and governmental agencies.

### **6.2.6 Aerial Surveillance**

Aerial surveillance is used primarily to gather photographic records of discharges and water quality conditions. Aerial surveillance is particularly effective because of the overall view of a watershed or facility that is obtained and because many facilities can be observed in a short period of time.

### **6.2.7 Water Quality Models**

Water quality models are useful tools to:

- provide a framework for organizing knowledge about a water body;
- reveal gaps in the knowledge and data on a water body;
- formulate baseline and trend monitoring programs;
- simulate water quality changes in response to point and nonpoint discharges to receiving waters; and
- assess potential conformance to proposed and existing water quality objectives.

Water quality models currently available to the staff of the North Coast Region include: a Water Quality Model for the Russian River, prepared by the Center for Environmental and Water Resources Engineering, Department of Civil Engineering, University of California, Davis, and; a Santa Rosa Plains Ground Water Model, prepared by the California Department of Water Resources.

### **6.2.8 Groundwater Monitoring**

Regional Water Board staff investigate the quality of groundwater in response to complaints, as a part of the Well Investigation Program, and through other specifically-funded groundwater quality investigations.

Most of the groundwater investigations in the Region are performed by dischargers, by order of the Regional Water Board. This type of discharger-funded groundwater investigation falls within discharger self-monitoring addressed earlier in this section.

Groundwater has been impaired at various locations regionwide particularly as a result of agricultural, industrial, and commercial chemical handling, storage, and disposal practices. Particular problems are known to exist in several groundwater basins within the Region, including the Santa Rosa Plains, Smith River Plain, and Eureka Plain. Monitoring contract funds have been requested in recent years for the acquisition of data with which to more effectively understand and address the impairment of these and other groundwater basins. Very little funding has been available for this purpose, and data is suggestive of more extensive problems. Further groundwater data will continue to be sought by the North Coast Region through all avenues to address problems resulting from contamination by pesticides, nitrates, solvents, fuel, and other chemicals.

### **6.2.9 Nonpoint Source Investigations**

Nonpoint source investigations are conducted on an as-needed basis and as funding allows. Typical sources of funding include Clean Water Act 205(j), 208, and 319(h) funds. The objectives of nonpoint source investigations are to identify the location(s) of the nonpoint source pollutant sources; develop information on the quantity, strength, character and variability of nonpoint source pollutants; evaluate the impact on receiving water quality and biota; provide information useful in management of nonpoint source pollutants; and to monitor the results of any control plan. Investigations are typically undertaken on a statewide priority basis.

### **6.2.10 Laboratory Support and Quality Assurance**

In response to federal requirements, the State Water Board has developed a Quality Assurance Program to ensure that data generated from environmental measurement studies are technically sound and legally

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defensible. The State Water Board Quality Assurance Program Plan (QAPP) summarizes procedures to be followed by the State Water Board and Regional Water Boards in administering state and federally funded programs that involve measurement of environmental parameters. The QAPP applies to special water quality studies involving surface, ground, or marine waters, State Mussel Watch Program, State Toxic Substances Monitoring Program, as well as to surveillance and compliance monitoring of discharges.

Dischargers must use laboratories approved by the Regional Water Board's Executive Officer and/or certified by the State Department of Health Services. The Regional Water Board's contract laboratories have approved quality assurance/quality control programs, and Regional Water Board staff follow a standard chain of custody process in the collection, transport, and handling of samples.

The methods employed for sample collection, handling, preservation, transport, analysis, and results reporting must be such that the results of the analyzed sample accurately represent the conditions in the sampled water body. Federal regulations require the establishment of criteria and standard methods to assure that quality is maintained throughout the work from sample collection to reporting of the results.

Briefly, these regulations require that (a) physical and professional capabilities be adequate to perform the analysis for all parameters in the sampling plan; (b) sample collection, handling, and preservation be conducted according to U.S. EPA manuals; (c) time-sensitive samples be transported and analyzed within specific holding times; (d) sample integrity be provided for a legal chain of custody of samples collected for support of enforcement actions; (e) analytical methods be in accordance with standardized methods; and (f) analytical quality control procedures be established for intra-laboratory checking of reference samples. Laboratory records including reference sample results, are to be available for U.S. EPA review.