

## SECTION 1

### STATE AND FEDERAL LAWS, REGULATIONS, AND PROGRAMS AFFECTING WATER QUALITY

#### REVIEW AND ANALYSIS OF IMPLICATIONS FOR REGIONAL PLANNING

##### INTRODUCTION

The purpose of this section of the SEAGO Water Quality Management Plan (WQMP) is to describe briefly the state and federal rules and regulations that impact on water quality. There are four major federal laws and resulting regulations and programs that have an impact on water quality planning: the 1972 Clean Water Act (CWA) with major amendments in 1987, which focuses primarily on protection of surface water; the Safe Drinking Water Act (SDWA) as amended in 1986 with a focus on protection of public drinking water supplies; the 1980 Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) which provides for response to releases of hazardous substances; and, the 1976 Resource Conservation and Recovery Act (RCRA), along with the Hazardous and Solid Waste Amendments of 1984, which regulate hazardous and non-hazardous solid waste. Two Arizona laws, the Groundwater Management Act (GMA) of 1980 and the Environmental Quality Act (EQA) of 1986, along with the federal laws, form the basis for state water quality management programs.

##### **MAJOR FEDERAL WATER QUALITY MANAGEMENT LAWS**

###### **Clean Water Act (33 USCA 1251)**

The objective of the Clean Water Act (CWA) is to restore and maintain the chemical, physical and biological integrity of the Nation's waters. It requires that states establish water quality standards as goals to be achieved for navigable waters. Standard setting involves two steps: designating uses to be protected and determining the water quality level (criteria) needed to support those uses.

In order to protect quality and designated uses of navigable waters, the Act makes discharge of pollutants unlawful unless it is permitted under the CWA. Provision is made for establishing effluent limitations based on (1) available technology and (2) water quality criteria for the waters into which the effluent is discharged.

The **National Pollutant Discharge Elimination System (NPDES)** program is established to issue permits which apply effluent limitations to ensure compliance with established navigable water quality standards. The CWA also prohibits disposal of sewage sludge except in accordance with a NPDES permit and requires the EPA to develop regulations and provide guidelines for sludge disposal. In Arizona, the NPDES program is administered by the EPA in cooperation with the state. Before a permit may be issued, the state must certify, under Section 401 of the CWA, that the discharge will not result in violation of Arizona's water quality standards or other requirements.

The NPDES program deals with discharge of wastewater into surface waters. To protect waters from pollution associated with discharge of other materials, the CWA established a permit program under Section 404 for discharge of dredged or fill material into navigable waters. This program is administered by the U.S. Army Corps of Engineers. As with the NPDES program, states must certify that permitted discharges will not result in violations of water quality standards.

Initial emphasis in implementation of the CWA was on the development of controls and wastewater treatment facilities necessary to prevent discharge of pollutants to surface water. It provided for planning and funding of construction for publicly owned treatment works in addition to regulatory programs.

Amendments to the CWA in 1987 changed the focus of the Act. Major changes included a high priority on control of toxic pollutants, provisions for regulating storm water runoff through the NPDES program, and programs to control nonpoint source pollution. In addition, the federal grant program for funding construction of publicly owned wastewater treatment facilities was phased out, to be replaced by a revolving loan program at the state level.

The 1987 amendments to the CWA expanded the NPDES program to include municipal and industrial stormwater discharge. Implementation of the stormwater requirements is to begin with industrial activities and municipal systems serving populations greater than 100,000.

A new section (319) was added which requires states to develop nonpoint source management programs which identify waters which cannot be expected to meet water quality standards without additional action to control nonpoint source pollution, identify nonpoint source categories contributing to that pollution, and define processes for identifying control measures. This section also establishes a grant program for implementation of management programs.

The CWA as amended places increased emphasis on control of toxic pollutants, with requirements for development of water quality criteria for toxics. States are also required to identify waters which cannot reasonably be expected to meet water quality standards due to toxic pollutants, even after application of technology based controls. For each of these, states must identify responsible point sources and develop individual control strategies to reduce discharge of toxic pollutants within three years.

The CWA requires each state to prepare a biennial report which describes the quality of its navigable waters and analyzes the extent to which it protects wildlife and recreational use and the extent to which pollutant discharge limits have been achieved. This report describes nonpoint sources of pollution and makes recommendations for control of those sources. If point source discharges, with effluent limitations, interfere with attainment of water quality to assure protected uses, control strategies are to be established.

The CWA also provides for water quality management planning. Section 208 provides for development of areawide waste treatment management plans and for designation of waste treatment management agencies to implement portions of those plans. Plans developed under this section are also to include a process for identification of certain nonpoint sources of pollution. Section 303 requires states to have a continuing planning process for water quality management.

### **Safe Drinking Water Act (42 USC, 300f)**

The purpose of the Safe Drinking Water Act (SDWA) is to ensure that drinking water supplied to the public is safe and wholesome. Federal regulations promulgated under the SDWA establish goals and standards for all drinking water supplied to the public: Maximum Contaminant Level (MCL) goals, MCLs and secondary MCLs. The MCL goal is the level of contamination associated with no adverse health effects, and is a goal, not an enforceable standard. The MCL is an enforceable standard which is based on the MCL goal but which also takes costs and technologies into consideration. Secondary MCLs are guidelines only, related to the aesthetic quality of water (taste, odor, and color). Primary standards may also include treatment technique requirements for contaminants which are difficult or costly to measure. Instead of setting MCLs, the EPA may require specific water treatment practices such as filtration or corrosion control to prevent health problems.

Amendments to the SDWA in 1986 increased EPA and state drinking water program responsibilities, requiring development of standards for additional contaminants including Volatile Organic Compounds (VOCs), stringent filtration and disinfection requirements, and increased monitoring. The 1986 amendments also prohibit use of lead pipes, solder or flux in any public water system or plumbing in any facility connected to a public water system. The SDWA also provides for protection of underground sources of drinking water through state underground injection control programs, sole source aquifer designation, and wellhead protection program requirements.

ADEQ is responsible for enforcing the SDWA in Arizona and is required to adopt and enforce drinking water standards and rules that are at least as stringent as those adopted by the EPA. Drinking water suppliers are responsible for implementing standards, and meeting monitoring and reporting requirements. Suppliers are also responsible for notifying the public in the event that standards are violated.

### **Resource Conservation and Recovery Act (42 USC, 6901)**

The purpose of the Resource Conservation and Recovery Act of 1976 (RCRA) is to regulate hazardous and solid waste. Under Subtitle D, which deals with non-hazardous solid waste, the EPA developed solid waste management criteria which were the minimum criteria to be met by the states in their programs. New federal regulations for solid waste disposal facility criteria were promulgated in 1991 which establish more stringent criteria for landfills, including water quality monitoring. However, solid waste management is primarily a state and local responsibility with little EPA regulation.

Hazardous waste management programs under Subtitle C of RCRA regulate entities that generate, transport, treat, store, and dispose of hazardous waste. These programs include tracking of hazardous waste from its generation to its disposal through a system of manifests and permits.

Subtitle I of RCRA establishes a regulatory program for Underground Storage Tanks (USTs). The USTs are regulated through standards developed by EPA for tank design, installation, removal and monitoring.

The 1984 Hazardous and Solid Waste Amendments to RCRA provide additional standards for small quantity generators and underground storage tanks containing hazardous wastes or other regulated substances. The RCRA was amended in 1986 by the Superfund Amendments and Reauthorization Act (SARA) which established a mechanism for response to release of regulated substances from underground storage tanks and established a leaking UST (LUST) trust fund. The SARA also strengthened programs under the 1980 Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) which provides authorities to respond to releases of hazardous substances and establishes the federal "Superfund."

### **Comprehensive Environmental Response, Compensation, and Liability Act**

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) provides authorities to respond to releases of hazardous substances and establishes the federal "Superfund." Federal programs under this act were strengthened with the 1986 Superfund Amendments and Reauthorization Act (SARA). The SARA also provides for stronger state involvement in the cleanup process.

## **MAJOR STATE WATER QUALITY MANAGEMENT LAWS**

### **Environmental Quality Act (ARS Title 49)**

The Environmental Quality Act of 1986 established the Arizona Department of Environmental Quality (ADEQ) as the responsible agency for all purposes of the Clean Water Act, the Safe Drinking Water Act, and RCRA. It also transferred responsibility for air quality to ADEQ from the Department of Health Services. The EQA addresses protection of both surface and groundwater, and requires the Director of ADEQ to adopt water quality standards by rule for both navigable waters and aquifers. It also requires that programs be adopted by rule to protect both surface and groundwater, and to control both point and nonpoint source pollution discharges.

The EQA requires any discharging facility to obtain an Aquifer Protection Permit (APP). An APP may be issued only to facilities designed, constructed, and operated to ensure the greatest degree of discharge reduction achievable through application of the Best Available Demonstrated Control Technology (BADCT). The EQA also identifies conditions under which general permits may be issued and specifies criteria for developing Best Management Practices (BMPs) which may be required by a general permit. General

permits with BMPs for regulated agricultural activities (application of nitrogen fertilizer and concentrated animal feeding operations) are required to be adopted by rule.

EQA provisions include a Water Quality Assurance Revolving Fund (WQARF) to cover costs of remedial action, with requirements for rules to be adopted for use of the fund and for determining priorities and selection of remedial actions to be undertaken. Arizona Department of Water Resources (ADWR) has joint authority with ADEQ for conducting feasibility studies and remedial investigations for groundwater.

The EQA also provides for regulation of pesticides and gives the Director of ADEQ responsibility for pesticide contamination prevention. The Act requires information to be submitted on pesticides registered for use in Arizona and requires establishment of a "groundwater protection list" of pesticides that have the potential to pollute groundwater. Use of listed pesticides must be regulated.

The Director of ADEQ is required by the EQA to conduct ongoing monitoring to determine compliance with applicable standards and effectiveness of BMPs and BADCT. The EQA provides for compliance orders, civil and criminal penalties for violation of water quality standards. It also allows for citizen's suits to enforce the Act.

### **Groundwater Management Act**

The purpose of the Groundwater Management Act of 1980 (GMA) was to control severe overdraft of groundwater supplies in some parts of the state and to provide a means for allocating limited groundwater resources. The GMA established the Arizona Department of Water Resources (ADWR) to manage groundwater resources and established four Active Management Areas (AMAs) in areas where groundwater supplies were most threatened. It required development of management plans and regulatory programs for these AMAs to achieve a long-term balance between the amount of groundwater used and the amount of recharge of aquifers ("safe yield"). In addition, two Irrigation Non-Expansion Areas (INAs) were established where groundwater supplies are insufficient to provide a reasonably safe supply of irrigation water. The GMA places emphasis on the quantity of groundwater available in critical areas, although water quality may be included as a consideration in AMA planning.

Management plans for each AMA must establish conservation requirements for agricultural, municipal, and industrial users, as well as evaluate means of augmenting water supplies through such measures as groundwater recharge and reuse of effluent. The second management plans for each area also include groundwater quality assessments and water quality management programs developed in coordination with ADEQ.

The GMA established grandfathered rights to groundwater, as well as procedures for selling those rights; methods to reduce withdrawals through conservation, augmentation of water supply and purchase and retirement of farmland; other management methods and rules for transportation of groundwater. Financing and enforcement mechanisms were also established. Wells are regulated under the GMA, which require licensing of well drillers, registration of existing wells and ADWR approval for new wells. Injection wells are regulated by ADEQ.

## **MAJOR PROGRAMS FOR WATER QUALITY MANAGEMENT IN ARIZONA**

The federal and state laws set out the basic requirements for water quality management programs which must be developed by appropriate designated agencies. Primary responsibility for meeting federal water quality management requirements falls on the Environmental Protection Agency (EPA). The Arizona Department of Environmental Quality (ADEQ) has primary responsibility for state programs, although the Department of Water Resources shares responsibilities for some programs. Major program categories include program planning, designation of water uses and development of standards to protect those uses, water pollution control programs, monitoring and assessment, compliance and enforcement, and program evaluation.

### **Program Planning**

The CWA provides for development of waste treatment management plans under Section 208, which are to identify treatment works necessary to meet anticipated municipal and industrial waste treatment needs over a 20-year period, and to include a process for identification of certain nonpoint sources of pollution. The 1987 amendments also provided for development of state nonpoint source management plans. States are also required to have a continuing planning process which includes effluent limitations and total maximum daily loads with schedules of compliance, priority rankings of waste treatment work needs, and elements from applicable areawide waste treatment plans. Each of these plans required by the CWA must be approved by the EPA.

Arizona has developed required state plans, including a Nonpoint Source Management Plan and Wellhead Protection Program, and recently revised the state Continuing Planning Process. In addition to required plans, the Arizona Department of Environmental Quality has developed a number of strategies, such as the Groundwater Protection Strategy and Groundwater and Surface Water Monitoring Strategies, which provide the framework to guide program implementation and evaluation.

### **Designated Uses/Water Quality Standards**

Water quality standards are required by federal law for surface waters and for public drinking water supplies. State law requires standards for surface waters, groundwater and drinking water. These standards are based on the uses for which waters are designated to be protected, and serve as the water quality goals for management programs.

#### Surface Water

Section 303 of the Clean Water Act requires states to establish use designations and water quality standards for navigable waters which must be reviewed every three years ("Triennial Review"). Arizona's Environmental Quality Act requires the Director of ADEQ to adopt surface water quality standards by rule, and also provides that the Director may adopt water quality standards for waters of the state not included under navigable waters. In 1992, the state adopted revised standards for navigable waters but did not include standards for other waters.

Establishing water quality standards requires the designation of uses for navigable waters and development of standards which will protect those uses. In Arizona, uses are designated by rule, with "fishable and swimmable" used as a baseline goal to meet CWA requirements. Designated uses may be revised, under specified conditions, if water quality improvements allow a use not currently designated.

Narrative water quality standards are defined which apply to all navigable waters. Numeric standards are established for each designated use and apply to listed waters and tributaries unless superseded or supplemented by standards prescribed specifically for unique waters or effluent-dominated waters. Changes adopted in 1992 include the addition of numeric standards for priority (toxic) pollutants as required by the 1987 amendments to the CWA.

Water quality standard rules also define state antidegradation policy which prohibits degradation of water quality where the existing quality does not meet standards and provides that if existing water quality is better than standards, it shall be maintained except under specifically defined conditions (Reference: R18-11-104).

Adopted state water quality standards for navigable waters must be approved by the EPA as the oversight agency for implementation of the Clean Water Act. If state standards are less stringent than federal requirements, the EPA must establish water quality standards for the state.

### Groundwater

Under the EQA, all aquifers in the state are classified to be protected for drinking water use, although the EQA also provides a process for reclassification of aquifers to non-drinking water status. (Reference: R18-11-503.) The EQA established primary drinking water MCLs as drinking water aquifer standards for the state and requires the Director of ADEQ to adopt additional MCLs as aquifer water quality standards within twelve months of their adoption by the EPA. It also allows the Director to adopt additional numeric standards if necessary to protect human health. To date, the state has adopted MCLs only as aquifer water quality standards.

### **Water Pollution Control Programs**

A number of regulatory and voluntary programs have been established at the federal and state level to control or prevent pollutants from impairing protected uses of surface and groundwater.

### **TECHNICAL REVIEW/OPERATOR CERTIFICATION**

State sewerage system rules (AAC R18-9-804) require ADEQ approval of plans prior to construction of sewage systems, including septic tank systems, and requires that these systems be in conformance with the Certified Water Quality Management Plan for that area. The rules also require final approval of construction, specify minimum requirements for sewage systems, and refer to Engineering Bulletins which provide minimum design guidelines for sewage systems. State Drinking Water Rules (AAC R18-4-216) also require ADEQ review and approval of public and semi-public water supply system plans and construction and specifies minimum requirements.

State certification rules (AAC R18-4, Article I) require that public water systems and wastewater treatment plants be run by certified operators. Certification requirements are also established.

### **POINT SOURCE CONTROL PROGRAMS**

#### **National Pollutant Discharge Elimination System (NPDES) Program**

In order to protect water quality and designated uses, the CWA (Section 301) prohibits discharges to surface waters except as permitted under the Act. Provision is made for establishing effluent limitations based on available technology and water quality criteria for the waters into which the effluent is discharged. The CWA (Section 402) also establishes the NPDES program to issue permits which apply and ensure compliance with established effluent limitations.

The NPDES program is administered by the EPA in cooperation with the states. States may, and are encouraged to, submit proposals to the EPA to administer their own NPDES programs. While the EQA requires the Director of ADEQ to adopt a permit program for point source discharges to navigable waters which would allow state administration of the NPDES program, Arizona is not actively pursuing NPDES primacy.

Before a NPDES permit may be issued, the state must certify under Section 401 of the CWA that the discharge will not result in violation of state navigable water quality standards or effluent limitations. The NPDES program also requires public notice and opportunity for comment.

## **Effluent Limitations**

Effluent limitations for Publicly Owned Treatment Works (POTWs) are based on secondary treatment. Effluent limitations for industrial discharges are generally technology-based and require application of "Best Available Control Technology Economically Achievable" for that class of industry. New sources are required to meet standards of performance reflecting the greatest degree of effluent reduction achievable at the time they begin discharge. In cases where application of technology-based effluent limitations does not allow attainment of water quality standards, more stringent controls may be required (i.e. water quality based effluent limitations).

## **Pretreatment**

For industries discharging to publicly owned treatment works, effluent limitations may be different from those required for discharge directly to a receiving water. The CWA established a National Pretreatment Program to prevent the discharge of pollutants through treatment works and to prevent discharge of pollutants into POTWs which could interfere with operations or expose POTW workers to chemical hazards. The EPA has established federal standards which prohibit discharge of certain types of pollutants as well as categorical standards which apply to industrial users in specific industrial categories. POTWs may also set local discharge limits as needed to meet water quality standards or to comply with sludge management regulations.

All POTWs greater than 5 million gallons per day (mgd) are required to have pretreatment programs as a condition of their NPDES permits, and smaller plants may be required to have programs if types of discharges into the plant warrant pretreatment. Pretreatment programs must be approved by the EPA.

## **Sludge Management**

The CWA prohibits disposal of sewage sludge except in accordance with a NPDES permit and requires the EPA to develop regulations and provide guidelines for disposal. Technical regulations have been adopted which limit pollutants allowed in sludge for certain uses. Arizona requires an Aquifer Protection Permit (APP) for agricultural application of wastewater sludge and has issued a general permit for sludge applications meeting specified conditions.

## **Stormwater Discharge**

The 1987 amendments to the CWA expand the NPDES program to include municipal and industrial stormwater discharge. Permits for industrial stormwater must meet technology-based effluent limitations, while municipal permits require controls to reduce the discharge of pollutants to the maximum extent practicable. Implementation is to begin with industrial activities and municipal storm sewer systems serving populations of 100,000 or more.

Regulations provide for individual, group, and general permits for industrial discharge. The EPA has issued a general permit for industrial stormwater discharge in areas where it retains NPDES primacy, including Arizona. This permit is intended as a baseline permit for all categories, requiring notification of the EPA by dischargers who must develop plans for controlling stormwater runoff and pollution. The EPA strategy also provides for more stringent permits for facilities in watersheds shown to be threatened by stormwater discharge and for industries which are shown to need more stringent controls.

Arizona includes urban runoff, and development of urban runoff Best Management Practices in its nonpoint source program which is discussed below. Stormwater NPDES permits are included in the nonpoint source management section of this plan.

## **Dredge and Fill (404) Permits**

Section 404 of the CWA established a permit program for discharge of dredged or fill material into navigable waters. This program is administered by the Army Corps of Engineers, although as with the NPDES program, states are encouraged to submit proposals to administer their own programs. Also, as with the NPDES program, states must certify under Section 401 of the CWA that permitted discharges will not result in violations of state navigable water quality standards. This program also is used to provide federal protection of wetlands as defined in regulations adopted in 1989.

Several activities which may require Section 404 permits, such as construction and sand and gravel mining, are considered nonpoint sources of pollution in Arizona and are included in the nonpoint source discussion below and in the plan.

### **Aquifer Protection Permit Program** (ARS Title 49, Chapter 2, Article 3)

The state Aquifer Protection Permit (APP) Program, established by the Environmental Quality Act (EQA), is designed to regulate facilities that may discharge to groundwater. It replaces the Groundwater Quality Protection Permit Program which was established in 1984. The APP program covers a wide range of facilities including solid waste disposal facilities, injection wells, land treatment facilities, mine tailing piles and leaching operations, septic tank systems with a capacity greater than 2,000 gallons per day, and sewage or sludge ponds and wastewater treatment facilities.

Individual permits may be issued only to facilities designed, constructed and operated to ensure the greatest degree of discharge reduction achievable through application of the Best Available Demonstrated Control Technology (BADCT). The BADCT guidance documents have been established for several types of facilities, including mining operations, landfills, and municipal wastewater treatment facilities. These guidance documents outline ADEQ's review processes, available control technologies, site characteristics, and other considerations which can influence selection of BADCT. The BADCT for a particular facility is site-specific and is determined through negotiations with ADEQ.

General permits may also be issued under certain conditions and may require application of Best Management Practices (BMPs). These may be required for a number of activities, including, urban runoff, silvicultural activities, and septic tank systems with a capacity of less than 2,000 gpd. General permits are required by the EQA, and regulations have been adopted, for certain agricultural activities (application of nitrogen fertilizer and concentrated animal feeding operations).

### **Drywell Registration** (ARS Title 49, Chapter 2, Article 8)

Drywells are injection wells constructed strictly for disposal of stormwater and must be registered in Arizona. A license is required to drill drywells. Other injection wells are considered discharging facilities and are regulated under the APP Program.

### **Reuse Permits**

Reuse of reclaimed wastewater for beneficial use requires a Reuse Permit (R18-9, Article 7). Requirements are established for both the wastewater treatment facility that generates the reclaimed water and for the user of the reclaimed water. Allowable types of reuse are identified and specific numeric parameters are established for different types of reuse including pasture and crop irrigation, livestock watering, irrigation of landscaped areas with restricted and open access, and incidental or full body contact. There are additional requirements for application of reclaimed water for specific uses as well as requirements for restricting public access.

## **NONPOINT SOURCE CONTROL PROGRAMS**

The CWA as amended in 1987 required states to develop management programs for nonpoint source pollution. Arizona's Nonpoint Source Management Program was completed in 1989. It identifies categories of nonpoint sources including agriculture, silviculture, construction, urban runoff, resource extraction, land disposal, hydraulic/habitat modification, and recreation. Regulatory and other programs for controlling

nonpoint source pollution are outlined and responsible agencies are identified.

### **Aquifer Protection Permit (APP) Program**

Some categories of nonpoint source pollution, including mining and land disposal, are covered under the APP Program. Individual permits are required for mine tailings piles and ponds and mine leaching operations. A general permit has been issued for wash water from sand and gravel operations and placer mining operations, as long as no hazardous substances are used, added or exposed in the process. General permits have also been issued for septic tank systems with flows of less than 2,000 gallons per day and for sewage disposal systems with flows of between 2,000 and 20,000 gallons per day, if they meet certain conditions.

### **Best Management Practices**

Best Management Practices (BMPs) have been adopted by rule for some agricultural activities (application of nitrogen fertilizer and concentrated animal feeding operations). For other nonpoint source categories, such as silviculture and grazing, agreements with land managers (Memoranda of Understanding) are being developed for nonpoint source management. Advisory committees have been formed for development of Best Management Practices for some categories, such as grazing.

### **Riparian Area Protection**

Alteration of riparian areas falls under the hydrological/habitat modification category of nonpoint source pollution. Protection of riparian areas is also provided for in Arizona by Executive Order 91-6 which outlines state policy recognizing the critical nature of riparian areas and encouraging management practices which will result in maintenance of existing riparian areas and restoration of degraded riparian areas. It also establishes an Interagency Riparian Areas Coordinating Council and provides for development of a statewide riparian management plan and legislation mandating state riparian area protection.

### **Underground Storage Tanks**

Underground Storage Tanks (USTs) are regulated under RCRA and the EQA. USTs must be registered with ADEQ and records kept. Release detection systems are required and immediate action must be taken in the event of a release to stop the leak and mitigate the impacts.

### **Wellhead Protection Program**

The SDWA as amended in 1986 requires states to establish Wellhead Protection Programs to protect groundwater used to supply public water systems. Development of a program includes delineation of the area to be protected, identification of potential sources of contamination and development of management approaches to protect groundwater from pollution sources. It also requires contingency plans for alternative supplies in the event of contamination of water supplies.

Arizona's Wellhead Protection Program relies on existing, comprehensive programs for groundwater protection (also outlined in the state Groundwater Protection Strategy) with emphasis on regulatory and educational measures. The EPA has also developed a strategy for groundwater protection and guidance documents for development of wellhead protection programs which focus more on local programs and solutions than does Arizona's state program. Demonstration programs have been funded in Pima and Yuma Counties in Arizona.

### **Facility Financing**

Federal and Arizona environmental legislation have not generally included provision of funding for facility construction. Title II of the Clean Water Act is an exception, which provides for a grant program to fund

construction of publicly-owned waste treatment works. In 1987, Title VI was added which provides for grants to the states for establishment of revolving funds for construction of treatment works and for implementation of nonpoint source management programs. State Revolving Fund (SRF) programs, which require state matching funds, replace the federal construction grant program.

In 1989, the state of Arizona established the Wastewater Management Authority of Arizona which may issue bonds to provide matching state funds for the program and has since issued rules for the loan program which establish eligibility criteria and a process for developing a priority list of eligible projects similar to that used in the construction grants program. A separate priority system is used for nonpoint source projects and is consistent with the criteria defined in the state Nonpoint Source Management Plan.

Under Arizona's rules, the state is to publish an Intended Use Plan each year which will identify communities to receive assistance and to identify the types of financial assistance and interest rates. It is expected that interest rates will depend on the bond ratings of the communities receiving financing, since they must secure the bonds.

### **Monitoring and Assessment**

The ADEQ has developed Surface and Groundwater Quality Monitoring Strategies to guide statewide monitoring efforts. These strategies include development of networks to monitor current water quality and to develop information for identification of water quality trends.

### **Ambient Water Quality Monitoring Networks**

Monitoring of ambient surface and groundwater quality is done to determine whether water quality standards are met and to identify areas where water quality is threatened or standards violated. Fixed station monitoring consists of taking samples at representative sites along major rivers and areas of critical interest. Samples are collected at regular intervals for extended periods and are analyzed on a broad range of parameters. Monitoring stations are maintained by the USGS as well as ADEQ. Water quality information from this network is kept in the Storage and Retrieval (STORET) database maintained by the EPA.

### **Facility Monitoring**

Water and wastewater facilities must conduct monitoring as part of permit and system requirements and report results to ADEQ, which maintains a database for monitoring and compliance tracking. The ADEQ conducts construction inspections to ensure that water and wastewater facilities are constructed in accordance with approved plans and specifications. Compliance assurance inspections are performed periodically to monitor the operation and maintenance of facilities. Priorities are developed annually to identify facilities to be inspected based on an evaluation of compliance history, date of last inspection and complaints received. Results of these inspections are published each year in ADEQ's Water Quality and Waste Programs Annual Report.

### **Special Investigations**

The state also conducts intensive surveys and repeated sampling as complaints are received or problems occur.

### **State Water Quality Assessment (305(b) Report)**

Section 305(b) of the CWA requires states to prepare a biennial report which describes the quality of its navigable waters and analyzes the extent to which it protects wildlife and recreational use and the extent to which pollutant discharges have been achieved. This 305(b) Report also describes nonpoint sources of pollution and makes recommendations for control of those sources. The ADEQ includes an assessment of both surface water and groundwater quality in its 305(b) Reports.

The state Water Quality Assessment is based on monitoring data for the report period where available, with other waters evaluated based on previous assessments, older data, and field reports. The report identifies the principal water quality problems for the state as well as major sources of pollutants. The 305(b) Report is used by the state more as the basis for planning to address problem areas than as a basis for enforcement actions. The 305(b) Report is updated in off years with a 205(j) report, which highlights significant changes from the 305(b) Report.

### **Toxic Pollutants (304(l) List)**

Section 304(l) of the CWA requires the state to identify waters which cannot reasonably be expected to meet water quality standards due to toxic pollutants, even after application of technology-based controls.

### **Compliance and Enforcement**

#### **Water and Wastewater Facilities**

If a wastewater facility is not in compliance with its NPDES permit conditions, ADEQ must report the noncomplying system to the EPA, who has enforcement responsibility. If a facility is in violation of conditions of a state APP, reuse or groundwater protection permit, ADEQ may take administrative action, usually via a cease and desist order. The ADEQ may also seek injunctive relief and request a civil penalty through action filed in Superior Court.

If there is a violation of drinking water standards, Maximum Contaminant Levels (MCLs), the system owners must notify users of the violation. The ADEQ may also initiate enforcement action in the form of warning letters, compliance (or cease and desist) orders, or informal measures such as meetings and verbal notifications. In some cases, violations may be referred to the Attorney General's office for legal action. The EPA may also require states to initiate enforcement actions if water systems are in violation under a strategy authorized by the 1986 Amendments to the Safe Drinking Water Act (SDWA).

#### **Individual Control Strategies**

For each of the waters identified under Section 304(l), states must identify responsible point sources and develop individual control strategies to reduce discharge of toxic pollutants within three years.

#### **Administrative Orders**

The ADEQ may issue compliance orders against facilities which do not comply with state rules or permits. The Environmental Protection Agency issues administrative orders and notices of violations for facilities which do not comply with federal permits.

#### **Legal Action**

The Director of ADEQ may seek injunctive relief for facilities which are not in compliance with state rules or permits, and may ask that a civil penalty be assessed against the owner through an action filed in Superior Court. If a person violates a water quality standard or discharges without a permit knowingly or with criminal negligence, it is a criminal violation subject to action by the Attorney General. The EQA also provides for citizen's suits if state water quality standards or permit requirements are violated.

#### **Remediation**

The federal superfund program, authorized by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), gives the EPA the responsibility to assure that all appropriate remedial response actions are taken in the event of a release, or threat of a release, of a hazardous substance into water, land, or air. The ADEQ is the lead agency for purposes of CERCLA in Arizona, and provides some support to federal superfund activities which involve groundwater contamination. The

Environmental Quality Act also established a Water Quality Assurance Revolving Fund (WQARF) and allows ADEQ to require development of a program to remedy pollution which endangers, or has already contaminated, waters of the state.

The Leaking Underground Storage Tank Trust Fund (LUST Trust) was established by SARA in 1986 to pay the costs of EPA or state-initiated corrective action, as well as for some enforcement and cost-recovery activities at sites of release from USTs containing petroleum. The ADEQ is cooperating with the EPA to implement the LUST Trust program in Arizona, and is developing rules which will allow the state to administer its own UST/LUST program.

### **Program Evaluation**

Assessment and monitoring may be used to determine whether water quality management programs are effective in protecting designated uses and maintaining or improving water quality. The primary tool for this in Arizona is the annual water quality assessment (305(b) or 205(j) report) which is also used to identify priority water quality problems. This may be used in conjunction with facility monitoring data in ADEQ's 305(b) or 205(j) reports to evaluate water quality management programs. Plans and strategies may be revised as necessary to increase effectiveness of programs in maintaining and improving the quality of Arizona's waters.

## WATER QUALITY MANAGEMENT PROGRAM IMPLEMENTATION

### DISCUSSION OF ISSUES AND IMPACTS

#### PROGRAM PLANNING

State and Areawide Water Quality Management Plans developed in the late 1970s as required by the Clean Water Act have become out-of-date as changes have occurred in laws, regulations, and programs as well as in the region. Limited availability of federal funds for planning has also affected the ability of planning agencies to keep the plans updated. Areawide plans have also, to some extent, been supplanted by a number of state plans and strategies developed to meet requirements of the EQA and 1987 amendments to the CWA. Outside of state public participation requirements, there is no clearly defined process for regional involvement in state water quality management planning. The exception is for 208 Plan Amendments and participation of the Councils of Government in the state Water Quality Management Working Group.

#### **Issues for Regional Planning**

Regional plans should define a process for maintaining areawide plans in the future. They should also make recommendations for regional involvement in development of state plans and programs. Plans should also consider integration of multiple programs and planning efforts as a means to facilitate understanding and coordination (e.g. through the Continuing Planning Process).

#### DESIGNATED USES/WATER QUALITY STANDARDS

##### **Surface Water**

Arizona is required by the EQA to adopt numeric criteria for all priority (toxic) pollutants. The EPA has been slow in developing the necessary criteria documents for the 126 priority pollutants required by the CWA, and some of the documents which exist are out-of-date. ADEQ has derived its own numeric criteria designed to protect human health and aquatic and wildlife designated uses for all priority pollutants.

State water quality standards adopted in 1992 are generally based on national information because of a lack of data specific to the Southwest or regions within the state. In the future, state standards may be developed which are designed to protect the ecological integrity of particular ecoregions. ADEQ has initiated the process of defining regions which are similar based on climatological data, geological surveys, soil surveys, chemical data, and vegetation data and plans to begin biological and chemical data collection from selected reference sites in 1992. The process of collecting data, identifying appropriate ecoregion boundaries and developing biological criteria may take ten years.

##### **Impacts of Revised Standards**

Additional and/or more stringent water quality standards as adopted by ADEQ in 1992 are expected to result in additional needs for wastewater treatment. The cost of implementing surface water quality standards is a major concern.

The greatest impact of criteria for **toxic pollutants** is expected to be on wastewater treatment facilities which receive wastewater from industrial dischargers. These facilities may need to establish more stringent pretreatment requirements which would pass the impact onto industries which discharge into municipal wastewater treatment systems. Some industries which discharge directly to navigable waters would also be affected. As required by Section 304(l) of the CWA, Arizona has identified some navigable waters which cannot be expected to attain water quality standards for toxic pollutants even after application of technology-based effluent limits. These data indicate that only ten (of 126) priority pollutants are of a concern in Arizona. Therefore, ADEQ concludes that impact of proposed numeric toxic pollutant criteria will be low and will not require upgrading of wastewater treatment facilities.

Compliance with standards for **total ammonia** and **total residual chlorine** will require nitrogen and chlorine removal by wastewater treatment facilities. In its Economic Impact Statement for the proposed rules, ADEQ estimated that implementation of nitrogen removal at approximately 130 wastewater treatment plants statewide could cost several hundred million dollars over the next five to eight years. ADEQ's estimated cost for statewide implementation of ultraviolet irradiation or ozonation is over \$40 million. ADEQ does not consider these costs attributable to the revised standards but rather the results of implementation of the narrative standard "no toxics in toxic amounts." (Reference: ADEQ Economic Impact Statement submitted to the Governor's Regulatory Review Council in support of ADEQ's proposed water quality standards rules, March 1991.)

Adoption of drinking water Maximum Contaminant Levels (MCLs) as surface water quality standards for **radiochemicals** is expected to have an impact in the Little Colorado River Basin, where the adopted standards will provide a regulatory basis for implementation of nonpoint source controls.

### **Issues for Regional Planning**

Implementation of navigable water quality standards will require facilities which discharge to surface waters to meet more stringent standards. Alternative measures to meet requirements will have to be evaluated, including upgrading of facilities and alternatives to surface water discharge. Costs of engineering studies and modifications to facilities could be significant. Regional plans should include identification of compliance requirements and schedules for discharging facilities. Financing alternatives should also be discussed.

Regional plans should also identify surface water segments where nonpoint source controls may be required to meet more stringent standards.

### **Groundwater**

Adoption of MCLs as aquifer water quality standards may mean that standards are more stringent than natural background. However, impacts are primarily on users of groundwater or discharging facilities. These impacts are discussed under drinking water and the Aquifer Protection Permit Program.

## WATER POLLUTION CONTROL PROGRAMS

### **Technical Review/Operator Certification**

Plans should consider whether recommendations could be made to improve effectiveness at the regional level, including training.

### **Point Source Control Programs**

#### NPDES Permit Programs

Amendments to the Clean Water Act in 1987 imposed new NPDES program requirements for effluent limitations for toxic pollutants, sludge management, and stormwater discharges.

### **Effluent Limitations**

Effluent limitations are affected by revisions to surface water quality standards. Issues associated with these impacts are discussed under water quality standards. Technology-based effluent limitations for industrial dischargers may further be affected by guidelines developed by the EPA. Regional plans should consider whether there are appropriate guidelines for industries in the region and make recommendations as necessary for additional or revised guidelines.

## **Pretreatment**

Pretreatment programs are controlled by POTWs, who determine which of their industrial users should be regulated, issue permits with discharge limits, monitor compliance and take enforcement action when necessary. Discharge limits may be based on EPA standards which prohibit discharge of certain types of pollutants and on standards which apply to specific categories of industrial users. Limits may also be set locally to meet water quality criteria or to comply with sludge management regulations. Pretreatment programs in Arizona, which do not have NPDES pretreatment primacy, must be approved by the EPA.

Regional plans should consider whether pretreatment programs are adequate and whether they are enforced. Lack of technical or financial resources may affect the ability of POTWs to set appropriate limits. POTWs may also be reluctant to fully enforce pretreatment programs or to publish the required list of significant violators for a number of reasons, including concern about potential liability if the limit violated was challenged and found not to be technically sound, or concern that users might become less cooperative.

## **Sludge Management**

Disposal of sludge in landfills has been a common disposal method in the past, but will be limited in the future due to federal regulations for municipal solid waste landfills (MSLWFs) which were adopted in October 1991 and prohibit disposal of liquids in MSLWFs. If sludge is to be disposed of in a MSLWF, it must pass the "paint filter test" (i.e. must contain at least 20 percent solids) which requires substantial dewatering.

Federal regulations adopted in February 1993 establish standards for other methods of sewage sludge disposal: application to agricultural and non-agricultural land, placement in or on surface disposal sites, and incineration. The rule includes specific numerical limits for several pollutants as well as management practices, monitoring and recordkeeping requirements. Reporting is required for facilities required to have approved pretreatment programs or publicly owned treatment works with design flows of one mgd or more.

Regional plans should identify current methods of sludge disposal for facilities and address possible need for changes as a result of new regulations for solid waste disposal. Alternative methods should be considered, including the possible need for more stringent pretreatment requirements to meet sludge quality standards.

## **Aquifer Protection Permit Program**

Many facilities in Arizona have filed Notices of Disposal and will be required to obtain Aquifer Protection Permits. The permitting process requires substantial resources to implement and has moved slowly since the APP rules were adopted. However, in June of 1991, new legislation required that schedules of compliance be established for all facilities which have submitted Notices of Disposal, based on a list published on January 1, 1992 with deadlines for application submittal. Deadlines are based on the degree of risk posed by each facility and an ADEQ work plan to process all permit applications no later than January 1, 2001.

Regional plans should include a schedule for compliance with APP program requirements. Coordination with federal NPDES permit schedules and state reuse permit programs should be considered. Resource issues should also be addressed.

## **Nonpoint Source Control Program**

Arizona's Nonpoint Source Management Program identifies a number of nonpoint sources of pollution requiring best management practices or other control measures. Responsibilities for planning and implementation of control measures are also identified. The program also specifies criteria for establishing priorities for funding nonpoint source management projects.

Regional plans should address development and implementation of best management practices for activities which contribute to nonpoint source pollution in the region, and responsible management agencies should be identified at the regional and local level. Plans should identify existing or potential demonstration or watershed projects. BMP monitoring and evaluation should also be addressed.

Wellhead protection programs should also be considered in regional plans as a local means of implementing controls on potential sources of pollution. Plans should identify areas where groundwater supplies are threatened and wellhead protection programs may be appropriate.

### **Stormwater Discharge**

EPA regulations for NPDES permits for stormwater discharge from municipal and industrial facilities set an application deadline of November 1991 for individual and group permits. In August 1991, the EPA issued a proposed implementation strategy which relies primarily on general permits which would cover stormwater discharges from most industrial activities. The EPA also issued a draft general permit for states, including Arizona, where it retains NPDES primacy. Under the general permit, facilities would have to submit notices of intent to the EPA, would be required to develop plans to prevent pollution from stormwater discharge and to conduct some monitoring. Plans and monitoring reports would not necessarily have to be submitted to states or the EPA.

Issues for regional planning include identification of possible areas where general permit requirements may not adequately protect water quality and identification of industrial facilities which need individual permits. The need for Best Management Practices (BMPs) should be addressed, including technical and financial resources required for BMP development and implementation.

### Dredge and Fill (404) Permits

Federal regulations adopted in 1989 included a definition of wetlands which has become a very controversial issue as Congress addresses reauthorization of the Clean Water Act. Developers and business interests argue that current regulations "protect lands of marginal ecological value at a great economic cost" while environmental groups are looking for more stringent protection measures. Congress may address this issue through separate legislation.

Regional plans should address whether the Section 404 permit program in Arizona is implemented in a manner that adequately protects water quality, riparian areas and wetlands. The need for additional controls or best management practices for some activities, such as construction or sand and gravel mining, should be considered.

### **Construction Grant/State Revolving Fund Programs**

The 1987 amendments to the Clean Water Act phased out the construction grant program and replaced it with federal capitalization grants for State Revolving Fund (SRF) programs. The SRF programs require state matching funds of at least 20 percent to use the federal funds. States could begin using at least a portion of federal construction grant funds to capitalize state programs as early as Fiscal Year 1987 if a SRF program were developed by the state and approved by the EPA. Construction grant funds were authorized through FY 1990, and SRF capitalization grants were authorized through FY 1994.

Arizona did not pass enabling legislation for a SRF until 1989. In order to meet state matching fund requirements, Arizona established a bonding authority so that matching funds would be borrowed, and interest rates depend on the bond ratings of communities applying for funds. Because of the time taken to establish Arizona's program, funds that could have been loaned and repaid were awarded as grants, reducing the size of the state loan program. Congress has also appropriated less funds for SRF programs than authorized by the CWA, although reauthorization of the CWA may extend the authorization of federal funding for state revolving loans.

Regional plans should consider whether the SRF program provides an effective funding mechanism and should identify a process for identifying alternative means of funding construction and nonpoint source projects in the region.

## **Monitoring and Enforcement**

### **Drinking Water**

As new standards and other regulations are established as required by the 1986 amendments to the Safe Drinking Water Act, program responsibilities will increase. Many systems may have to install new equipment to comply with new surface-water filtration and disinfection requirements. Sampling requirements are also becoming increasingly technical and operators may not have the necessary training, especially in small systems. Some systems may have to hire skilled operators to take water samples and operate facilities and contract with certified laboratories to perform complicated analytical services. The EPA has estimated the annual cost of compliance with new regulations nationwide at about \$2.5 billion, assuming systems are in compliance with existing standards.

ADEQ's Annual Report Water and Wastewater for 1990 considered 70 percent of the 1,780 regulated water systems in Arizona to be in non compliance with one or more applicable sampling requirements, and 59 percent of all systems were in violation of one or more applicable drinking water quality standards. (This includes systems that did not provide samples.)

Regional plans should assess general compliance levels for drinking water systems in the region and identify major reasons for non-compliance. Needs for upgrades such as filtration systems should be identified and the need for technical and financial resources should be addressed. Recommendations should be made for improved compliance, which may include issues of resource utilization and viability of small systems.

### **Surface Water Quality Assessment/Control of Toxic Pollutants**

In a July 1991 study, the General Accounting Office reported that efforts to control toxic pollution under Section 304(l) of the CWA are not as effective as they could be (GAO/RCED-91-154). Water quality monitoring was found to be not comprehensive enough to accurately assess the extent of pollution problems. In many cases, assessments of water quality are based on an evaluation of descriptive information rather than analysis of water samples. [Arizona's 1990 Section 305(b) Report assessed about 30 percent of the stream miles in the state. Over 70 percent of the miles assessed were evaluated, and about 28 percent were monitored.] Monitoring often is done in areas where known problems exist, and states generally do little monitoring of nonpoint source toxic pollution. (In its 1991 Assessment (205(j) Report), ADEQ identifies this and a number of other problems with the current assessment.) The GAO report cited lack of resources as one reason monitoring is limited. Mandatory programs take priority over ambient monitoring, and point source programs come before nonpoint source because of the legal requirements and emphasis of the CWA.

CWA provisions also limit requirements for individual control strategies to clean up impaired waters to those where impairment is the result of point source discharge of one of the 126 toxic pollutants identified by the EPA. In Arizona, this means five ("short-list") of 165 impaired waters. No more stringent controls are required for the other 160 waters, even though the priority pollutant list may not include all of the most harmful toxic pollutants and nonpoint sources may contribute more pollution than point sources.

Regional plans should consider whether the monitoring program and level of emphasis on point versus nonpoint sources of pollution in the region is appropriate to regional needs and problems. Recommendations should be made for monitoring locations and emphasis as appropriate. Plans should also include recommendations for effective feedback on monitoring results to land and resource managers. Individual control strategies for facilities in the region should also be identified and processes for follow-up monitoring and evaluation should be developed.

### **Resource Requirements/Constraints**

Resources have been identified as a limiting factor in effective management of a number of water quality programs. Implementation of federal laws requires development of EPA regulations and guidelines for

implementation at the state and local levels. State programs also require adoption of standards and regulations, often by rule, to provide the basis for enforcement. With increased requirements, federal and state agencies must look for sources of additional funds or reconsider agency roles in implementation of the CWA, SDWA, and other laws.

Among funding sources under consideration as part of reauthorization of the Clean Water Act are charges for permits and fees to cover development of effluent limits. The EPA is also working to develop a fee system based on the toxicity of a facility's discharge. However, "the EPA predicts that financial responsibility to close the anticipated funding gaps will shift increasingly to the states" (GAO Toxic Water Pollution). Many states use some sort of alternative financing method such as fees, taxes or bonds to generate funds for their water quality management programs. Most of these are permit application, training or operator certification fees.

With limited resources, setting priorities is critical. The GAO has reported that federal priorities may be guided more by public perceptions than on rankings of public risk. ("Meeting Public Expectations with Limited Resources," June, 1991.) The same report discusses the importance of measuring results to ensure the effectiveness of programs. However, because of limited data, the EPA generally monitors its performance based on activities it carries out rather than on environmental improvements which may or may not result from those activities.

Regional plans should include a process for evaluating how funds are spent and whether the emphasis is placed in areas of greatest concern. Processes should be defined for establishing regional priorities and evaluating program effectiveness. Alternative means of funding programs should be identified.

## **FRAMEWORK FOR REGIONAL PLANNING**

Federal laws and regulations place demands on the states, local governments, and other agencies for implementation. State laws, rules, and programs also make demands on local agencies. There are a number of levels on which these demands may be evaluated and at which they can be addressed in regional water quality management plans.

### **Broad Policy Level (Federal/State)**

Once federal and state laws have been passed and rules and regulations have been adopted, they must be implemented by state and local agencies, industry, and individuals. While implementation is largely a top-down process, there is opportunity for public participation in development of laws, rules, and regulations. A regional continuing planning process for water quality management can provide for informed and effective local involvement.

### **Regional Planning and Policy Level**

Planning for implementation of federal and state water quality management laws and regulations must also take regional considerations into account.

- (a) Geography, hydrology, population, land use, and land ownership have an impact on which elements of laws and regulations are most salient in the region and where priorities lie.
- (b) Other federal and state laws and regulations may have an impact on water quality management at a regional level. These include requirements of the National Environmental Policy Act and the National Forest Management Act, which may have a major impact in areas with large areas of federal land or national forests.
- (c) Regional standards and requirements for water quality management could be established based on shared regional values. Federal laws are generally minimum requirements, and state requirements are at least as stringent as national requirements. While regions must meet the state requirements at a minimum, regional plans could establish more stringent requirements.

### **Local Planning and Policy Level**

Local plans, policies, zoning, and ordinances may have an impact on water quality issues and implementation of federal and state laws and regulations. Depending on local values and conditions, some county or community plans may take a strong, proactive role toward protection of natural resources, while others do not. Local plans and ordinances can serve as tools for implementing regional water quality management plans. Some programs, such as the Wellhead Protection Program, offer opportunities for local implementation.

### **Management Agency Level**

Agencies with designated responsibilities for water quality management must develop specific plans to meet federal and state requirements. Regional plans can identify general requirements, but it is the Designated Management Agency which must implement a plan designed to meet very specific conditions and requirements. (Management agency plans include facility plans for wastewater treatment works, pollution prevention plans for stormwater runoff, and best management practices to be used for various types of activities which can cause nonpoint source pollution.) These plans must also identify the specific steps and resources needed to implement them. Areawide plans can define steps by which it can be ensured that these plans are consistent with applicable plans, laws, and regulations and meet applicable requirements. They can also recommend priorities and schedules for plan development.

## **Implementation**

Once specific plans have been developed to meet the requirements of federal and state laws and regulations, they must be implemented. However, resources for implementation (and perhaps for development of specific plans) may not be available or adequate to meet requirements for compliance with laws and regulations. While areawide Water Quality Management Plans cannot solve the problem of lack of resources, they can be used to define a process for providing information on funding sources. They can also address provision of technical assistance to local agencies for planning and implementation. In addition, they could be used to develop a process and/or guidelines for setting priorities.

## **Monitoring**

Monitoring may serve a number of purposes for water quality management. Baseline monitoring can characterize existing conditions and provide a basis for planning and future evaluations. Monitoring can be used to assess whether implementation activities, such as use of best management practices, are carried out as planned, and may also be used to evaluate whether the activities had the desired effect. Monitoring may be used to show the impact of a project on water quality, or be used to measure whether water quality standards are being met. (Reference: Monitoring Guidelines to Evaluate Effects of Forestry Activities on Streams in the Pacific Northwest and Alaska, EPA, May 1991.)

Areawide Water Quality Management Plans can address monitoring requirements in the region as well as feedback loops necessary to get information on monitoring results to land managers and other responsible agencies so that appropriate action may be taken.

## **Compliance and Enforcement**

While compliance and enforcement are primarily the responsibility of federal and state regulatory agencies, processes for facilitating compliance and ensuring appropriate enforcement could be addressed in the areawide plans, perhaps through design of effective monitoring and feedback systems.

## **Remediation**

The areawide Water Quality Management Plans could address a process for identifying problem areas and setting priorities for remediation activities.

## **Program Evaluation and Planning**

Areawide Water Quality Management Plans should include a process for monitoring plans and programs in the region to ensure that they are implemented and to evaluate their effectiveness in protecting designated uses and maintaining water quality. This is a broad monitoring and evaluation process, with feedback to federal and state lawmakers and regulatory agencies as well as local planning and management agencies.