

APPENDIX VI

Existing Point And Nonpoint Source Water Quality Programs

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EXISTING POINT AND NONPOINT SOURCE POLLUTION CONTROL PROGRAMS

NORTH CAROLINA'S POINT SOURCE CONTROL PROGRAMS

Discharge permits are issued under the authority of North Carolina General Statute (NCGS) 143.215.1 and the National Pollutant Discharge Elimination System (NPDES) program. NPDES permits establish effluent limitations on the maximum level of wastes or pollutants, that may be discharged into surface waters. North Carolina has a very comprehensive NPDES program that includes the following major components:

1. NPDES Permit Review and Processing,
2. Wasteload Allocation Modeling,
3. Compliance Monitoring and Enforcement,
4. Aquatic Toxicity Testing,
5. Pretreatment,
6. Operator Certification and Training and
7. Nondischarge and Regional Wastewater Treatment Alternatives.

Below is a brief summary of key components of North Carolina's NPDES program

NPDES Permit Review and Processing

In North Carolina, the issuance of discharge permits is coordinated with the basinwide planning process. Thus, DWQ issues all discharge permits within a given basin at approximately the same time. These permits are valid for five years. New discharge permits issued during an interim period between cycles will have a shorter expiration period in order to coincide with the next basin permitting cycle. Thus, DWQ can more effectively monitor and modify its permitting system consistently across the river basins.

DWQ will not process a permit application until the application is complete. The requirements for discharge permit application and processing are outlined in Administrative Code Section: 15A ~~NCAC 2H .0100 - Wastewater Discharges to Surface Waters~~. Under this rule, all applications must include a feasibility analysis on alternative disposal options, such as spray irrigation, and justification for the selection of the discharge option.

Applications for new discharges greater than 500,000 gallons per day of wastewater, 10 million gallons per day (MGD) of cooling water, or 1 MGD of any other type of effluent must include an *assessment* report in addition to the normal permit application. The assessment is to provide sufficient information to describe the impact of the proposed action on the waters in the area. DWQ may also require an Environmental Impact Statement or Environmental Assessment, under the NC Environmental Policy Act for certain publicly funded projects.

DWQ staff establish waste limits for permit applications based on a wasteload allocation process (described in the following section). The staff review also includes a site inspection (for existing facilities up for renewal, the inspection may be conducted prior to submittal of a complete application). If DWQ finds the application acceptable, it will issue a public notice (called a Notice of Intent to Issue) in newspapers having wide circulation in the local area. The Notice of Intent includes all of the permit applications for a particular subbasin (or subbasins) that will be issued

within a given month. The public then has a 30-day period to comment on the proposed permit. If the public expresses sufficient interest in one or more of the applications, DWQ may hold a public hearing.

DWQ also sends copies of the Notice of Intent to a number of state and federal agencies for comment. For example, the Division of Environmental Health reviews the applications for their potential impact on surface water sources of drinking water. Once DWQ received and evaluates the comments, the Director of DWQ decides whether to issue or deny the permit. The final permit will include recommended waste limits and other special conditions that may be necessary to ensure protection of water quality standards.

Establishing Discharge Permit Effluent Limitations/Wasteload Allocations

Effluent limitations, also called waste limits, dictate the amounts of wastes (pollutants), that the permittee is allowed to discharge into surface waters under an NPDES permit. Before DWQ issues a discharge permit, it evaluates the projected impact of the discharge on the receiving waters. This determination, called a wasteload allocation (WLA), is usually based on a computer model which considers many factors, including the characteristics of the waste (e.g., flow and type) and the characteristics of the receiving waters (e.g., flow, waste assimilative capacity, channel configuration, rate of reaeration, water quality classification). DWQ determines permit limits using models called water quality-based limits. DWQ also bases some permit limits based on federal effluent guidelines established by the USEPA.

DWQ performs wasteload allocations by using various models, depending on the parameter (type of pollutant) of interest and the characteristics of the receiving waters. Model frameworks (discussed in more detail in Appendix IV) can range from simple mass balance analyses to 3-dimensional dynamic water quality models. Modeling fits into the basin plan by drawing on the current conditions within the basin and evaluating the effects of various management strategies. DWQ uses models for a number of objectives, including determining the fate and transport of pollutants, setting reduction goals for point and nonpoint sources, and to derive effluent limits for NPDES permits. For example, models can be used to predict concentrations of a parameter at a given site, such as instream DO or chlorophyll *a* in a lake.

Models can also be a tool for determining the level of pollutant reductions needed to protect instream standards. In addition, DWQ performs uncertainty analyses of water quality models to expand their predictive capabilities and increase confidence in results. Waste limits may vary from summer to winter for some parameters, such as nutrients and ammonia, with winter limits being somewhat less stringent than summer limits due to higher instream flows during the winter months.

When point sources are responsible for water quality problems, WLAs can yield appropriate permit limits that offer adequate water quality protection. Where a sole discharge is responsible for the water quality impacts, DWQ can perform a simple WLA without considering other discharges. In this case, DWQ will establish limits in accordance with the state's Standard Operating Procedures (SOP) for Wasteload Allocations manual. The SOP manual has been developed to support State and Federal regulations and guidelines and has been approved by the EPA.

A critical factor in determining the wasteload for an individual discharge is whether the receiving waters have a flow during 7Q10 or 30Q2 conditions. DWQ's policy prohibits new or expanded discharges into "no flow" streams that have a 7Q10 and a 30Q2 equal to zero. In addition, DWQ will look for ways to remove existing discharges on such streams unless it is determined that there are no reasonable alternatives. If it is not feasible to remove the discharge, then the facility will be

required to meet limits of 5 mg/l BOD₅ and 2 mg/l NH₃N in summer (and 10 mg/l BOD₅ and 4 mg/l NH₃N in winter).

When numerous discharges affect water quality, the Environmental Management Commission is required to consider the cumulative impacts of all of the permitted discharges to a water body (pursuant to NCGS 143-215.1(b)(2)). Such areas are identified and discussed in Chapter 6. Generally, these are areas where the SOP alone does not provide adequate guidance. Since the SOP addresses mostly single discharge or relatively simple interaction of multiple discharges, WLA procedures outside the realm of the SOP represent the larger, basinwide strategy that DWQ is implementing.

Compliance Monitoring and Enforcement

Most dischargers are required to periodically sample the treated effluent from their discharge pipes. Also, many larger and more complex dischargers are required to sample points in the receiving waters both up and downstream from the discharge point. This process is called self-monitoring and it is typically required five days a week for some parameters (Monday through Friday) for major facilities. The sampling results (contained in a daily monitoring report or DMR) are then submitted each month to DWQ for compliance evaluations.

If a plant does not meet its permitted limits, DWQ may take one or more of the following actions: issue a notice of violation, initiate enforcement action, place the facility on moratorium, and/or enter into a Special Order by Consent (SOC). An SOC is a legal commitment entered into by the state and the discharger that establishes a time schedule for bringing the wastewater treatment plant back into compliance. During this time period, interim waste limits may be assigned to the facility until the improvements can be made. These interim limits may be less stringent than those in the permit although they are still required to protect water quality in the receiving waters.

In addition to the DMR data, illegal or improperly treated discharges may be identified in other ways including through third party reports, routine DWQ site inspections, and water quality monitoring conducted by DWQ staff.

Aquatic Toxicity Testing

There are thousands of chemicals and compounds that can enter wastewater systems and potentially be discharged to surface waters. Treatment plants are unable to monitor each of these chemicals individually due to limited funds and time, and limits in the ability of current analytical techniques to detect some pollutants. Even if the existence and potential effects of every constituent of a wastewater were known, the combined effects of these constituents could not be predicted.

North Carolina uses an integrated approach to aquatic toxicity testing that includes monitoring specific chemicals, assessing resident aquatic populations, and analyzing whole effluent toxicity (WET). Whole effluent toxicity limits predict the impacts of toxicants by measuring those impacts in a laboratory setting. It is from this same foundation of aquatic toxicity laboratory tests that chemical specific limits and criteria are derived for the majority of chemical toxicants.

In February 1987, North Carolina implemented a policy to incorporate WET limits for all major and complex minor permits. As of June 1996, 567 permitted NPDES discharges were required to perform WET monitoring, and over 15,000 individual toxicity analyses had been performed for plants across the state. WET limits were developed to protect aquatic life from the discharge of substances in toxic amounts as prescribed by 15 NCAC 2B. 0208 (i.e. so as not to result in chronic toxicity at permitted discharge flow and 7Q10 receiving flow volumes). Since the

inception of the program, a change in WET limitations has been observed. Previously, DWQ had predicted that approximately 25% of the facilities tested to be acutely toxic instream; however, DWQ has lowered that prediction to ten percent.

Aquatic toxicity testing, like other complex analytical techniques, requires a great deal of quality assurance and control to achieve reliable results. In 1988, North Carolina initiated a program that requires all laboratories performing NPDES analyses in North Carolina to be certified by the state as a biological laboratory. As of June 1996, 22 commercial, municipal, and industrial laboratories had achieved this certification in either aquatic toxicity analyses and/or aquatic population survey. The NC Biological Laboratory Certification Program, much like WET permitting in North Carolina, is looked at as a national leader in its field.

Pretreatment Program

The goal of pretreatment program is to protect municipal treatment plants or publicly-owned treatment works (POTWs) as well as the environment from the discharge of hazardous or toxic wastes into a public sewage system. The pretreatment program regulates non-domestic (e.g., industrial) users of POTWs that discharge toxic wastes under the Domestic Sewage Exclusion of the Resource Conservation and Recovery Act (RCRA). In essence, the program requires that businesses and other entities that use or produce toxic wastes pretreat their wastes prior to discharging their wastewater into the sewage collection system of POTW. State-approved pretreatment programs are typically administered by local governments that operate POTWs.

Local pretreatment program address four areas of concern: (1) interference with POTW operations, (2) pass-through of pollutants to a receiving stream, (3) municipal sludge contamination, and (4) exposure of workers to chemical hazards. Interference refers to any problem with plant operation, including physical obstruction and inhibition of biological activity. DWQ and the local government develop local pretreatment limits by determining the maximum amount of each pollutant the plant can accept at the influent (or headworks) and still protect the receiving water, the POTW itself, and the POTW's sludge disposal options.

Operator Certification and Training Program

Water pollution control systems must be operated by individuals certified by the North Carolina Water Pollution Control System Operators Certification Commission (WPCSOCC). The level of training and certification that the operator must have is based on the type and complexity of the wastewater treatment system. These systems include: wastewater treatment plants, wastewater collection systems and "non-discharge" ground absorption systems, such as alternative on-site disposal technologies and spray irrigation facilities. The Commission currently certifies operators in four grades of wastewater treatment, four grades of collection system operation, subsurface operation, spray irrigation operation, animal waste management and a variety of specialized conditional exams for specific technologies (e.g. oil/water separators).

The Technical Assistance and Certification Group of the North Carolina Division of Water Quality provides staff support for the Commission and assists in organizing training for operators in cooperation with the North Carolina University System, the North Carolina Community College System and through the professional associations for operators and pollution control professionals. Specialty courses and seminars for operators are also offered by the North Carolina combined Section Of The Water Environment Association/American Water Works Association (WEA/AWWA).

Training and certification of operators is essential to the proper operation and maintenance of pollution control systems. Without proper operation and maintenance, even the most effectively designed treatment system will not function efficiently. The goal of the WPCSOCC is to train

competent and conscientious professionals that will provide the best wastewater treatment and thus protect the environment and public health.

Nondischarge and Regional Wastewater Treatment Alternatives

DWQ requires NPDES permit applicants to consider alternatives for disposal of wastewater effluent other than discharge to a stream. For some, there may be no other economically feasible alternatives. However, for others, particularly smaller dischargers, there are a number of potentially cost-effective and environmentally sound alternatives. There are several types of non-discharging wastewater treatment systems including spray irrigation, rapid infiltration, trickling systems and underground injection. Researchers in North Carolina are evaluating artificial wetlands as wastewater treatment systems. Permit requirements for non-discharging systems are listed in Administrative Code Section 15 NCAC 2H .0200 - Waste Not Discharged to Surface Waters.

Another alternative to a surface water discharge is to tie into an existing wastewater treatment system. Where possible, DWQ is encouraging smaller dischargers to connect to large established municipal systems. Regionalization, as this is called, has several advantages. Large municipal facilities, unlike smaller package-type plants, have a larger and better-trained staff, thereby reducing the potential for plant malfunctions. When malfunctions do occur in a large plant, they can be caught and remedied more quickly than in a small plant. Larger facilities provide a higher level of treatment more economically and more consistently than can smaller plants. Larger plants are monitored daily. Additionally, centralizing the discharges reduces the number of streams receiving effluent. As DWQ evaluates future permit expansion requests from regional facilities, it will look favorably upon plants that accept flows from smaller discharges.

Nondischarge permits are required for alternative methods of wastewater treatment. Nondischarge permits are also issued for the land application of residual solids (sludge) from wastewater treatment processes.

NONPOINT SOURCE CONTROL PROGRAMS

Agricultural Nonpoint Source (NPS) Control Programs

Agricultural BMPs have been developed largely to control the five major agriculturally-related causes of pollution: nutrients, sediment, pesticides, oxygen-demanding substances and bacteria. BMPs vary from site to site and are dependent upon a particular pollutant but include practices such as grassed waterways and vegetated buffers, non-discharging animal waste lagoons, integrated crop and pest management and soil testing. BMPs may be administered through one or more of the agricultural programs described below. Common agricultural BMPs are listed in Appendix VI.

- **North Carolina Agriculture Cost Share Program**

In 1984, the North Carolina General Assembly budgeted approximately \$2 million to assist landowners in 16 counties within the "Nutrient Sensitive Water" (NSW) watersheds including the Upper Neuse River (Falls Lake) and the New River in Onslow County to implement BMPs for agricultural and silvicultural activities. These funds were increased in May 1987 to include 17 additional coastal counties by the passage of a General Statute formally creating the *Agriculture Cost Share Program for Nonpoint Source Pollution Control (NCACSP)*. In 1989 the NCACSP became a statewide program. The NCACSP will pay a farmer 75 percent of the average cost of implementing approved BMPs and offer technical assistance to the landowners or users which would provide the greatest benefit for water quality protection. The primary purpose of this voluntary program is water quality protection.

The local Soil and Water Conservation District Boards under the administration of the North Carolina Soil and Water Conservation Commission (SWCC) are responsible for identifying treatment areas, allocating resources, signing contractual agreements with landowners, providing technical assistance for the planning and implementation of BMPs and generally encouraging the use of appropriate BMPs to protect water quality. The criteria for allocating funds to the District is "based on the identified level of agricultural related nonpoint source pollution problems and the respective District's BMP installation goals and available technical services as demonstrated in the District's annual strategy plan" (NC Administrative Code, Title 15, Chapter 6, Section 6E). This local participation is crucial to the success of the program.

The DEHNR-Division of Soil and Water Conservation (DSWC) provides staff, administrative and technical support to the SWCC. The DSWC also coordinates the efforts of various associated Program committees and acts as the clearinghouse for District strategy plans, contracts, etc. A legislated Technical Review Committee meets quarterly "to review the progress of the Program" (G.S. 143-215.74B) and to make technical recommendations to the Commission.

Technical assistance for the implementation of approved BMPs is provided to the Districts through a 50:50 cost share provision for technical positions to be filled at the District level. The USDA-Natural Resources Conservation Service also provides technical assistance.

- **North Carolina Pesticide Law of 1971**

In 1971 the General Assembly created and authorized the North Carolina Pesticide Board to regulate the use, application, sale, disposal and registration of pesticides for the protection of the health, safety, and welfare of the people and for the promotion of a healthy and safe environment. Some of the responsibilities of the Pesticide Board and the North Carolina Department of Agriculture include registering all pesticides prior to distribution and sale in North Carolina, sampling pesticides to insure that all products are up to guaranteed analysis and unadulterated by any other pesticide, sampling pesticides at time of application to insure that the applicator is following label instructions, and certifying the competency of applicators and dealers of restricted use pesticides.

The Pesticide Section of the North Carolina Department of Agriculture conducts mandatory annual inspections of all aircraft used in pesticide application and conducts random inspections of ground application equipment and chemigation systems (application of pesticides through irrigation systems). These inspections are intended to encourage proper calibration and use of equipment in order to avoid excessive application rates and accidental spills from faulty systems. Stop use orders are issued for noncompliance with the regulations.

Inspections are also required for bulk storage tanks prior to filling. All commercial pesticide storage facilities are required to have an approved Pre-fire Plan. In addition, each large commercial storage facility is required to develop and maintain an Emergency Contingency Plan. This plan describes the actions facility personnel shall take to respond to fires, explosions, spills, or any other sudden or gradual release of pesticides or pesticide contaminated materials to air, soil, or surface waters. The Contingency Plan is designed to minimize hazards to human health and the environment.

Penalties are assessed to careless pesticide applicators. Enforcement of the law is based on where the pesticide is deposited rather than just where it is applied. For example, if a pesticide is found in a stream as a result of wind drift, the applicator is subject to legal action. The Raleigh Office staff of the NCDA Pesticide Section is comprised of 20 employees. There are 10 Inspectors who conduct field-level compliance monitoring and investigation services. The annual budget for pesticide control and analytical work is \$1.4 million.

- **NCDA Pesticide Disposal Program**

In 1976, the North Carolina Pesticide Board adopted regulations governing the disposal of pesticides. These regulations make it illegal in North Carolina to dispose of hazardous waste (which includes certain pesticides) in sanitary landfills. While households and farms which generate less than 220 pounds of hazardous waste and less than 2 pounds of acutely hazardous waste are exempt from federal disposal requirements, the regulations prohibiting the disposal of these wastes in sanitary landfills still applies to them. The option to use commercial hazardous waste disposal companies is too expensive and most companies will not pickup small quantities. As a result of this dilemma, the NCDA created the Pesticide Disposal Program in 1980 through appropriations from the General Assembly.

The goal of the Program is to provide an available, affordable and environmentally acceptable mechanism in which any homeowner, farmer, or institution can dispose of unwanted or unusable pesticides. It is mandatory, however, that all pesticide products are labeled correctly before NCDA will pick them up. An EPA permitted hazardous waste treatment or disposal facility (TSD) requires proper identification before the products can be disposed.

The Food and Drug Division of the North Carolina Department of Agriculture administers the Pesticide Disposal Program. The same staff used for enforcing the North Carolina Pesticide Law of 1971 are used in the Disposal Program.

- **Animal Waste Management**

Regulations

On December 10, 1992, the Environmental Management Commission adopted a rule modification (15A NCAC 2H .0217) to establish procedures for properly managing and reusing animal wastes from intensive livestock operations. The goal of the rule is for intensive animal operations to operate so that animal waste is not discharged to waters of the state. This means that if criteria are met and no waste is discharged to surface waters, then an individual permit from DWQ is not required. The rule applies to new, expanding or existing feedlots with animal waste management systems designed to serve more than or equal to the following animal populations: 100 head of cattle, 75 horses, 250 swine, 1,000 sheep or 30,000 birds with a liquid waste system. These operations are deemed permitted if a signed registration and an approved waste management plan certification are submitted to DWQ by the appropriate deadlines.

The deadline for submittal of registrations to DWQ for existing facilities was December 31, 1993. Animal waste management plans for existing facilities must be certified by a technical specialist designated by the Soil and Water Conservation Commission and submitted to DWQ by December 31, 1997. The standards and specifications of the USDA Natural Resources Conservation Service are the minimum criteria used for plan approval by the local Soil and Water Conservation Districts.

Operator Training and Certification

The North Carolina General Assembly ratified Senate Bill 974 (NCGS 143-215.74C - E) on July 29, 1995, which requires that the Department of Environment, Health and Natural Resources, in cooperation with the Cooperative Extension Service, develop and administer a training and certification program for operators of swine facilities with more than 250 swine that land apply animal waste. The Department assigned the task of developing and administering this program to the Technical Assistance and Certification Group of the Water Quality Section. The purpose of this program is to reduce nonpoint source pollution associated with the operation of animal waste management systems. Animal waste management systems are defined as a combination of structural and non-structural practices that collect, treat, store, or apply animal waste to the land. All animal operations with 250 or more swine (*Sus scrofa*)

are required to designate an Operator in Charge who has primary responsibility for the operation of the animal waste management system. There are approximately 4,000 animal operations in the state that are required to designate an Operator in Charge.

A steering committee was established that includes representatives from the animal agriculture industry, environmental groups, North Carolina Department of Agriculture, Natural Resources Conservation Service, Division of Soil and Water Conservation, North Carolina Cooperative Extension Service and the Division of Environmental Management. The primary purpose of this committee was to develop the instructional manual and exam questions for the training and certification program. The manual has been completed and is being used in the training sessions that are primarily being conducted by the Cooperative Extensive Service in each county. Also involved in the training will be personnel from the NC Department of Agriculture, Natural Resources Conservation Service and pork producers. The training sessions for the operators began in April 1996. The examinations will be administered by the Technical Assistance and Certification Group in eighteen locations throughout the state beginning in May, 1996.

Persons who wish to be certified as operators of animal waste management systems must attend a minimum of six hours of training and demonstrate competence in the operation of animal waste management systems by passing an examination. The training and certification requirements must be completed once every five years. Participants in the training program will receive instruction in the following areas: 1) proper operation of animal waste management system components such as lagoons and irrigation systems; 2) waste utilization plans and proper waste, soil and tissue sampling techniques; 3) proper application of waste including calculation of application rates and calibration of equipment; and 4) consequences of improper management and environmental stewardship.

Inspection and Enforcement

Prior to July, 1995, DWQ's limited compliance resources were mostly directed toward getting existing facilities registered, insuring that new and existing facilities had approved waste management plans and responding to citizen complaints.

Following major lagoon dike breaks in late June and July, 1995, DWQ and the Department's natural resources divisions made a major commitment to inspecting all animal operations. As of December 1, 1995, over 4,000 operations were inspected.

These inspections have found a very high percentage of these facilities with problems. DWQ is currently working with these problem facilities to get them into compliance. These efforts include technical assistance, Notices of Violations, notification of loss of deemed permitted status and other appropriate enforcement actions. Approximately 1,800 out of the 3,922 reports entered in the Division's database indicate a compliance problem. As of May 13, 1996, approximately 200 facilities were found to have a discharge during an inspection.

As of May 13, 1996, 40 civil penalty cases were assessed and 8 court injunctions have been filed. Eighty-five facilities have lost their deemed permitted status and are required to obtain a certified waste management plan prior to the December 31, 1997 deadline.

Animal Inspection Database
May 13, 1996

Inspections	Total	Swine	Cattle	Poultry
Reports Entered	3922	3,012	803	107
Inadequate Freeboard	579	449	87	43
Seepage observed from lagoon	118	85	26	7
Erosion observed	426	376	32	18
Inadequate acreage available for spray	112	96	3	13
Cover crop inadequate	225	206	4	15
Man made conveyance of wastes	154	99	52	3
Inadequate Records	1,078	868	162	48
Non-Man made conveyance of wastes	59	43	8	8

This is preliminary information based on only the inspection reports entered as of the date of the report. These numbers are not considered accurate until a quality assurance procedure is in place. These numbers will change daily based on the entry of new reports and quality assurance checks of the information in the data base.

Swine Farm Siting Act

The Swine Farm Siting Act, SB 1080, was adopted on July 11, 1995 to minimize adverse impacts on property adjoining concentrated animal operations. The Act specifies that a swine house or lagoon of a new farm sited on or after October 1, 1995 is required to be at least 1,500 feet from any occupied residence; at least 2,500 feet from any school, hospital, or church; and at least 100 feet from any property boundary. The Act restricts the application of lagoon effluent to land at least 50 feet from a residential property line and from any perennial stream or river, excluding irrigation ditches and canals. If written permission is given by the property owner and recorded with the Register of Deeds, a swine house or lagoon may locate closer to a residence, school, hospital, church, or property boundary.

• **NC Cooperative Extension Service and Agricultural Research Service**

Crop and animal production programs are administered under the research and education activities of the NC Agricultural Research Service (ARS) and the NC Cooperative Extension Service (CES). The research and education efforts are broad and include areas such as variety development, crop fertilizer requirements, soil testing, integrated pest management, animal housing, animal waste management, machinery development and irrigation. Guidelines for most agricultural enterprises have been developed and made available to farmers. A more intensified water quality emphasis is being incorporated in these areas and many other projects undertaken by ARS and CES. The local contact that county CES agents have with farmers and homeowners provides an excellent opportunity for dialogue and education in nonpoint source pollution control. This network of contacts can be used to inform people about BMPs and to provide some structure for a general NPS education program.

The NC Agricultural Research Service and the NC Cooperative Extension Service conduct broad research and education efforts that include areas such as variety development, crop fertilizer requirements, soil testing, integrated pest management, animal housing, animal waste management, machinery development, and irrigation. County Cooperative Extension agents work closely with farmers and homeowners, providing an excellent opportunity for dialogue and education in nonpoint source pollution control. In addition, CES has begun assisting DWQ in holding a series of public workshops in each river basin prior to DWQ's preparation of the draft basin plan.

• **Soil, Plant Tissue, and Animal Waste Testing Program**

These services provide farmers with information necessary to improve crop production efficiency, to manage the soil properly and to protect environmental quality. The Soil, Plant

Tissue and Animal Waste Testing Program is administered by the Agronomic Division of the North Carolina Department of Agriculture. Water and wastewater from lagoons is also tested for irrigation and fertilizer use.

- **Watershed Protection and Flood Prevention Program (PL 83-566)**
The purpose of the Watershed Protection and Flood Prevention Program is to provide technical and financial assistance in planning, designing, and installing improvement projects for protection and development of small watersheds. The Program is administered by the USDA-Natural Resources Conservation Service in cooperation with the NC Division of Soil and Water Conservation, the State Soil and Water Conservation Commission, the U.S. Forest Service, Soil and Water Conservation Districts, and other project sponsors.

The emphasis of the Program over the past three decades has been to provide flood control. However, legislation has shifted emphasis of PL-566 land treatment projects so that a project proposal must demonstrate off-site water quality benefits in order to have any chance of funding.

- **Food Security Act of 1985 (FSA) and the Food, Agriculture, Conservation and Trade Act of 1990 (FACTA)**
There are several provisions authorized by the federal Food Security Act of 1985 (FSA) and re-authorized by the Food, Agriculture, Conservation, and Trade Act of 1990 (FACTA) which offer excellent opportunities for the abatement of agricultural nonpoint source pollution. The FSA and FACTA make the goals of the USDA farm and conservation programs more consistent by encouraging the reduction of soil erosion and production of surplus commodities and the retention of wetlands. At the same time, the provisions can serve as tools to remove from production those areas which critically degrade water quality by contributing to sedimentation. Important water quality-related provisions are known as the Conservation Reserve, Conservation Compliance, Sodbuster, Swampbuster, and Conservation Easement, Wetland Reserve, and Water Quality Incentive Program. These provisions are administered by the USDA.

Conservation Reserve Program

The Conservation Reserve Program (CRP) is administered by the USDA Agricultural Stabilization and Conservation Service (ASCS) and the USDA Natural Resources Conservation Service (NRCS). Other cooperating agencies include the NC CES, NC Division of Forest Resources and local Soil and Water Conservation Districts. The CRP was established to encourage removing highly erodible land from crop production and to promote planting long-term permanent grasses and tree cover. The ASCS will share up to half of the cost of establishing this protective cover. The intention of the program is to protect the long term ability of the US to produce food and fiber by reducing soil erosion, improving water quality and improving habitat for fish and wildlife. Additional objectives are to curb the production of surplus commodities and to provide farmers with income supports through rental payments over a 10 year contract period for land entered under the CRP.

Conservation Compliance

The Conservation Compliance provision of the FSA and FACTA discourages the production of crops on highly erodible cropland where the land is not carefully protected from erosion. Highly erodible land is defined as land where the potential erosion (erodibility index) is equal to eight times or greater than the rate at which the soil can maintain continued productivity. This rate is determined by the Natural Resources Conservation Service.

A farmer had until January 1, 1990 to develop and begin applying a conservation plan on highly erodible land. Plans were required to be operational by January 1, 1995. If a conservation plan is not developed and implemented, the farmer loses eligibility in price and

income supports, crop insurance, FHA loans, Commodity Credit Corporation storage payments, farm storage facility loans, Conservation Reserve Program annual payments, and other programs under which USDA makes commodity-related payments. In other words, Conservation Compliance is an economic disincentive, quasi-regulatory program.

Sodbuster

The Sodbuster provision of the FSA and FACTA is aimed at discouraging the conversion of highly erodible land for agricultural production. It applies to highly erodible land that was not planted in annually tilled crops during the period 1981-85. As with the other provisions of the FSA, the Natural Resources Conservation Service determines if a field is highly erodible. If a highly erodible field is planted in an agricultural commodity without an approved conservation system, the landowner (or farmer) becomes ineligible for certain USDA program benefits.

Swampbuster

The purpose of Swampbuster is to discourage the conversion of wetlands to cropland use. Wetlands are defined as areas that have a predominance of hydric soils that are inundated or saturated by surface water or groundwater at a frequency or duration sufficient to support a prevalence of hydrophytic (water loving) vegetation. It is the responsibility of the Natural Resources Conservation Service to determine if an area is a wetland. Like the other provisions of the FSA and FACTA, a farmer will lose eligibility for certain USDA program benefits on all the land which is farmed if a wetland area is converted to cropland.

Conservation Easement

The Conservation Easement provision encourages producers whose FHA loans are in or near default to place their wetland, highly erodible land, and fragile land in conservation, recreation, or wildlife uses for periods of at least 50 years. The producer benefits by having the FHA loan partially canceled. The environment benefits by reducing the level of soil disturbing activities and the threat of agricultural pollutants.

Wetland Reserve

FACTA established a voluntary program for farmers to grant the federal government a 30-year or perpetual easement to wetlands. Eligible land includes farmed or converted wetlands which could be restored to their highest wetland function and value. The goal is to enroll one million acres by the end of 1995.

Water Quality Incentive Program

FACTA established this cost sharing program to help farmers control pollution problems associated with agricultural activities. A producer could receive up to \$3,500 in cost share assistance to implement approved BMPs. The goal is to enroll 10 million acres by 1995.

Nonpoint Source Programs for Urban and Developed Lands

- **Federal Urban Stormwater Discharge Program / NC NPDES Stormwater Program**

In 1987, Congress passed the Water Quality Act Amendments to the Clean Water Act requiring the U.S. Environmental Protection Agency (EPA) to develop regulations on permit application requirements for stormwater discharges associated with industrial activities as well as those associated with large and medium municipal separate storm sewer systems (population greater than 100,000). These regulations became effective in December 1990.

The goal of the stormwater discharge permitting regulations in North Carolina is to prevent stormwater runoff pollution by controlling the source(s) of pollutants. Defining the potential pollutant sources and establishing controls of the sources that will reduce and minimize pollutant availability will result in an improvement to the water quality of the receiving streams, consistent with the overall goal of the water quality program. Authority to administer these

regulations has been delegated to the North Carolina Division of Water Quality (DWQ). The NPDES stormwater regulations require that facilities with stormwater point source discharges associated with industrial activity and municipalities defined as either large or medium municipal separate storm sewer systems be permitted.

The municipal permitting requirements are designed to lead to the formation of site-specific stormwater management programs for a municipal area. Therefore, the permits issued to municipalities for their municipal separate storm sewer systems will be explicitly written for each individual municipality. Municipal permits of this type in North Carolina are currently required for Charlotte, Durham, Greensboro, Raleigh, Winston-Salem and Fayetteville/Cumberland County. The municipalities will develop and implement comprehensive stormwater quality management programs to reduce the discharge of pollutants in stormwater to the maximum extent practicable (MEP). MEP will be defined separately for each municipality required to be permitted. Industrial facilities discharging through a municipal separate storm sewer system are required to submit a permit application to the state and receive their own NPDES stormwater permit.

Industrial activities which require permitting are defined in eleven categories in the federal regulations ranging from sawmills and landfills to phosphate manufacturing plants and hazardous waste treatment, storage or disposal facilities. The regulations cover point source discharges that are related to manufacturing, processing, or material storage areas at an industrial facility. Stormwater discharges associated with industrial activities are required to be covered by permits which contain technology based controls based on Best Available Technology (BAT)/Best Conventional Pollutant Control Technology (BCT) considerations or water quality controls, if necessary. Through monitoring and regulating stormwater discharge quality, the goal of the NPDES stormwater program is to reduce the pollutant load in stormwater runoff.

The permitting requirements described here represent Phase I of the stormwater program. EPA and Congress are currently involved in studies to determine the scope of additional stormwater coverage under Phase II of the stormwater program. Further stormwater NPDES coverage could include additional industrial activities or additional municipal areas. If additional areas of coverage are added under the federal stormwater programs, DWQ will be responsible for the appropriate permitting of these areas within North Carolina.

• **Water Supply Watershed Protection Program**

Approximately 50 percent of North Carolina's population depends on surface water supplies for drinking, commercial, and industrial uses. Water supplies have become more important in recent years because of increased demand for water, concern over potential contamination by toxic substances, and protection of human health. As a result, the General Assembly passed the Water Supply Watershed Protection Act of 1989 (NCGS 143-214.5). This Act requires all local governments that have land-use jurisdiction within surface water supply watersheds, or a portion thereof, to be responsible for implementation and enforcement of nonpoint source management requirements related to urban development, according to minimum standards adopted by the state. NPS control strategies are included in the rules for urban, agricultural, silvicultural, and Department of Transportation activities. The Water Supply Watershed Protection Rules were adopted by the Environmental Management Commission on February 13, 1992 and became effective on August 3, 1992. These rules were recently revised (effective August 1, 1995) to give local governments more flexibility in the implementation of water supply protection programs.

The purpose of the Water Supply Watershed Protection Program is to encourage communities to work with the state to provide enhanced protection for their water supply from nonpoint pollution sources. There are five water supply classes that are defined according to existing land use and the amount and types of permitted wastewater discharges. (See Appendix I for a

summary of the management requirements for the five water supply classifications.) By classifying a watershed as a water supply watershed, local governments with land use jurisdiction within the watershed will take steps to control nonpoint sources of pollution and thereby reduce the potential of pollutants contaminating drinking water supplies. In turn, the state limits the point source discharges that can locate within the watershed which reduces the potential of contamination of the water supply.

This dual approach of state and local government action to preclude potential impacts from stormwater runoff and wastewater discharges is important since only a small fraction of the pollutants that enter water supplies from nonpoint sources have water quality standards. As more is learned about the types and effects of pollutants in our drinking waters, the state will be forced to adopt additional water quality standards. If these additional standards are imposed, one effect may be that water treatment facilities will be required to apply additional technology and possibly more expensive treatment facilities or operation to ensure safe drinking water. It is, therefore, very important for the state and local governments to consider alternative means of preventing nonpoint source pollution from entering drinking water supplies in the first place. The land-use requirements, including density controls, buffers along perennial streams and stormwater control requirements for high density developments are but a few ways to accomplish this.

The Water Supply Protection Program is administered by staff in the Operations Branch of the DWQ. These staff coordinate with the Division of Community Assistance (NCDCA) which helps local governments develop land-use ordinances, the Division of Environmental Health, which certifies that a proposed water supply is suitable for drinking water, and DWQ staff in NCDEHNR regional offices who are responsible for water quality sampling. Statewide, the compliance rate for submittals is 100%.

- **Coastal Stormwater Management**

In November 1986, the EMC adopted rules which required new development in a limited zone (575 feet) around Class SA (shellfish) waters to control stormwater either by limiting density or completely controlling a 4.5 inch, 24-hour storm with the use of a stormwater treatment system. The regulations applied to development activities which required either a CAMA major permit or a Sediment/Erosion Control Plan (generally development disturbing more than one acre). The design storm, low density limits, and aerial coverage were all quite controversial and the adopted rules represented a compromise by all parties. A sunset provision was added to the rules to force the staff and Commission to reconsider the rules after a year. These rules expired December 31, 1987, but new stormwater regulations were adopted having an effective date of January 1, 1988. ~~These regulations are administered by the DWQ.~~ Approximately five man-years are allocated to implementing this program. Planning Branch staff are responsible for providing guidance and interpretation to promote consistent implementation of the rules: DWQ regional staff review and approve plans and enforce the requirements of the regulations.

Perhaps the most important measure accomplished with the regulations has been the applicability of stormwater controls to development activities within the 20 CAMA coastal counties. Certainly the near-water impact of stormwater as addressed in the original rules is important, but the staff believed the cumulative impact of stormwater runoff throughout the coastal zone also needed to be addressed. Therefore, the expanded area of coverage helps provide better protection of both shellfish waters and coastal water quality in general.

Other major items specified in the rules address the sizing of stormwater treatment systems. For developments adjacent to SA waters, infiltration systems must be able to retain 1.5 inches of rainfall, whereas development in other areas must control one inch of rainfall. Wet detention ponds are not allowed for stormwater control near SA waters and must be sized for 85 percent TSS removal in other areas. In addition, porous pavement is considered an innovative

infiltration system (only five are allowed until they are proven to work) as evidence has not been provided regarding its effectiveness in coastal areas. A low density option of the new regulations applies a built-upon limit of 25 percent for SA areas and 30 percent for other coastal areas rather than a limit on effective impervious cover. Development exceeding these levels is required to have an engineered stormwater system as indicated.

In summary, the regulations, which have an expanded aerial coverage increases the annual number of projects affected from approximately 50 (original rules) to 500. This increase is coincident with a reduction in design storm that is comparable to requirements in other states. In addition, the low density option, retained from the original regulations, is encouraged as operation and maintenance concerns associated with stormwater controls are not applicable.

- **Coastal Nonpoint Pollution Control Programs**

As part of the Coastal Zone Act Reauthorization Amendments of 1990, Congress enacted a new section 6217 entitled "Protecting Coastal Waters". This provision requires states with coastal zone management programs (which includes North Carolina) that have received Federal approval under section 306 of the Coastal Zone Management Act (CZMA) to develop and implement Coastal Nonpoint Pollution Control Programs. The coastal nonpoint programs will provide additional control for sources of nonpoint pollution that impair coastal water quality. Sources subject to the 6217 Coastal NPS Program include: agriculture, forestry operations, urban and developing areas, marinas, hydromodification projects, and wetlands and riparian areas.

Section 6217 requires coastal states to submit their coastal nonpoint control programs to the National Oceanic and Atmospheric Administration (NOAA) and the U.S. EPA for approval by July 1995. The programs are to be implemented by January, 1999. Failure to submit an approvable program by July 1995 will result in a state losing substantial portions of its Federal funding under section 306 of the CZMA and section 319 of the Clean Water Act. The coastal nonpoint program will be developed and administered jointly by the NC Division of Coastal Management and DWQ.

Summary of Changes Since 1989

- The N.C. DWQ has developed programs for the administration of NPDES stormwater permits for industries and municipalities.
- The N.C. DWQ has developed and issued eighteen general permits to cover a variety of facilities that discharge stormwater associated with industrial activity.
- Water Supply Protection Legislation was passed in N.C. which has resulted in the development and implementation of statewide water supply watershed protection requirements. This program is described in detail in the previous section.
- The stormwater management rules governing coastal areas, High Quality Waters and Outstanding Resource Waters have been modified. These rules were finalized and effective on September 1, 1995. These programs are described in more detail in the previous section.
- Educational Efforts: The N.C. DWQ has instituted a number of educational efforts related to stormwater management across the state. These efforts have included:
 - Guidance Manuals:
 - 1 *Stormwater Management Guidance Manual*
 - 2 *Stormwater Management In North Carolina: A Guide For Local Officials*
 - Fact Sheets on Stormwater Management
 - 1 *Stormwater Problems and Impacts*
 - 2 *Stormwater Control Principles and Practices*
 - 3 *Stormwater Management Roles and Regulations*
 - 4 *Local Stormwater Program Elements and Funding Alternatives*
 - Statewide Stormwater Conference - (1994)

- Statewide Workshops on The Water Supply Protection Program (1994 & 95)
- Statewide Workshops on Stormwater Management (1995)
- **ORW and HQW Stream Classifications**
Outstanding Resource Waters (ORW) and High Quality Waters (HQW) have management strategies that address handling of urban stormwater. Controls for urban stormwater, either through development density limitations or stormwater treatment systems, are required by DWQ. Other NPS management agencies are expected to place priority on protecting these waters as well. For example, the NC Department of Transportation and the NC Division of Land Resources require more stringent sediment control on construction sites in ORW and HQW areas.
- **CAMA Land Use Plans**
The Coastal Area Management Act (CAMA), passed in 1974, requires the development of land use plans by each of the 20 coastal counties that fall within the coastal area. These plans must be consistent with state guidelines and address a wide range of issues, including resource protection and conservation, hazards mitigation, economic development and public participation. Land use plans must be updated every five years. 1995 revisions to the land use planning guidelines strengthened the connection between land use planning and surface water quality. Future land use plan updates must consider water quality use classifications, watershed planning and problems identified in basinwide plans. There are 91 jurisdictions that have prepared and adopted CAMA land use plans.

A land use plan is a "blueprint" used by local leaders to help guide the decisions that affect their community. Through land use planning, local jurisdictions can influence how growth will affect surface water quality by adopting policies supported by local ordinances, promoting better sedimentation and erosion control standards, stream buffers and lower levels of impervious surface cover. Although land use plans are required only in the state's coastal area, these land use planning tools for the protection of water quality are available to any jurisdiction which chooses to implement them.

Construction - Sedimentation and Erosion Control Nonpoint Source Program

In 1973, the North Carolina General Assembly enacted the Sedimentation Pollution Control Act (SPCA). The Act authorized the establishment of a sediment control program to prevent accelerated erosion and off-site sedimentation caused by land-disturbing activities other than agriculture, forestry, and mining. The Land Quality Section of the Division of Land Resources is responsible for administration and enforcement of the requirements of the Act under the authority of the NC Sedimentation Control Commission.

The sediment control program requires, prior to construction, the submission and approval of erosion control plans on all projects disturbing one or more acres. On-site inspections are conducted to determine compliance with the plan and to evaluate the effectiveness of the BMPs which are used. The intent is to offer permanent downstream protection for stream banks and channels from damages caused by increased runoff velocities. If voluntary compliance with the approved plan is not achieved and violations occur, the Land Quality Section will pursue enforcement through civil penalties and injunctive relief. House Bill 448, passed in 1991, authorized the issuance of stop-work orders for violations of the SPCA. This additional enforcement mechanism will help improve the overall performance of the program.

Sedimentation control rules are more stringent for areas draining to waters supplementally classified as Trout or High Quality Waters.

Local programs are reviewed annually for compliance with the requirements of the Sedimentation Pollution Control Act. The Land Quality Section also conducts educational programs directed toward state and local government officials in order to strengthen the local programs. Persons engaged in land-disturbing activities and interested citizen groups are included in the educational effort.

The Sedimentation Control Commission has delegated to the Division of Highways of the North Carolina Department of Transportation (DOT) the authority to approve erosion and sedimentation control plans for land-disturbing activity conducted by that agency or by other persons under highway contracts with that agency. The DOT sedimentation control program has been reviewed by the Division of Land Resources under the authority of the Sedimentation Control Commission. DOT uses more stringent sedimentation controls in areas adjacent to High Quality Waters and Outstanding Resource Waters. The NC Department of Environment, Health, and Natural Resources (NCDEHNR) has established a position to evaluate environmental aspects of DOT highway projects and programs. DOT, in cooperation with DWQ, has developed and adopted formal BMPs for protection of surface waters. These BMPs and other efforts are significant improvements in developing a proactive system at DOT toward environmental issues.

On-Site Wastewater Disposal - Sanitary Sewage Systems Nonpoint Source Program

Septic tank soil absorption systems are the most widely used method of on-site domestic wastewater disposal in North Carolina. More than 52 percent of all housing units in the state are served by septic tank systems or other systems besides public or community sewage systems. A conventional septic system consists of a septic tank, a distribution box or equivalent branching lines, and a series of subsurface absorption lines consisting of tile or perforated pipes laid in a bed of gravel. All subsurface sanitary sewage systems are under the jurisdiction of the Commission for Health Services (CHS) of the Department of Environment, Health, and Natural Resources. The CHS establishes the rules for on-site sewage systems which are administered by the Division to Environmental Health. BMPs for onsite sewage systems are listed in Appendix VI.

According to GS 130A-335(e) and (f), the rules of the CHS and the rules of the local board of health shall address at least the following: sewage characteristics; design unit; design capacity; design volume; criteria for the design, installation, operation, maintenance, and performance of sanitary sewage collection, treatment, and disposal systems; soil morphology and drainage; topography and landscape position; depth to seasonally high water table, rock, and water impeding formations; proximity to water supply wells, shellfish waters, estuaries, marshes, wetlands, areas subject to frequent flooding, streams, lakes, swamps, and other bodies of surface or groundwaters; density of sanitary sewage collection, treatment, and disposal systems in a geographical area; requirements for issuance, suspension, and revocation of permits; and other factors which affect the effective operation in performance of sanitary sewage collection treatment and disposal systems.

The rules also must provide construction requirements, standards for operation, and ownership requirements for each classification of sanitary systems of sewage collection, treatment, and disposal in order to prevent, as far as reasonably possible, any contamination of the land, groundwater, and surface waters. There exists a strict permitting procedure which regulates site selection, system design, and installation of on-site sewage systems. Privately owned subsurface sewage discharging systems are governed by NCDEHNR through local county health departments. Authorized local sanitariums serve as agents of NCDEHNR and assist in implementing the state sewage rules. Local boards of health may adopt by reference the state rules and append to those rules more stringent laws and local criteria which they desire. These amendments, however, must be approved by the state. Only nine counties in the state currently

operate under local rules. The 1983 amendments of the state public health laws eliminated the comingling of state rules with local rules except by state approval.

The Straight Pipe Elimination Amnesty Program was established in 1996 for the purpose of eliminating domestic sewage or wastewater discharges, from both straight pipes and overland flow of failing septic systems. The program contains three components: identification and elimination of domestic sewage discharges into streams currently or proposed to be used for public water supplies; an amnesty period to end on December 31, 1997 during which time violations of State rules and laws on domestic sewage and wastewater discharges identified as a result of this program will not result in legal consequences; and a public education effort on the program and the amnesty period.

Solid Waste Disposal NPS Programs

- **Federal Program**

The major federal legislation in the area of solid waste management is the Resource Conservation and Recovery Act (RCRA) administered by the U.S. Environmental Protection Agency (EPA). RCRA deals almost entirely with hazardous waste management but it does require that states meet minimum standards for solid waste facilities. EPA does not have permitting authority over solid waste management facilities.

- **State Program**

States are accorded a major role in solid waste management by RCRA. North Carolina now operates under revisions by the General Assembly to Chapter 130A of the General Statutes. The Division of Solid Waste Management (DSWM) in the Department of Environment Health and Natural Resources is authorized as the single state agency for the management of solid waste. DSWM is responsible for the development of the state's solid waste management plan, has permitting authority over all solid waste management facility siting and operation, inspects permitted facilities, provides technical assistance, investigates complaints, responds to emergencies, monitors ground water quality at facilities, promotes the state's recycling effort, and closes non-conforming sites.

The Solid Waste Management Act of 1989 established the policies and goals of the state to recycle at least 25 percent of the total waste stream by January 1, 1993. This Act created a Solid Waste Management Trust Fund to promote waste reduction and fund research and demonstration projects to manage solid waste. In 1991, the Solid Waste Management Act of 1989 was amended to broaden the goal to reduce the solid waste stream by 40 percent through source reduction, reuse, recycling, and composting by June 30, 2001.

The state adopted solid waste management rules, effective February 1, 1991, requiring liner, leachate collection, and final cover systems at all new landfills, lateral expansions of existing landfills, and at all active landfills by January 1, 1998. Septage rules and regulations also have been adopted and are administered through a permit program.

- **Local Program**

Solid waste collection and disposal has long been a municipal function. The operation of solid waste collection and disposal facilities is among the enterprises which municipalities are expressly authorized by statute to operate (G.S. 160A-311 through 160A-321). Municipalities are also authorized to regulate the disposal of solid waste within their corporate limits. Such regulations may specify the location and type of receptacles to be used for collection (G.S. 160A-192).

Outside municipal limits, counties are authorized to operate solid waste collection and disposal facilities either as a function of county government or through establishment of a special service

district (G.S. 153A-292 and 301). Since 1970, county governments have increasingly accepted responsibility for solid waste disposal activities and most disposal facilities in the state are now operated by counties or with county financial assistance.

Forestry NPS Programs

- **Forest Practice Guidelines Related to Water Quality**

In 1989 the Sedimentation Pollution Control Act (SPCA) was amended to limit the forestry exemption to those operations that adhere to forest practice guidelines. The forestry amendment to the SPCA required the Division of Forest Resources to develop performance standards known as the Forest Practices Guidelines Related to Water Quality.

Guidelines consist of nine performance standards for activities such as maintaining streamside management zones and applying fertilizer and pesticide applications. These Guidelines are used to determine if a forestry operation will fall under the jurisdiction of the Division of Land Resources which enforces the SPCA. The Guidelines were developed in October 1989 and were put into effect on January 1, 1990. A Memorandum of Agreement was also signed between the Division of Forest Resources and the Division of Land Resources to coordinate their respective activities in the sedimentation control program. DLR has also signed an MOA with DWQ.

Site-disturbing forestry activities are being inspected by local DFR personnel as part of a training, mitigation, and monitoring program. Site inspections are conducted when a problem or potential problem is suspected to exist. Sites not brought into compliance within a reasonable time schedule are referred by DFR to DLR or DWQ for appropriate enforcement action. Commonly used forestry BMPs are listed in Appendix VI.

- **National Forest Management Act (NFMA)**

The National Forest Management Act was passed in 1976 and applies to all lands owned or administered by the National Forest System. The Act stipulates that land management plans be prepared which consider economic and environmental aspects of forest resources. The Act further states that timber will be harvested from National Forest lands only where soil, slope, or other watershed conditions will not be irreversibly damaged; and where protection is provided for streams, streambanks, shorelines, lakes, wetlands, and other bodies of water from detrimental changes in water temperatures, blockages of watercourses, and deposits of sediment, where harvests are likely to seriously and adversely affect water conditions or fish habitat.

- **Forest Stewardship Program**

The Division of Forest Resources initiated the Forest Stewardship Program in 1991 along with the cooperation and support of several other natural resource and conservation agencies. This program encourages landowners with ten or more acres of forestland to become involved and committed to the wise development, protection and use of all natural forest resources they own or control.

Mining NPS Program

In 1971 the North Carolina General Assembly passed the Mining Act to ensure that the usefulness, productivity, and scenic values of all land and waters involved in mining will receive the greatest practical degree of protection and restoration. The Mining Commission is the rule-making body for the Act and has designated authority to administer and enforce the rules and regulations of the Act to the Mining Program within the Land Quality Section of the NCDEHNR Division of Land Resources.

The Mining program has four major areas of responsibility. First, the Program requires submission and approval of a mining permit application prior to initiating land disturbing activity if the mining operation is one (1) or more acres in surface area. The mining permit application must have a reclamation plan for these operations. Second, the Program conducts on-site inspections to determine compliance with the approved application and whether or not the plan is effective in protecting land and water quality. Third, the program pursues enforcement action through civil penalties, injunctive relief, and/or bond forfeiture to gain compliance when voluntary compliance is not achieved. Finally, the Mining Program conducts educational efforts for mine operators.

Wetlands Regulatory NPS Programs

There are numerous reasons for preserving wetlands, but of special interest within the context of basinwide planning is their role in protecting water quality. Because of their intrinsic characteristics and location within the landscape, wetlands function to protect water quality in a number of ways. These functions include the retention and removal of pollutants, stabilization of shorelines, and storage of flood waters.

Numerous authors have studied the effectiveness of riparian wetland forests for nutrient retention and transformation (Jones et al. 1976; Yates and Sheridan 1983; Brinson et al. 1984; Lowrance et al. 1984; Peterjohn and Correll 1984; Jacobs and Gilliam 1985; Budd et al. 1987; and Groffman et al. 1991). The location of riparian wetlands allows them the opportunity to receive nutrients from the surrounding landscape as well as through overbank flooding. In addition to the storage of nutrients in wetland vegetation, the microbial and chemical processes within wetland soils may function to completely remove nutrients from the system.

Headwater riparian wetlands are extremely important and effective in terms of sediment and associated nutrient and toxicant retention and transformation. Since small streams comprise most of the total stream length within a watershed (Leopold 1974), these areas intercept the greatest proportion of eroded sediments and associated substances from uplands before these pollutant reach waters downstream. Novitzki (1978) found that approximately 80% of the sediments entering a stream were retained in headwater wetlands.

Wetlands adjacent to streams, rivers and lakes stabilize shorelines and help protect these bodies of water from erosive forces. This function is particularly important in urbanized watersheds where the prevalence of impervious surfaces contributes to greater peak storm flows. Wetland vegetation serves to dissipate erosive forces and anchors the shoreline in place preventing sediments and associated pollutants from entering waterways. Wetlands by their very nature of being "wet" are also vital for water storage. ~~Those wetlands adjacent to surface waters, that have the opportunity~~ to receive flood waters and surface runoff, are most important to water storage. Wetlands located in headwaters generally minimize peak flood waters in tributaries and main channels. Lakes and wetlands with restricted outlets hold back flood waters and attenuate flood peaks (Carter et al. 1978).

Several important state and federal wetland protection programs are described below. In addition to the following wetlands programs, provisions of the 1985 and 1990 Farm Bills, discussed in Section 5.3.1, should also help reduce wetlands impacts. Agriculture conversions should be reduced by the "swampbuster" provision of the 1985 Farm Bill, which encourages farmers not to convert wetlands for agriculture to prevent the loss of their USDA subsidies, loans, and price supports. Silviculture is exempted from the swampbuster provision and therefore, conversion of wetlands for intensive or managed forestry is not affected by this provision. A Wetland Reserve Program was established by the 1990 Farm Bill with the goal of allowing one million acres of prior-converted wetlands to revert back to wetlands by 1995.

- **Section 10 of the Rivers and Harbors Act of 1899**

This act, administered by the US Army Corps of Engineers, provides the basis for regulating dredge and fill activities in navigable waters of the United States. Originally, this Act was administered to protect navigation and the navigation capacity of the nation's waters. In 1968, due to growing environmental concerns, the review of permit applications was changed to include factors other than navigation including fish and wildlife conservation, pollution, aesthetics, ecology, and general public interest. Activities which may be covered under the Act include dredging and filling, piers, dams, dikes, marinas, bulkheads, bank stabilization and others.

- **Section 404 of the Clean Water Act**

The U.S. Army Corps of Engineers administers a national regulatory program under Section 404 of the Clean Water Act aimed at controlling the discharge of dredged or fill material into waters of the United States. Section 404 applies to the discharge of dredged or fill materials into waters of the United States including dredging. Waters of the United States refers to navigable waters, their tributaries, and adjacent wetlands. Activities covered under Section 404 include dams, dikes, marinas, bulkheads, utility and power transmission lines and bank stabilization. Although the 404 program does not fully protect wetlands, it is nonetheless the only existing federal tool for regulating wetland development statewide. State legislation has not been adopted to protect inland freshwater wetlands in North Carolina, as has been done for coastal wetlands, but the EMC in March of 1996 adopted rules which will formalize the wetlands protection measures associated with the 401 Water Quality Certification review process.

- **Section 401 Water Quality Certification (from CWA)**

The Division of Water Quality is responsible for the issuance of 401 Water Quality Certifications. Section 401 of the federal Clean Water Act provides that no federal agency can issue any license or permit to conduct any activity that may result in a discharge to navigable waters unless the state in which the discharge may occur certifies that the discharge will not result in a violation of any state water quality or related standards. Thus, a 401 certification is required for, among other things, a discharge into surface waters or wetlands for projects that require a section 404 permit. A federal permit cannot be issued if a 401 certification is denied. Any conditions added to the 401 certification become conditions of the 404 permit. The 401 certification process is coordinated with the 404 and CAMA processes in the 20 counties of CAMA jurisdiction.

- **North Carolina Dredge and Fill Act (1969)**

This act requires permits for "excavation or filling begun in any estuarine waters, tidelands, marshlands, or state-owned lake". This law is currently administered with North Carolina's Coastal Area Management Act (CAMA) (1974).

- **Wetlands Restoration Program/Funds**

The Wetlands Restoration Program was established in 1996 as a nonregulatory program "...for the acquisition, maintenance, restoration, enhancement, and creation of wetland and riparian resources that contribute to the protection and improvement of water quality, flood prevention, fisheries, wildlife habitat, and recreational opportunities". The purposes of the program include: the restoration of wetlands function and values; to provide a consistent and simplified approach to mitigation requirements associated with permits or Corps of Engineers authorizations; to streamline the permitting process; to increase the ecological effectiveness of mitigation efforts; to achieve a net increase in wetlands acres, functions and values for each major river basin; to promote a comprehensive approach to environmental protection.

Through the Wetlands Restoration Program, basinwide plans for wetlands and riparian area restoration will be developed. The goals of the plans are to protect and enhance "...water

quality, flood prevention, fisheries, wildlife habitat, and recreational opportunities..." These plans will be developed for each of the seventeen major river basins in the state beginning in July 1997. Compensatory mitigation (a required condition of section 404 permits issued by the U.S. Corps of Engineers) options will be addressed within the plans.

A Wetlands Restoration Fund has been established under the program. The Fund is a trust fund designed as a repository for monetary contributions and dedication of interest to real property under the compensatory mitigation options. These funds will primarily be used to restore, enhance, preserve or create wetlands and riparian areas in accordance with the basinwide plan.

Hydrologic Modification

Hydrologic modification is defined as channelization, dredging, dam construction, flow regulation and modification, bridge construction, removal of riparian vegetation, streambank modification/destabilization, and dam collapse. By its very nature hydrologic modification is closely tied to wetland issues. It is not surprising then that the U.S. Army Corps of Engineers (Corps) is the agency most involved in issuing permits for land-disturbing activities in wetlands. These permits are issued through Section 404 and the Rivers and Harbors Act discussed above.

In addition to wetland issues, dam construction and the lack of low flow releases into streams can severely impact downstream aquatic resources. Dam construction, repair, modification, and removal are regulated by the NC Division of Land Resources under the Dam Safety Law of 1967. A dam safety permit is required for any dam which is 15 feet or greater in height (from top of dam to lowest point on downstream toe) and the impoundment capacity is 10-acre-feet or greater at the top of the dam. Low-flow release requirements to maintain adequate instream flows are established in permits where appropriate. Instream flows are recommended by the NC Division of Water Resources.

There are several other programs which can affect hydrologic modification. The Forest Practice Guidelines Related to Water Quality requires streamside management zones to be maintained during logging operations. The Water Supply Watershed Protection Program also has requirements to maintain buffers for certain activities. The Conservation Reserve Program encourages the establishment of vegetative filter strips (66-99 feet wide) for farming operations. A significant number of local governments have established greenway programs within urban settings in order to maintain and protect riparian areas.

Water Supply Legislation in North Carolina

- **Water Supply Planning Law**
The Water Supply Planning law (G.S. 143-355 (l) and (m)) was adopted in 1989 and amended in 1993. It requires all local governments that supply or plan to supply water to prepare a local water supply plan. In their plans, local governments are to include present and projected population, industrial development and water use within the service area, present and future water supplies, an estimate of technical assistance needs and other information that may be required by the Department. All local plans are to be approved and submitted to DWR by January 1, 1995. Information in those local plans is to be included in a State Water Supply Plan. The State Plan will also investigate the extent to which the various local plans are compatible.
- **Registration of Water Withdrawals and Transfers Law**
The Registration of Water Withdrawals and Transfers law (G.S. 143-215.22H) requires any person who withdraws or transfers 1 MGD or more of surface water or groundwater to register the average daily and maximum daily withdrawal or transfer with the Environmental

Management Commission (EMC). The law also provides that if a local government has an approved local water supply plan on file with DWR, it does not have to register that withdrawal, thereby reducing duplication of effort by local governments that otherwise would be subject to both laws. In addition, the law includes a 5-year renewal requirement, which will ensure that the data is regularly updated.

- **Regulation of Surface Water Transfers Act**

In 1993, the legislature adopted the Regulation of Surface Water Transfers Act (G.S. 143-215.22I et seq.). This law was designed to regulate large surface water transfers by requiring a certificate from the EMC and by repealing several other laws that had previously affected interbasin transfers. The law applies to anyone initiating a transfer of 2 MGD from one river basin to another and to anyone increasing an existing transfer by 25 percent or more if the total transfer is 2 MGD or more. Applicants for certificates must petition the EMC and include a description of the transfer facilities, the proposed water uses, water conservation measures to assure efficient use and any other information desired by the EMC. A certificate will be granted for the transfer if the Commission concludes that the overall benefits of the transfer outweigh its detriments. The Commission may grant the petition in whole or in part, or deny it, and it may require mitigation measures to minimize detrimental effects. The law also provides for a \$10,000 civil penalty for violating various statutes.

- **Capacity Use Act**

DWR administers the Capacity Use Act (G.S. 143-215.11 et seq.), which allows the EMC to establish a Capacity Use Area where it finds that the use of ground water, surface water or both requires coordination and limited regulation. If after an investigation and public hearings a Capacity Use Area is designated, the EMC may adopt regulations within the area, including issuance of permits for water users. In the near future, DWR plans to review the rules for implementation of the Capacity Use statute and develop a model of the aquifer system, in coordination with the Groundwater Section of DWQ, for Capacity Use Area 1, which was created to regulate surface water and ground water withdrawals in an area surrounding Texasgulf, Inc. in Aurora, N.C. A new ground water flow model will be used to simulate Capacity Use Area 1 as a basis for permitting withdrawals.

- **Dam Safety law**

The Dam Safety law (G.S. 143-215.24) was amended in 1993, and rules are being developed for implementation of these amendments. Among the changes, the amendment defines "minimum stream flow" as a quantity and quality sufficient in the judgment of the Department of Environment, Health and Natural Resources (DEHNR) to meet and maintain stream classifications and water quality standards established by DEHNR and to maintain aquatic habitat in the affected stream length.

The Dam Safety Law applies to dams that are 15 feet or more high or with impoundment capacity of 10 acre feet or more. The law requires that the EMC adopt rules specifying minimum stream flow in the length of the stream affected by a dam and sets specific parameters for minimum stream flow for dams operated by small power producers that divert water from 4,000 feet or less of a natural stream bed and return the water to the same stream.

Section 319 Nonpoint Source Management and Other Programs

- **Section 319**

Clean Water Act Section 319(h) grant monies are made available to the states on an annual basis by EPA. Agencies in the state that deal with NPS problems submit proposals to DWQ each year for use of these funds in various projects. Projects that have been funded in the past include BMP demonstrations, watershed water quality improvement projects, data management, educational activities, modeling, stream restoration efforts, riparian buffer

establishment, and others. North Carolina DWQ established a Workgroup process in 1995 for prioritizing and selecting projects from the pool of cost-share proposals for inclusion in its annual application to EPA. DWQ staff first reviews proposals for minimum 319 eligibility criteria such as:

- support state Program milestones;
- address targeted, high priority watersheds;
- provide sufficient cost-share match (40% of project costs);
- propose adequate time periods;
- identify measurable outputs;
- use compatible GIS products with those of the state; and
- make commitment for educational activities and a final report.

Workgroup members separately review and rank each proposal which meets the minimum 319 eligibility criteria. The Workgroup consists of representatives from the state and federal agencies that deal with NPS issues, including agricultural, silvicultural, on-site wastewater, mining, solid waste and resource protection. In their review, members consider such factors as: technical soundness; likelihood of achieving water quality results; degree of balance lent to the state Program in terms of project type; and competence/reliability of contracting agency. They then convene to discuss individual projects' merits, to pool all rankings and to arrive at final rankings for the projects. All proposals that rank above the funding target are included in the annual grant application to EPA, with DWQ reserving the right to make final changes to the list. Actual funding depends on approval from EPA and yearly Congressional appropriations.

• **Use Restoration Waters**

The North Carolina Division of Water Quality is currently developing the Use Restoration Waters (URW) program to restore surface waters to their designated uses. If adopted, this program will allow the state to work with local governments, businesses, and residents to develop management strategies appropriate for the area. In order to be effective, the URW program will include a mix of mandatory and voluntary programs. The voluntary and mandatory programs will be coordinated on a site-specific basis by DWQ and a group of stakeholders who have an interest in the impaired water body and associated watershed. In addition, the URW program will attempt to develop cooperative relationships among these agencies so that overlapping efforts can be consolidated and targeted to restore designated water body uses.

The URW Program will apply to polluted surface waters where the following conditions apply:

- ~~- Biological, physical and/or chemical data indicate the specific sources of pollution.~~
- A use attainment study indicates that the sources of pollution are not transitory.
- It is possible to control the sources of pollution by implementing appropriate management strategies under the existing authority of the North Carolina Environmental Management Commission (EMC), other state commissions, and local agencies or voluntary actions implemented by citizens and other groups.

Based on current water quality data, there are approximately 4,300 miles of freshwater streams (or about 1.4 percent of total miles) and about 40,000 saltwater acres (or about 2 percent of total saltwater acres) that would be potential candidates for URW consideration.

The restoration strategies developed under the URW Program will be site-specific to the watershed of the nonsupporting or impaired water body. DWQ and the stakeholders will coordinate each URW strategy with other agencies' programs to create a holistic approach to address the array of pollution problems in the watershed.

- **The Nonpoint Source (NPS) Team Process**

Successfully managing NPS pollution requires not only a knowledge of science and technology, but also an understanding of the local resources and economy. Although there are some general management guidelines, there is no single technique for controlling NPS pollution. The most efficient and effective NPS solutions will be site-specific. Formulating NPS solutions often requires cooperation between different interested parties. Each group that contributes to the NPS problem must be part of the solution.

DWQ will coordinate the HiwasseeNPS Team to include a wide variety of stakeholders interested in the basin. This team will take the lead in identifying NPS problems and implementing solutions. The NPS Team process is discussed below and in Chapter 7.

1. Coordinate the NPS Team.

DWQ's goal in forming the Hiwassee NPS Team is to choose predominantly locally-based members that represent the federal, local, and state agencies, local governments, industries, and citizens' groups that have interests and responsibilities pertaining to NPS pollution. DWQ will consult local groups to determine which interests should be represented on the team.

Once the NPS Team is formed, DWQ and the team will work as partners to identify, prioritize, and address the NPS problems in the basin. DWQ will offer information from the state's water quality monitoring program and its staffs' knowledge of technical and financial resources. The NPS Team will describe current NPS initiatives, identify priority NPS-impaired waterbodies, and analyze NPS issues and needs. One of the most important missions of the DWQ-NPS Team partnership is to foster coordination and cooperation between the basin's diverse interest groups and agencies. The eventual goal of the NPS Team is to create and implement Action Plans that will address priority *NPS-impaired waterbodies* and *NPS issues* as part of the basinwide planning process. The implementation schedule will be determined as the plans are developed.

2. Take inventory of the initiatives and programs in place to address NPS pollution.

Each member of the NPS Team will describe the existing initiatives and programs of the agency or group he/she represents. A list of these initiatives is included in the basinwide plan to show readers some of the potential resources for addressing their NPS problems (see Chapter 5). This effort will provide an opportunity for mutual education, understanding and coordination with other stakeholders. An important responsibility of the NPS Teams will be to assess whether existing initiatives and programs in the basin are successfully improving water quality.

3. Choosing the priority NPS-impaired waterbodies and NPS issues.

Since the NPS Team will not be able to address all of the *NPS-impaired waterbodies* and *NPS issues* in the basin, it will have to follow a system for prioritization. The NPS Team will use the following process to target NPS-impaired waterbodies and select NPS issues.

Selecting the Priority NPS-impaired Waterbodies

Within the guidelines described below, the NPS Team will select at least one NPS-impaired waterbody for which an Action Plan will be developed. More than one waterbody may be selected if time and resources allow. The goal of the Action Plan will be to restore the designated use of the selected waterbody using a comprehensive, site-specific, and coordinated approach. The Actions Plans will be a prime candidate for funding under the federal Section 319(h) program.

The NPS Team will use both primary and secondary criteria to select the *priority NPS-impaired waterbodies*. The primary criteria are (in order of importance):

- Highly-valued resource waters, such as High Quality Waters and Water Supplies I-IV, that have a demonstrated pollution problem.
- Monitored waters that have an overall use support rating of non-supporting.
- Monitored waters that have a use support rating of partially supporting but have a high predicted loading for one or more pollutants.
- Highly valued resource waters, such as High Quality Waters and Water Supplies I-IV, that are in need of protection.
- Monitored waters that have an overall use support rating of partially supporting.

DWQ will provide a list of waterbodies that meet the primary criteria to the NPS Team.

The secondary criteria for selecting the priority *NPS-impaired waterbodies* are:

- Waters that pose a potential threat to human health,
- Waters that are important for ecological reasons not reflected in their classification and use support ratings (such as endangered species, unique habitats, or significant biological resources),
- Waters that are highly eroded or have other evidence of serious erosion problems that are not reflected in the use support ratings,
- Waters that have experienced a recent, rapid decline in water quality, and
- Waters that have identifiable pollution sources and a high likelihood of successful restoration.

An NPS-impaired waterbody that meets the primary criteria as well as one or more of the secondary criteria listed above is a good candidate for prioritization by the NPS Team. However, the NPS Team may select a priority NPS-impaired waterbody that does not meet the primary criteria but meets *several* of the secondary criteria. This allows the team to select waters that DWQ did not monitor or waters for which the use support rating failed to describe the extent of the NPS problem.

Selecting the Priority NPS Issues

In order to address problems in the remaining NPS-impaired or threatened waterbodies (ones not prioritized for specific Action Plans), the following criteria will be used to target NPS issues throughout the basin:

- Issues that apply throughout a significant portion of the basin or address one or more impaired waters that were not selected as a *priority NPS-impaired waterbody*,
- Issues that have a clearly defined "problem" and "solution," and
- Issues that are within the team's ability to address through educational efforts, improved coordination between stakeholders, focused new initiatives, or involvement of additional stakeholders.

4. Determine what is needed to address the priority NPS-impaired waterbody and the NPS issues the team selects.

The NPS Team will decide which actions are likely to restore the priority NPS-impaired waterbodies and address the NPS issues. Some of the possible needs include:

- Public education. When water quality problems result from citizens' lack of knowledge about how their local actions affect water quality or from land use decisions, public education is a key component of the solution.

- **Implementation of best management practices (BMPs).** BMPs are structural or nonstructural management practices used to reduce nonpoint source inputs to receiving waterbodies in order to achieve water quality protection goals. Often higher levels of pollutant removal can be achieved by using a combination of different BMPs.
 - * Structural BMPs generally work by capturing, retaining, and treating runoff before it leaves an area. Some examples of structural BMPs include constructed wetlands and wet detention ponds in urban settings and controlled drainage on agricultural lands. Structural BMPs require regular maintenance.
 - * There are a variety of nonstructural BMPs. One nonstructural BMP is source reduction, which reduces the amount of pollutants that are introduced into the environment. Some types of source reduction are nutrient management plans for crop production and hazardous waste collection sites in urban areas. Another nonstructural BMP is maintaining natural drainageways to allow the vegetation and soil to cleanse runoff before it enters a waterbody.
- **Ecosystem restoration and management.** If a stream's ecosystem is badly damaged, removing pollutants alone will not always restore the water's uses. In cases like these, it will be necessary to restore the ecosystem through measures such as riparian revegetation and streambank stabilization.
- **Local water quality planning.** Development sites can be planned in order to reduce their risk of harming water quality. Some planning techniques include steering development towards less environmentally sensitive areas, using natural drainage systems rather than curb and gutter, and planning for development densities that allow for open space, greenways, and wildlife corridors.

5. Develop comprehensive Action Plans consisting of management strategies to address the priority NPS-impaired waterbody and the NPS issues.

The NPS Team members will work together to develop "Action Plans." These Action Plans will consist of a list of Action Items that form a coordinated, comprehensive effort to address each priority NPS-impaired waterbody and NPS issue. Each Action Item will include lead contacts, goals, and a schedule for completion and may utilize one or more of the following vehicles for implementation:

- **Efforts by NPS Team members:** The NPS Team members can make commitments to target their agency's/group's existing resources to address the priority NPS-impaired waterbody or NPS issues. Team members can also agree to share their expertise on a volunteer basis.
- **Section 319:** Clean Water Act Section 319(h) grant monies are made available to the states on an annual basis by EPA. Agencies in the state that deal with NPS problems submit proposals to DWQ each year for use of these funds in various projects. Projects that have been funded in the past include BMP demonstrations, watershed water quality improvement projects, data management, educational activities, modeling, stream restoration efforts, riparian buffer establishment, and others. Refer to Section 5.7 for a complete program description.
- **Agriculture Cost Share Program:** Provides a number of cost-share practices designed to solve soil, water, and related environmental problems in agricultural areas including forested buffer strips.
- **Wetlands Restoration Program.** A bill recently ratified by the NC General Assembly establishes a statewide Wetland Restoration Program that will provide a leadership role in targeting and consolidating all wetland and riparian area restoration initiatives in NC.
- **Proposed Use Restoration Waters (URW) Program.** DWQ is currently developing the URW program to restore surface waterbodies to their designated uses. If adopted, this program would allow the state to work with local governments, businesses, and residents to develop

focused management strategies appropriate for the area. Those affected by the URW program will be requested to meet well-defined milestones and goals for water quality improvement. If these milestones are not met on a voluntary basis within an established schedule, mandatory controls may be considered by the Environmental Management Commission.

- **Federal Initiatives:** There are a number of federal programs and resources that may be available to address the Priority NPS-impaired waterbody and NPS issues. These include US Fish and Wildlife Service funds, the USDA-NRCS Wetland Reserve Program, and the Environmental Quality Initiative Program (EQIP) provisions of the Farm Bill.
- **Other Programs:** There are numerous other programs sponsored by private and state agencies that could be initiated to address the NPS Team's priority waterbodies and issues. Some of these programs include corporate funding for educational programs, the Small Watershed Program, and US Fish and Wildlife Grants. A complete list of funding sources for NPS pollution is listed in Appendix VIII.

6. Implement Action Plans.

Implementation is the most important part of the state's NPS program since it is the only way to restore the priority NPS-impaired waterbody and address NPS issues. Most, if not all, members of the NPS Team will be involved with the implementation of one or more of the Action Items. During the implementation phase, the NPS Team will continue to meet on a regular basis. The purpose of these meetings will be for the team to update each other on their progress toward completing the Action Items and provide a forum for continuing the coordination between team members. When some of the team members experience setbacks in implementing an Action Item, the rest of the team can advise and/or provide additional help so that the item can be completed successfully.

7. Monitor to evaluate the effectiveness of management strategies.

The NPS Team will identify where additional water quality monitoring sites may be needed to document the effectiveness of its Action Plans. DWQ and the NPS Team will cooperate to assure that pre- and post-monitoring is in place before a new program, initiative or BMP is implemented. In order to supplement DWQ's monitoring programs, the team may seek the involvement of citizens' groups. Any agencies that receive 319 grants will be required to conduct pre- and post-evaluations as a part of their project.

8. Consider additional management strategies if the voluntary approaches do not result in an improvement in water quality.

If the NPS Team's management strategies do not show progress in improving water quality according to the designated schedule, DWQ and the team will work together to identify the reason for the lack of progress. Some of the potential courses of action are:

- Reevaluate the source of impairment.
- Increase and/or redirect voluntary measures.
- Consider additional measures.